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IBM AS/400 V3R1: Managing AS/400 Networks with Operations Control Center/400

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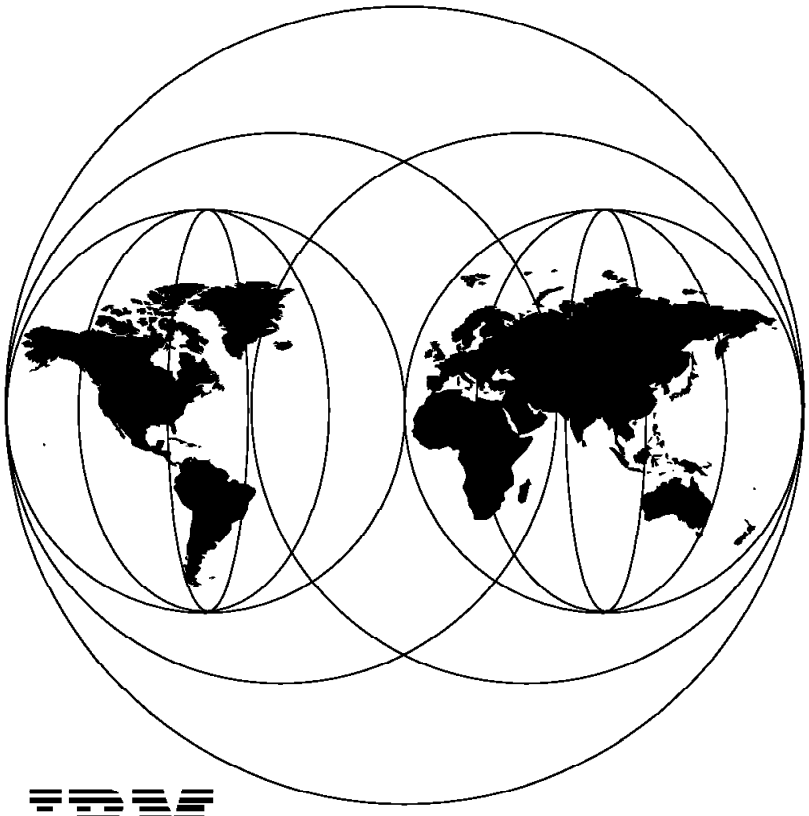

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Take Note!

Before using this information and the product it supports, be sure to read the general information under "Special Notices" on page xix.

Second Edition (February 1996)

This edition applies to Version 3 Release 1 and Version 3 Release 1 Modification 1 of IBM SystemView System Manager/400 (5763-SM1) and Managed System Services/400 (5763-MG1) for use with Version 3 Release 1 of OS/400.

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Abstract

This document describes the use of IBM System Manager/400 centralized management functions for networks of AS/400 systems. It provides multiple examples of how to use System Manager/400 and Managed System Services/400 distribution, operations, change, problem, and user profile management functions. The book presents practical scenarios common to all AS/400 networks and explains how system management solutions can be implemented using System Manager/400 and Managed System Services/400. The diskettes included with this publication contain the sample programs.

The new edition of this document includes the Graphical User Interface added to System Manager/400 in V3R1M1 and provides tips and techniques for installation and use by the central network administrator or operator.

Security and auditing considerations are also discussed in this edition.

This document is intended for network administrators, independent software vendors, and IBM representatives who need to know or advise others in managing AS/400 networks. Basic knowledge of System Manager/400 and Managed System Services/400 is useful to the reader.

(479 pages)

Contents

Figures

Tables

Special Notices

This publication is intended to help network administrators, independent software vendors, and IBM representatives to understand the use, positioning, and product integration of *IBM System Manager/400* and *Managed System Services/400*. The information in this publication is not intended as the specification of any programming interfaces that are provided by *IBM System Manager/400* and *Managed System Services/400*. See the PUBLICATIONS section of the IBM Programming Announcement for *IBM Operations Control Center/400* for more information about what publications are considered to be product documentation.

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Preface

The purpose of this document is to provide guidelines and examples for the implementation of *IBM System Manager/400* and *Managed System Services/400* in centralized distribution, operations, change, problem, and user profile management of networks of AS/400 systems.

This document is intended for network administrators, business partners, and IBM representatives who design and implement system management solutions for networks of AS/400 systems. This document is based on a series of practical scenarios for automation of change, distribution, operations, and user profile tasks. Simple examples are provided to allow the beginning reader to become more familiar with the product; more complex scenarios illustrate the use of the advanced function of Operations Control Center/400.

How This Document is Organized

The document is organized as follows:

- Chapter 1, “Introduction”

  This chapter provides an overview of all of the features and functions available with the Operations Control Center/400 integrated offering and its products: *IBM System Manager/400* and *Managed System Services/400*.

- Chapter 2, “Configuring Operations Control Center/400 for Distribution and Remote Operations”

  This chapter describes the installation and configuration of the sample network used in this document.

- Chapter 3, “Using Fast Path Commands for Distribution Activities”

  This chapter introduces the concept of fast path commands and provides examples of their use.

- Chapter 4, “Using CRQD for Complex Remote Operation Scenarios”

  This chapter describes how to use change request descriptions and provides implementation examples.

- Chapter 5, “Using the Distribution Repository and Global Naming”

  This chapter provides examples of Operations Control Center/400 distributions using the distribution repository, global names, and the distribution catalog.

- Chapter 6, “Security and Auditing Considerations”

  This chapter gives examples on how to implement security on both the central site and the managed systems and provides guidance on how to audit the use of System Manager/400 and Managed System Services/400.

- Chapter 7, “Using the Graphical User Interface”

  This chapter discusses the functions and facilities introduced with the graphical user interface in V3R1M1 and V3R6.

- Chapter 8, “National Language Support Considerations”

This chapter provides special considerations that apply when using remote commands in a network where the central site system and the managed systems have different national languages installed.

- Chapter 9, “Comparing Operations Control Center/400 and the System Management Tools PRPQ”

  This chapter describes how to implement SMT-equivalent functions using Operations Control Center/400.

- Chapter 10, “Problem Determination”

  This chapter provides a practical example of how to do problem determination when using Operations Control Center/400.

Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this document.

- *System Manager/400 Use*, SC41-3321
- *Managed System Services/400 Use*, SC41-3323
- *Communications Configuration*, SC41-3401
- *APPN Support*, SC41-3407
- *SNA Distribution Services*, SC41-3410
- *Work Management Guide*, SC41-8078
- *Query/400 User's Guide*, SC41-9614
- *SQL/400 Query Manager User's Guide*, SC41-0037
- *System Application Programming Interface Reference*, SC41-3801
- *Network and System Management*, SC41-3409
- *AS/400 CL Reference*, SC41-3722
- *OS/400 Central Site Distribution V3R1*, SC41-3308
- *Systems Management Tools Guide*, SC41-8257
- *National Language Support*, SC41-3101

International Technical Support Organization Publications

- *Communications Definitions Examples*, GG24-3449
- *Communications Definitions Examples Volume 2*, GG24-3763
- *AS/400 V2R3: Software Life Cycle Management with ADM/400 and SystemView System Manager/400*, GG24-4187

A complete list of International Technical Support Organization publications, with a brief description of each, may be found in:

International Technical Support Organization Bibliography of Redbooks, GG24-3070.

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To obtain more details about this service, employees may type the following:

TOOLS SENDTO USDIST MKTTOOLS MKTTOOLS GET LISTSERV PACKAGE

Note: INEWS users can select RelInfo from the action bar to execute this command automatically.

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Chapter 1. Introduction

Operations Control Center/400, an integrated offering, was introduced in V3R1. It consists of two separately orderable licensed programs: IBM SystemView System Manager/400 (5763-SM1) and Managed System Services/400 (5763-MG1). Together, they enable you to manage AS/400 systems, PS/2s, and RISC System/6000s from a central site system. The central site system can be an AS/400 system or a System/370 with NetView Distribution Manager for MVS V1R5 installed.

The offering was further enhanced in V3R1M1 and V3R6 with additional function and a graphical user interface to some facilities.

Both System Manager/400 and Managed System Services/400 are SystemView-compliant products. They provide you with change, operations, and problem management functions. In this chapter, we briefly describe those functions from a few different points of view: historical, SystemView, technical, and functional.

Overview of Operations Control Center/400

Operations Control Center/400 is an integrated offering that consists of two licensed programs:

- SystemView System Manager/400 (5763-SM1)
- SystemView Managed System Services/400 (5763-MG1)

SystemView System Manager/400

SystemView System Manager/400 (5763-SM1) allows a central AS/400 system to act as the point of control for other AS/400 systems in the network. The central site AS/400 system now has the capability to perform problem management for distributed AS/400 systems. SystemView System Manager/400 also provides the capability to perform change and operations management together with SystemView Managed System Services/400.

Problem Management

System Manager/400 enables you to perform the following problem management tasks for all managed AS/400 systems:

- Detecting problems
- Receiving problems
- Analyzing problems
- Answering problems
- Working with the problem log

A central site system acts as a single network connection point, referred to as a service provider, for providing electronic customer support. A service provider manages requests for ordering program temporary fixes (PTFs) and maintenance for managed systems or service requesters. If a central site system does not have the requested PTF, the request is forwarded to the IBM electronic customer support functions.

Service requesters can also send a problem log entry to a service provider. That requester's log is put into the central problem log. The central problem log is easily searched to view problems based on the originating site, problem type, and other relevant parameters. It improves administrative control by maintaining problem records for the entire network at the central site. Note that System Manager/400 is required only on a central site AS/400 system, and Managed System Services/400 is not necessary for any AS/400 system to perform the preceding problem management tasks.

Change Management

System Manager/400 provides you with the capability of packaging non-IBM products, managing PTFs, sending, retrieving, or deleting objects.

Packaging Non-IBM Products: Product packaging function enables you to make your application programs into a packaged product that is installed and maintained in the same manner as the IBM licensed products. Once your application has been packaged as a product, you can manage all of the objects for that application as a single entity. That is, all of those objects are installed with one Restore Licensed Program (RSTLICPGM) command, saved with one Save Licensed Program command (SAVLICPGM), and deleted with one Delete Licensed Program (DLTLICPGM) command.

The Display Software Resources (DSPSFWRSC) allows you to create a database file with information on each installed licensed program at a certain AS/400 system that is used as a software inventory provided all of your applications are packaged as licensed programs.

You can create PTFs for a packaged product using the Create PTF (CRTPTF) command. They are applied and removed using the Apply PTF (APYPTF) and Remove PTF (RMVPTF) commands respectively. You can also track the products installed on your systems (software inventory) using the Display Software Resource (DSPSFWRSC) command. All of the management functions discussed in this section are performed centrally through a communication line. This includes the capability to send and receive products and PTFs through a communication line as well as with tape media.

Software license management function assists you in managing the terms and conditions of packaged products available under the user-based, one-time charge option.

Managing PTFs: PTF managing activities that are done through a communication line include the following:

- Send PTF
- Retrieve PTF
- Apply PTF remotely
- Remove PTF remotely
- Delete PTF remotely

The Add Program Temporary Fix Change Request Activity (ADDPTFCRQA) command enables you to schedule PTF management tasks. The schedule is set based on either the time zone of each managed system location, or the time zone of the central site system. If the PTFs require an IPL, you can also schedule it on remote systems using the Add Resource Change Request Activity (ADDRSCCRQA) command.

Operations Management

System Manager/400 enables you to remotely run commands and programs using change requests or fast path distribution commands to remote AS/400 systems with Managed System Services/400 installed.

It also enables you to be notified of alerts and problem records received at the central site AS/400 system and to respond to them with replies or diagnostic commands.

For more information about SystemView System Manager/400, refer to *System Manager/400 Use*, SC41-3321.

User Profile Management

System Manager/400 enables you to collect user profile information from all of the AS/400 systems with Managed System Services/400 installed and to maintain a user profile database at the central site AS/400 system.

Using the graphical user interface, you can inquire on the database and maintain user profiles network wide.

Topology Management

System Manager/400 enables you to collect information about all of the AS/400 systems in an APPN network and clients such as PCs and RISC System/6000s managed by those AS/400 systems. A topology database is maintained at the central site AS/400 system.

SystemView Managed System Services/400

The SystemView Managed System Services/400 licensed program (5763-MG1) enables an AS/400 system to be managed from the System/390 NetView Distribution Manager (DM) for MVS or AS/400 system with System Manager/400 and Managed System Services/400 installed in SNA-based networks. NetView DM or the combination of System Manager/400 and Managed System Services/400 provides centralized control of the distribution of objects to AS/400 systems with SystemView Managed System Services/400 installed. SystemView Managed System Services/400 provides support for receiving, sending, and installing AS/400 objects such as programs, files, libraries, folders, documents, save files, PTFs, and so forth on an AS/400 system.

SystemView Managed System Services/400 also can receive and run commands from either the NetView Remote Operation Manager MVS/ESA or an AS/400 system with SystemView System Manager/400 and SystemView Managed System Services/400 installed. The functions of SystemView Managed System Services/400 are:

- Enabling central site control of distribution, installation, and management of objects.
- Sending, applying, deleting, and removing PTFs.
- Running commands and programs.
- Performing IPLs.

SystemView Managed System Services/400 must be installed on all AS/400 systems that participate in the network managed with Operations Control Center/400 or NetView DM.

Note that the AS/400 system now can be a central site system not only for other AS/400 systems but also for RISC System/6000s and PS/2s by using both SystemView System Manager/400 and SystemView Managed System Services/400.

For more information about SystemView Managed System Services/400, refer to *Managed System Services/400 Use*, SC41-3323.

Evolution of Operations Control Center/400

Operations Control Center/400 is a new, integrated offering in OS/400 V3R1M0 that has evolved from earlier systems management offerings and OS/400 functions.

OS/400 V1R3M0

- System Management Utilities (5730-SM1)

  This product was announced for OS/400 V1R3M0. It enabled central control and management of reporting, problem tracking, remote problem analysis, and problem resolution (PTFs) for AS/400 systems.

  – PTF management

    This function allowed for the request of PTFs by the remote sites to the central site through the Send PTF Order command (SNDPTFORD). The PTF data base at the central site was automatically searched when the service request was received. If a match was found, the PTF or PTFs were then automatically sent to the remote site for installation.

  – Central problem log

    Problem records were kept for the entire network at the central site. When an alert was received from a remote site, the central site automatically generated a problem record or had a problem record generated after remote problem analysis was complete. Once this problem record was generated, it was updated at each step through the process of managing the problem through completion, giving a chronology of the problem. This central problem log was searched to view problems based on the originating site, problem type, and other relevant parameters.

  – Remote problem analysis

    When an alert or problem was received at the central site, the operator was given the option of performing problem analysis. If this option was taken, the operator would transparently log on to the remote system and start problem analysis at the remote system. When this problem analysis was complete, the problem record contained more details including possible causes and symptom search strings. This information was then forwarded to another higher level central site or to IBM for hardware or software service.

  – Operator notification of incoming alert/request

    The network operator or system operator could be notified of all incoming alerts, PTF orders, and service requests from remote locations.

OS/400 V2R1M1

- SystemView System Manager/400 (5738-SM1)

  Systems Management Utilities was renamed to SystemView System Manager/400 (5738-SM1) with the announcement of OS/400 V2R1M1. It became the base for the delivery of centralized systems management functions on the AS/400 system. It was enhanced to handle defective and HIPER PTFs. With the announcement of V2R1M1, the AS/400 system had the capability to provide function in all six of the SystemView disciplines in combination with OS/400, SM/400, and other licensed programs.

OS/400 V2R2M0

- SNA management services transport APIs

  These APIs were announced with OS/400 V2R2M0. They provided the potential to enhance the support and functions provided by SystemView System Manager/400, especially by the addition of other platforms.

  SNA management services transport functions were used to support sending and receiving management services data between systems in an SNA network. The network can include AS/400 systems, OS/2, and NetView licensed programs as well as other platforms that support SNA management services architecture.

  The SNA management services functions provided in OS/400 V2R2M0 included:

  - Transporting network management data in APPN networks.
  - Maintaining node relationships for network management.

  Some examples of IBM applications that used SNA management services transport APIs are:

  - Alerts
  - Problem reporting
  - Remote problem analysis
  - PTF ordering

- Product packaging capability

  In V2R2, IBM SystemView System Manager/400 added product packaging capability. It allowed you to package user-written application programs as a product so that those programs were installed and maintained in the same way as IBM licensed programs.

- NetView Remote Operations Agent/400 (5733-165)

  NetView Remote Operations Manager MVS/ESA and IBM NetView Remote Operations Agent/400 provided the NetView operator with the ability to easily issue AS/400 commands from NetView to an AS/400 system using the architected OPERATE command. Prior to the introduction of these products, AS/400 systems had the capability of sending alerts to the NetView Alerts Dynamic display. However, the NetView operator had no ability to take action to resolve the problem easily. The operator had to use one of the following methods to log on to an AS/400 system:

  - Host Command Facility (HCF)
  - Network Routing Facility (NRF)

- SNA Primary LU Services (SPLS)

Having done that, the operator had to issue the appropriate commands to resolve the problem, log off, and bring down the display station session. With IBM NetView Remote Operations Manager MVS/ESA and IBM NetView Remote Operations Agent/400, the NetView operator was able to easily issue AS/400 commands from NetView to an AS/400 system without logging on to the AS/400 system.

IBM NetView Remote Operations Manager MVS/ESA ran under NetView with command processor and command support. IBM NetView Remote Operations Agent/400 runs on the AS/400 system to catch requests coming from NetView, see that they are correctly directed for processing, perform the command, and correlate the correct response with each request.

OS/400 V2R3M0

- Managed System Services/400 (Agent) (5738-MG1)

  Managed System Services/400 provided support to enable AS/400 systems to be managed remotely from a S/390 with the NetView Distribution Manager for the MVS licensed program, or by other systems in an SNA network that support the SNA/Management Services architecture. This support allowed a central site to control distribution, installation, and management of AS/400 objects, thus enabling unattended, remote operations.

  Managed System Services/400 included new, automated functions for managing and installing objects on an AS/400 system. These functions included receiving system and user objects on an AS/400 system, logging the object arrival in a local repository, and reporting the arrival to the sending system for correlation and confirmation. Managed System Services/400 provided both object retrieval and deletion support, thus enabling easier control of software resources from a central site system. It performed the following functions under the direction of the central site:

  - Send, retrieve, and delete AS/400 objects, documents, libraries, folders, PTFs, files, and programs.
  - Apply and remove PTFs.
  - Run programs.
  - Perform an IPL.

  Managed System Services/400 used LU6.2 support which enabled it to take advantage of APPC/APPN functions for routing, error recovery, and compression. It supported multiple, simultaneous activities on the managed system (for example, running a program and applying a PTF).

  Managed System Services/400 provided intermediate node functions to reduce transmission overhead on the controlling system by a fan-out capability to other nodes in the network. The central system needed to send only a single object for distribution and a list of nodes to which the object is distributed. The object and the associated node list are distributed to OS/2 systems using NetView Distribution Manager/2 or other AS/400 systems.

- SNA/DS *SVDS Distribution Queue (5738-SS1)

  SNA Distribution Services within OS/400 V2R3M0 was enhanced to allow the creation of an *SVDS Distribution Queue to enable an AS/400 system running MSS/400 to distribute objects to a host system running NetView DM.

OS/400 V3R1M0

- Operations Control Center/400

  IBM SystemView Operations Control Center/400 provides a comprehensive set of centralized management functions for networks of systems. It includes distribution management and NetView remote operations functions for the AS/400 system. The Operations Control Center/400 offering consists of the strategic AS/400 products that provide the problem, change, and operations functions described in IBM's SystemView structure.

  IBM SystemView Operations Control Center/400 offers you a set of products that work together to provide efficient centralized control of operations of systems in a distributed network. The products included are:

  - **IBM SystemView System Manager/400** for central site AS/400 systems that are managing other systems.
  - **IBM SystemView Managed System Services/400** for remote AS/400 systems that are being managed.

  Operations Control Center/400 provides distribution management functions for the AS/400 system as a member of the NetView Distribution Manager family. AS/400 objects, such as programs, commands and files, and non AS/400 objects, such as PC files and programs, are distributed throughout SNA (APPN) and TCP/IP networks. The user can run remote programs and can remotely IPL systems. All of the results are returned to the central site system for monitoring and tracking. Network-wide job schedules are implemented by specifying when functions are to be run on the systems.

  Operations Control Center/400 also provides NetView remote operations functions for the AS/400 system. Commands can be sent to one or more remote systems to run. Messages, spooled file data, and output file data resulting from running commands are returned.

  Note: OUTFILE data is only returned when using the Send Remote Command (QCQSRCMD) API interface that is packaged in Managed System Services/400 Passwords are supported without requiring users to sign on to remote systems.

  Software management support in Operations Control Center/400 includes packaging, electronic distribution, installation, and application software license management.

  Operations Control Center/400 provides centralized problem management support, including support for problem notification, a central problem log, remote problem analysis, and fix identification, creation, distribution, and installation.

  The Operations Control Center/400 products interoperate with a variety of products including NetView Distribution Manager for MVS, NetView Distribution Manager/2, NetView Distribution Manager/6000, and NetView Remote Operations Manager MVS/ESA. This enables the AS/400 system to manage other systems or to be managed in a network of mixed systems.

OS/400 V3R1M1 and V3R6

- Operations Control Center/400 Graphical User Interface

  Operations Control Center/400 is enhanced in V3R1M1 and V3R6 to provide a graphical user interface (GUI) to some existing and additional functions of the System Manager/400 component.

  Remote commands are now defined and initiated from the GUI. Results returned from remote systems are consolidated and viewed at the GUI. This command support applies to both remote AS/400 systems and remote clients.

  Centralized problem management is enhanced by the ability for a central site operator to be notified at the GUI of alerts and problem records received from managed AS/400 systems. The operator is able to reply to a received alert or to perform further problem analysis directly from the notification record received at the GUI.

  Powerful new function is added for centralized user profile management. A database of all user profiles on AS/400 systems throughout the network are collected and maintained at the central site AS/400 system.

  Inquiries are defined, based on criteria such as profile name, system name and user class, and run against the user profile database. User profiles can be added, copied, changed, and deleted centrally for any or all of the AS/400 systems in the network, allowing a new level of coordination and consistency.

  Centralized topology management is added. This enables information to be collected and maintained for all of the AS/400 systems in an APPN network (with or without OS/400 V3R1 or later installed) and clients, such as PCs and RISC System/6000s, managed by AS/400 systems with V3R1 or later installed. This topology information is used by other GUI-delivered functions such as alert/problem notification as well as providing information such as contact details to the central site operator.

Functional Comparison between V2R3 and V3R1 Onwards

As mentioned in “Evolution of Operations Control Center/400” on page 4, many functions implemented in Operations Control Center/400 have evolved since V1R3 of OS/400. This section briefly overviews the latest enhancements made in V3R1.

Table 1 on page 9 shows the functional differences between V2R3 and V3R1 of IBM SystemView System Manager/400 (SM/400) and Managed System Services/400 (MSS/400).

Enhanced functions in V3R1 are:

- Support of the AS/400 system as a managing system.
  - Distributing and retrieving objects.
  - Sending, retrieving, and installing a packaged product over a communication line.
  - Sending, retrieving, applying, removing, and deleting PTFs over a communication line.
  - Executing remote commands and programs.

- Support of RISC System/6000 and PC as a managed system.

Further enhancement in V3R1M1 and V3R6 is a graphical user interface for:

- Topology management of AS/400 systems and clients.
- Alert and problem notification from managed AS/400 systems.
- Execution of remote commands and programs on AS/400 systems and clients.
- Adding, copying, changing, deleting, and inquiring on AS/400 user profiles across the network.

As you can see in the comparison table, these functional enhancements mainly cover operations, problem, and change management tasks as well as business management in respect of security and topology information.

Table 1. SM/400 and MSS/400 V2R3 Versus V3R1 Versus V3R1M1/V3R6 Functions

Task	**SM/400**			**MSS/400**		
	V2R3	**V3R1**	**V3R1M1/ V3R6**	**V2R3**	**V3R1**	**V3R1M1/ V3R6**
Operations Management						
Distribute Files	N	4	4	1	Y	Y
Remote IPL	N	4	4	1	Y	Y
Track Requests	N	Y	Y	-	-	-
NetView RO Manager for MVS/ESA	-	-	-	2	Y	Y
Run Remote Command/Program	N	Y	Y	-	Y	Y
Problem Management						
Receive Alertable Messages	5	5	Y	3	3	3
Reply to Alertable Messages	N	N	Y	6	Y	Y
Report Remote Problems	Y	Y	Y	3	3	3
Track Problems	Y	Y	Y	3	3	3
Remote Problem Analysis	Y	Y	Y	3	3	3
Change Management						
Package Products	Y	Y	Y	-	-	-
Package Prod for Distribution	-	-	-	N	Y	Y
License Management Command	Y	Y	Y	-	-	-
Distribute PTFs	4	Y	Y	1	Y	Y
Distribute Products	N	Y	Y	1	Y	Y
Install Products Remotely	N	Y	Y	N	Y	Y
Load/Apply PTFs Remotely	N	Y	Y	1	Y	Y
Business Management						
Maintain Central User Profile Database	N	N	Y	N	N	Y
Perform Centralized User Profile Inquiries	N	N	Y	N	N	Y
Add, Copy, Change, Delete User Profiles Centrally	N	N	Y	N	N	Y
Discover Topology - AS/400 Nodes	N	N	Y	7	Y	Y
Discover Topology - Downstream PCs	N	N	Y	N	8	8

Notes:

1. SystemView Managed System Services/400 only provided these functions to NetView DM for MVS V1R5.
2. NetView Remote Operations Agent/400 V2R2 and V2R3 run commands received from NetView Remote Operations Manager MVS/ESA. With OS/400 V3R1M0, both SystemView Managed System Services/400 and NetView Remote Operations Agent/400 can receive commands from either NetView Remote Operations Manager MVS/ESA *or* SystemView System Manager/400 V3R1M0.
3. Service requester support is included in OS/400 to route problems to the service provider with SystemView System Manager/400 installed. Alert support is also provided by OS/400 independently of either Managed System Services/400 or SystemView System Manager/400.
4. In releases prior to OS/400 V3R1M0, the SNDPTF command can only send PTFs to remote systems. In OS/400 V3R1M0, the SNDPTF command can request that PTFs be applied at a specified time after PTFs are sent. It can also request execution of an IPL on remote systems at a specified time.
5. It is received at the AS/400 system but not managed by System Manager/400.
6. It is available by PTF.
7. This has limited information only. The system must be in same network, either as network node or as end node attached to a V3R1 or later network node.
8. This applies only if it is attached to a V3R1 or later network node.

Network of Operations Control Center/400

Figure 1 shows an example of the network of Operations Control Center/400.

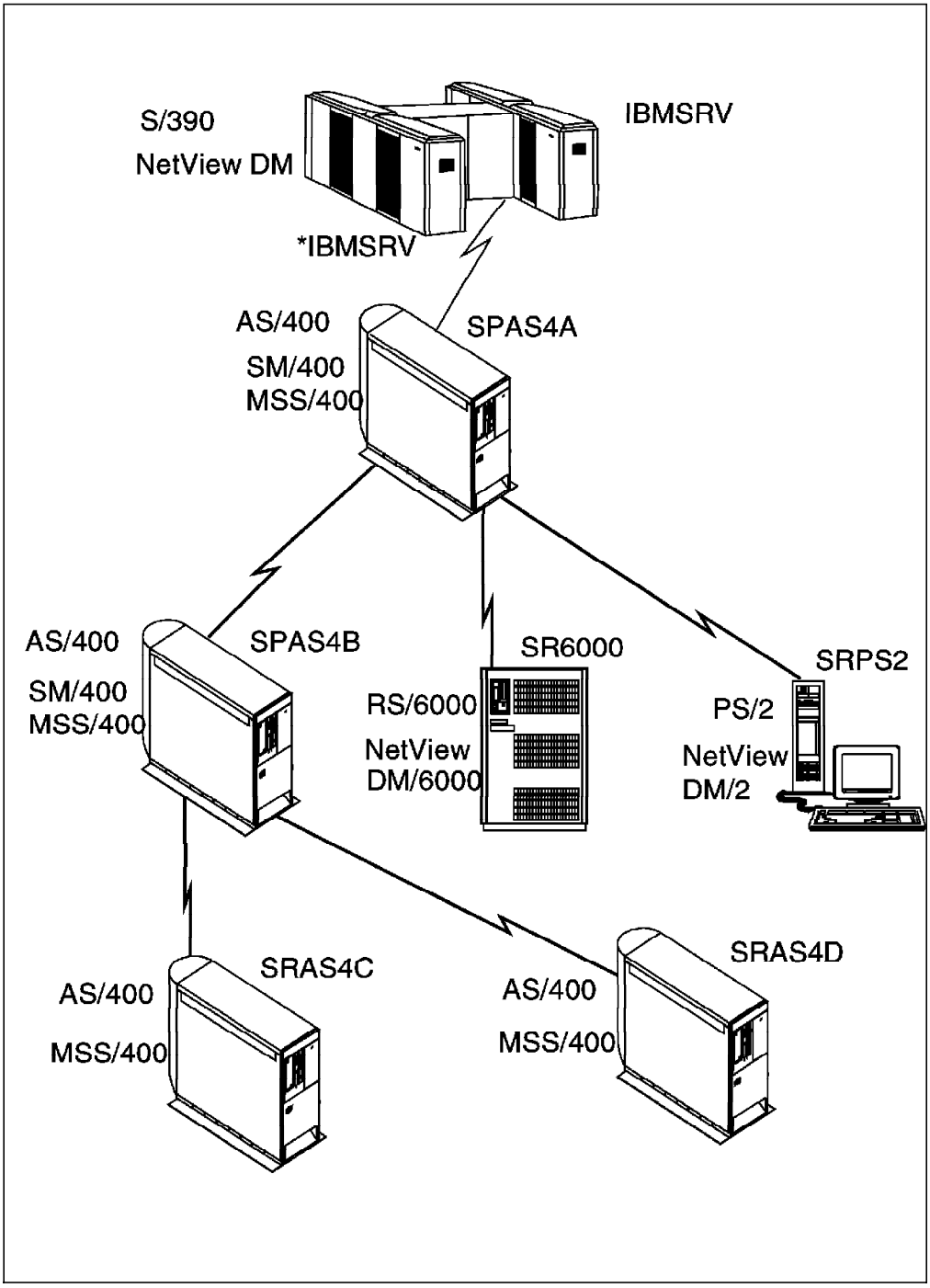


Figure 1. Operations Control Center/400 Sample Network

Four types of entities exist in an Operations Control Center/400 network.

1. Central site system

   A central site system is a system in the network that controls the network operations. A central site system can be:

- An AS/400 system with System Manager/400 V3R1 or later and Managed System Services/400 V3R1 or later installed. System Manager/400 V3R1M1 or V3R6 is required for the GUI.
- A host system with NetView DM/MVS V1R5 installed.

2. Managed system

   A managed system is a system that is managed by operators at the central site. A managed system can be:

   - An AS/400 system with Managed System Services/400 V2R3 or later installed. Managed System Services/400 V3R1 or later is required for full support of the GUI-delivered functions.
   - A RISC System/6000 with NetView DM/6000 installed.
   - A PC with NetView DM/2 installed.

3. Service provider

   A service provider is a central site system that handles all of the problems for the network. An AS/400 system and an IBM service support system can be the service provider. System Manager/400 is mandatory for the AS/400 system to be a service provider. The AS/400 system must be configured as service provider with the Change Service Provider Attributes (CHGSRVPVDA), Work with Service Requesters (WRKSRVRQS), and Work with Supported Products (WRKSPTPRD) commands.

   Multiple service providers can exist in a network and form a hierarchical support structure.

4. Service requester

   A service requester is any AS/400 system in the network that has a problem and requires service from a service provider. OS/400 provides this function. Therefore you do not need to install any additional licensed products. However, an AS/400 service requester must specify its service provider system or systems with the Work with Service Providers (WRKSRVPVD) command and must be registered on a service provider system as a service requester with the Work with Service Requesters (WRKSRVRQS) command.

The concept of service provider and service requester closely relates to problem management and change management tasks. The concept of the central site system and managed system basically applies to operation management tasks. Although the concept of the service provider and service requester does not limit service platforms, only an AS/400 system or an IBM service system can be a service provider, and only an AS/400 system can be a service requester in the context of Operations Control Center/400. You must configure each AS/400 system in a network as a service provider or a service requester to use problem and change management functions provided by System Manager/400.

Managed System Services/400 provides you with functions to transfer objects between a central site system and managed systems. Those functions are based on SNA such as SNA MS Transport, SNA Files Services, and SNA Distribution Services. However, thanks to AnyNet/400 support, System Manager/400 and Managed System Services/400 can work over a TCP/IP network as well as an SNA network.

Although it is not explicitly shown in Figure 1 on page 11, Operations Control Center/400 can manage NetView DM/6000 and NetView DM/2 change control

clients (CC clients) through the corresponding change control servers (CC servers) attached to the central site AS/400 system. For example, you can install a product for Windows CC clients and activate the product from a central site AS/400 system through a PS/2 running NetView DM/2 CC server support. Discussion of how to manage CC clients using Operations Control Center/400 is beyond the scope of this book. For details about this topic, refer to *AS/400 V3R1: Software Management for PC Clients*, GG24-4371.

Remote Operation

In V3R1, the AS/400 system has two aspects with regard to remote operation: the AS/400 system as a central site system and the AS/400 system as a managed system.

AS/400 System as a Central Site System

SystemView Managed System Services/400 in conjunction with SystemView System Manager/400 enables the AS/400 system to send and run commands and programs on managed systems. In this case, a managed system can be an AS/400 system with SystemView Managed System Services/400 installed, RISC System/6000 with NetView DM/6000 installed, or PS/2 (or PS/55) with NetView DM/2 installed.

Remote operation function provides you with a capability similar to the display station passthrough in terms of executing commands and programs on a remote system. However, there are a few differences between the two:

- Remote operation function can work with multiple systems simultaneously. That is, you have to type a command, or send it from the GUI only once, and the command is distributed to all designated systems and processed.
- You can get the results of executing a command from each managed AS/400 system in a consolidated form regardless of the output type: spooled file, output file, or user space.

Notes:

1. If you want to receive an output file or user space as a result of running a remote command, you must use the Send Remote Command (QCQSRCMD) API instead of the Run System Manager Command (RUNSMGCMD) command or the GUI.
2. Even though a managed system uses a different primary language than the central site system, you can receive an output from the managed system in the primary language of the central site system if the language is installed as a secondary language on the managed system.

The third difference is that the remote operation function can work with not only an AS/400 system but also with a PS/2 and a RISC System/6000. However, you can use a command interface to remotely execute commands and programs only when a managed system is an AS/400 system. If a managed system is a PS/2 or a RISC System/6000, you must use the QNSADDCM API. Use of the GUI overcomes this restriction; through the GUI, you can send commands equally to AS/400 systems or to clients such as PCs and RISC System/6000s.

AS/400 System as a Managed System

SystemView Managed System Services/400 provides NetView remote operations functions for the AS/400 system by providing functions to run commands on remote AS/400 systems without signing on to those systems. Functions include:

- Specifying command keywords.
- Returning job log information if the command failed.
- Returning output file data, spooled file data, and user space data.
- Scheduling remote commands.
- Tracking status by system.
- Canceling commands.
- Logging commands sent and received.
- Encoding passwords and command strings.

Managed System Services/400 interoperates with the IBM NetView Remote Operations Manager MVS/ESA product, which enables a S/390 system running NetView to send and run commands on AS/400 systems. The functions of the IBM NetView Remote Operations Agent/400 product are included in Managed System Services/400.

Note: It is important to note that the NetView Remote Operations Agent/400 product was included into Managed System Services/400 for V3R1. At this time, additional enhancements to the agent were also made. The enhancements included the ability to specify a user profile and password, encode the profile/password and command, and return OUTFILE or user space data (if the Send Remote Command QCQSRCMD API is used). The NetView Remote Operations Manager for MVS/ESA product does not support these additional enhancements.

By using this capability, you no longer need to sign on to individual remote systems. The time spent monitoring jobs on remote systems is reduced because job status is tracked centrally. Also, management tasks are performed more quickly and on many systems simultaneously, making the systems available to users sooner.

Note: Although its functions have been integrated into Managed System Services/400, NetView Remote Operations Agent/400 is still available in V3R1. You can use it instead of using SystemView Managed System Services/400 if you only need to run commands received from a central site system.

Change Request

SystemView System Manager/400, in conjunction with SystemView Managed System Services/400 and SNA Distribution Services, enables you to centrally execute change management and operations management tasks such as distributing objects, retrieving objects, and running remote commands by submitting change requests. As is discussed later in this section, there are two ways to submit a change request: using a change request description, and using fast path distribution commands.

Change Request Description

You can use SystemView System Manager/400 to plan daily business tasks or activities and put the plan into the system. The plan enables you to identify the operations that are to be performed, the systems on which they are to be performed, and when they are to be performed. Once the plan, which is called a change request description in the context of Operations Control Center/400, has been made, you can let the system run it for you.

A change request description consists of a series of change request activities that describes changes across the network. Each change request activity can check the end codes of up to five preceding change request activities or groups of activities (if generic activity names are used) and can make itself start only when all of the conditions are met. At this time, you can also specify a condition mode that indicates whether you want to check the end code of all of the nodes you sent the activity to or only the same node where the previous and current activity run, before proceeding to the next change request activity.

You can create a change request description by using the Create Change Request Description (CRTCRQD) command. The following commands are used to add activities to the change request description:

- ADDCMDCRQA - Add Command CRQ Activity

  This command adds an activity to run a command on one or more managed systems.

- ADDOBJCRQA - Add Object CRQ Activity

  This command adds an activity to distribute, retrieve, delete, or run objects.

- ADDPRDCRQA - Add Product CRQ Activity

  This command adds an activity to distribute, retrieve, or install a packaged product.

- ADDPTFCRQA - Add PTF CRQ Activity

  This command adds an activity to send, apply, remove, and delete PTF distribution function.

- ADDRSCCRQA - Add Resource CRQ Activity

  This command adds an activity to perform an IPL of a managed AS/400 system or restarts a non AS/400 resource such as a PS/2 with NetView DM/2 installed.

Another important feature of the change request activity is the scheduling function. You can specify when the change request activity should start execution on the central site system and when it should be activated on managed systems after it is distributed. The scheduled time for the managed systems can be either the central site time or local time.

This scheduling capability is very convenient if you have a number of managed systems in various time zones. For example, if you want to apply PTFs to all of the managed systems, you can schedule sending PTFs at midnight, central site time. You can then apply them at midnight at each remote site time.

Fast Path Distribution Commands

Fast path distribution commands enable you to execute a single change request. Thus, these commands are useful when you want to execute a change management or operations management task on remote systems on an ad hoc basis.

The following fast path distribution commands are available:

- Send SMG Object (SNDSMGOBJ)
- Retrieve SMG Object (RTVSMGOBJ)
- Delete SMG Object (DLTSMGOBJ)
- Run SMG Object (RUNSMGOBJ)
- Run SMG Command (RUNSMGCMD)
- Send PTF (SNDPTF)
- Retrieve PTF (RTVPTF)
- Apply Remote PTF (APYRMTPTF)
- Remove Remote PTF (RMVRMTPTF)
- Delete Remote PTF (DLTRMTPTF)
- Send Product (SNDPRD)
- Retrieve Product (RTVPRD)
- Install Remote Product (INSRMTPRD)

Function equivalent to RUNSMGCMD, with extensions for AS/400 user profile and client management tasks, is also provided through the System Manager/400 GUI.

Basically, the fast path distribution commands can do the same job as the change request activities. However, the fast path distribution commands do *not support*:

- The execution of more than one activity.
- Global names (see “Concept of Global Names” on page 17).
- Some of the scheduling functions.

If you need to use those functions, you have to use change request activities instead of the fast path distribution commands.

Tracking Change Request

Both change request description and fast path distribution commands are submitted to SystemView Managed System Services/400. After being submitted, they can be tracked to see whether they are working, have finished normally, or terminated abnormally using the Display Submitted Change Request (DSPSBMCRQ) command, the Work with Submitted Change Request (WRKSBMCRQ) command, or the Command Log provided in the System Manager/400 GUI. These commands and the GUI provide you with not only the status and end code of the change requests but also error messages pertinent to the requests if they abnormally terminate. You can easily find the cause of errors and correct the change requests.

Concept of Global Names

Operations Control Center/400 enables you to send and retrieve objects between various kinds of platforms such as an AS/400 system, RISC System/6000, PC, and MVS host system. Therefore, an object name must be recognized by all platforms and be uniquely identified in a network. To that end, a naming scheme that is commonly used across a variety of systems is required.

Global names are independent of the system, with a length of up to 64 characters, enabling them to uniquely identify an object within a network. Global names consist of up to 10 tokens with a blank between tokens. The tokens can be from 1 to 16 characters in length. However, the maximum length of global names is 64 characters including blanks between tokens. This naming structure enables you to coin hierarchical and descriptive names for objects. For example, you can give an object the following global name:

COMPANY1 DIVISION2 DEPT3 REPORT4 SALES WIDGET Y1994M10D16

The Distribution Catalog

Because the global names do not have the same syntax as standard AS/400 names (for example, library/object or folder/subfolder/document), a *distribution catalog* is used to either translate a global name into a standard AS/400 name or to point to a distribution object stored in a special staging area called a *distribution repository* (see “Distribution Repository” on page 19).

You can assign a global name to an AS/400 object using the Add Distribution Catalog Entry (ADDDSTCLGE) command. As mentioned previously, global names need to be uniquely identified in the network, and it is up to you to ensure it. Thus, you have to have consistent naming conventions for your network.

Note: Folders and documents can be referred to only with global names.

Managed System Services/400 uses the global name of each incoming or outgoing distribution as a search key in the distribution catalog. An exception are all of those global names starting with *prefix tokens* as described in the following section (“Prefix Tokens”).

Prefix Tokens

When you use an AS/400 standard name for an object in a change request activity, Operations Control Center/400 generates a global name for the object using prefix tokens specified on the Change Managed System Attributes (CHGMGDSYSA) command. You can specify up to four prefix tokens with a maximum total length of 20 characters including blanks between tokens. Global names created by the system have the following structure:

- Prefix tokens
- Token with a value of LIB, MEM, or OBJ
- AS/400 object name

For example, if you are going to distribute a program object with an AS/400 standard name LIBX/PGMY and the prefix token set is IBMCO ROCHESTER, Operations Control Center/400 creates a global name:

IBMCO ROCHESTER OBJ LIBX PGMY PGM

Vice versa, if Managed System Services/400 receives a distribution, before it checks the distribution catalog, it compares the first tokens of the global name with the prefix token defined on this system. If they match, the name is directly translated into a standard AS/400 object name.

To avoid the conflict between the user defined global names and the system defined global names, you are prohibited from using the prefix token set to define your own global names.

Before you send a packaged product, use the Package Product for Distribution (PKGPRDDST) command to make the product ready to be sent to remote systems. The Package Product for Distribution PKGPRDDST command creates a global name for the product with special prefix tokens `I3IBM1 AS400` followed by tokens that provide more detailed information about the product. The same prefix tokens are used for global names for PTFs, also. For more information about the product naming and PTF naming, refer to *Managed System Services/400 Use*, SC41-3323.

Partial Global Name Matching

Partial global name matching enables you to look for an object using a generic value as part of the global name. The distribution catalog entries are searched to find an object with a partial global name. You cannot use partial global name matching to find objects that have system defined global names because the system defined global names are not registered in the distribution catalog.

Partial global name matching is very convenient when you do not know the exact global name of the object. For example, if you have monthly sales report files with a creation date as a part of their global names, you can find the latest file by specifying *HIGHEST for the creation date token. In some cases, you might want to use this capability even though you know the exact global name of the object. In general, the same application uses the same library and object name on all systems. It causes a problem when you want to retrieve a specific file from each system. You need to distinguish each file in some way and global names provide a solution for it. Imagine that you have the following naming rule for global names:

Token1: Company Name
Token2: System Name
Token3: Application Name
Token4: Library Name
Token5: Object Name
Token6: Object Type

You can distinguish objects with the same library and object name by using this naming convention because the second token varies from system to system. When you retrieve a specific file from all AS/400 systems, you can specify *ANY for the Token2 (System Name) with specific values for other tokens. Then distribute a request to retrieve the corresponding objects. Therefore, it is beneficial for AS/400 objects to have user-defined global names even if they are distributed only between AS/400 systems.

Distribution Repository

The distribution repository is a staging area for sending and receiving objects. It holds objects that are ready to be sent or that have been received from other systems. The objects are held in the repository until you request the installation of them using a change request activity, or until you copy them to a library or folder using the Copy Distribution Repository Object (CPYDSTRPSO) command. Using a library or folder, the objects are readily accessible. However, you need to copy objects from the distribution repository to a library or folder before you can use them.

You can schedule the request for installing or copying an object in the distribution repository with a change request activity. This is quite beneficial for you when you want to distribute objects several days before you make them available on all of the systems in the network.

Any objects, including non-AS/400 objects, are stored in the distribution repository and tracked by the distribution catalog. For example, you can store PS/2 files in the distribution repository and later distribute them to other PS/2s.

When you distribute a product, it is located in the distribution repository of a central site system automatically either by the Package Product for Distribution (PKGPRDDST) command or the Send Product (SNDPRD) command.

If you want to put objects other than the products in the distribution repository, you need to use the Add Distribution Catalog Entry (ADDDSTCLGE) command specifying *DSTRPS for the storage location parameter STGLOC(*DSTRPS).

Security Considerations

When you distribute objects, a default user profile is used to perform the distribution requested activities. Thus, for distribution activities, the default user must be authorized to have access to objects such as commands, APIs, files, and so on that are necessary to perform the requested change activities. You can also provide a security program on the managed system that uses information from the incoming request to decide what user profile should be used.

There are two types of security programs:

- Distribution security program

  This program checks if the received activity should be executed or not and determines which user profile should be used.

- Remote command security program

  This program checks if the received remote command request should be executed or not and determines which user profile should be used.

Sample programs are provided with the product for both types of security programs in a source format so that you can modify them according to your requirements.

The default user profile and security program are specified by the Change Managed System Attributes (CHGMGDSYSA) command. You can also specify whether or not the managed system accepts change request activities from the

central site system using the Accept Received Activities (ACCRCVCRQA) parameter on the Change Managed System Attributes (CHGMGDSYSA) command. To accept the change request, you can specify ACCRCVCRQA(*YES) on all of the managed AS/400 systems.

Most of the commands of System Manager/400 and Operations Control Center/400 and associated command processing programs are shipped with PUBLIC(*EXCLUDE) authority. Thus, you have to give authority to each user who needs to use those commands.

Refer to *Managed System Services/400 Use*, SC41-3323, for more information.

Release Compatibility

When you think about compatibility between different releases of SystemView System Manager/400 and SystemView Managed System Services/400, you have to pay attention to the following aspects that the products provide:

- Service provider versus service requester
- Product packaging capability
- Change and operations management capability
- User profile management capability
- Topology management and notification capability

Table 2 shows compatibility between releases of the central site system and the managed systems.

Table 2. Release Compatibility Table

Central Site Release Level	Managed System Release Level								
	V1R3M0	V2R1M0	V2R1M1	V2R2M0 [1]	V2R3M0 [2]	V3R0M5	V3R1M0 [5]	V3R1M1	V3R6M0
V1R3M0	X								
V2R1M0	X	X							
V2R1M1	X	X	X						
V2R2M0 [1]	X	X	X	X					
V2R3M0		X	X	X	X				
V3R0M5				X	X	X			
V3R1M0 [3]				X	X	X	X		
V3R1M1 [4]					X	X	X	X	X
V3R6M0 [4]					X	X	X	X	X

Note:

X = The combination is supported.

[1] This is the earliest level for product packaging.

[2] This is the earliest level for the AS/400 system to be an agent for change and operations management.

[3] This is the earliest level for the AS/400 system to be a manager for change and operations management.

[4] This is the earliest level for the graphical user interface (GUI) and GUI-delivered functions.

[5] This is the earliest level for full support of GUI-delivered functions.

As shown in Table 2, an AS/400 system running OS/400 V3R1 can be the manager of other AS/400 systems running OS/400 V2R3 or V3R1 for change and operation management functions. However, there are some limitations that apply when the managed system is running Managed System Services/400 V2R3:

- Requests for sending, retrieving, deleting, or installing AS/400 products (licensed programs) are not supported.
- Requests for sending, retrieving, or deleting new object types (V3R1 object types) are not supported.
- Requests for running a remote command fails if the managed system is running Managed System Services/400 V2R3 and NetView Remote Operations Agent/400 (5733-165) is NOT installed. The Remote Operations Agent function was repackaged into Managed System Services/400 V3R1.
- If parameters are specified in requests for running a program in a V2R3 managed system, the function is performed normally (parameters are passed to the program for execution) at the managed system. However, the parameters are not displayed in the detailed information for the activity when the Work with Received Change Request Activities (WRKRCVCRQA) command is used.
- Several minor enhancements implemented in Managed System Services/400 V3R1, related to error reporting at the managed system are not in Managed System Services/400 V2R3. A few examples of such enhancements are:
  - Messages left in the job logs where activities were performed (at the managed system).
  - Messages sent back to the central site.
  - Entries added to the system management journal (QCQJMJRN).
- Full support of the System Manager/400 GUI topology management and notification functions is not provided by Managed System Services/400 V2R3.

Infrastructure for Operations Control Center/400

Operations Control Center/400 is a member of NetView Distribution Manager (NetView DM). Like other NetView DM product family members, Operations Control Center/400 functions are based on the network management services defined by SNA. They are:

- SNA Management Services (SNA/MS)
- SNA File Services (SNA/FS)
- SNA Distribution Services (SNADS)

Operations Control Center/400 provides the change and operations management capabilities based on these services. In this section, the preceding services are briefly described to clarify the role of each service in network management and the relation with each other.

SNA Management Services (SNA/MS)

SNA Management Services (SNA/MS) is the architecture that assists network management for SNA systems. It is composed of a set of functions and services that capture and use the information needed for effective management. This architecture is divided into mutually supportive functional categories:

- Problem management
- Performance and accounting management
- Configuration management
- Change management

- Operations management

SNA/MS has been enhanced to provide management capabilities to the network planner. These include scheduling, implementing, and tracking of changes to SNA nodes that are typically remote and unattended during normal operation of those nodes.

Data object classes supported by NetView Distribution Manager include software, procedures, flat file data, relational data, configuration files, dumps, traces, and error logs.

Operations Control Center/400 implements the focal point change control subset of SNA/MS for the centrally controlled distribution and retrieval, and remotely controlled installation of the supported data objects in conjunction with the connected entry points.

SNA File Services (SNA/FS)

SNA/FS is a SNA component designed to work with SNADS to move files from one location to another. Although the file processing requirements vary according to application, many of the file types are similar. In fact, the fetching and storing operations are an application-independent service. SNA/FS defines the file fetching and storing services that are provided by a common process. It also defines a naming scheme that uniquely names files across enterprises and networks.

SNA File Services (SNA/FS) defines facilities for identifying files in a network in a structured manner regardless of platforms. It enables you to retrieve files from, distribute files to, and store files at nodes in an SNA network. SNA/FS provides you with a common file service that is used by a variety of platforms and applications.

The SNA/FS functions are performed in an environment provided by SNA Distribution Services (SNADS).

Operations Control Center/400 implements the subset of SNA/FS architecture required by the SNA/MS architecture and, within this limitation, provides a generic file services server. Thus, it can issue distribution and retrieval requests to entry points.

SNA Distribution Services (SNADS)

SNA Distribution Services (SNADS) provides asynchronous data transfer functions that enable you to route, send, and receive messages and objects between users in the SNADS network. SNADS is based on LU6.2 architecture and works in an APPC or APPN network. SNADS has efficient protocols, and compact and flexible formats. SNADS is best suited to transport a variety of object types for a variety of application types. Data is transferred in a store and forward (or hop-by-hop) manner using routing information. SNADS uses a system distribution directory to direct distributions to users in a local system or other systems in an SNADS network.

For Operations Control Center/400 to send and receive objects between systems, not users, a new mechanism that enables you to directly send and receive objects between systems needed to be implemented in SNADS. Operations Control Center/400 uses SystemView Distribution Services which is added to

SNADS to specifically support SystemView Managed System Services/400 as a vehicle for sending and receiving distributions.

SystemView Distribution Services (SVDS)

The SNA Distribution Service (SNADS) implemented a support function for IBM SystemView Managed System Services/400 at OS/400 V2R3. This function is referred to as SystemView Distribution Services (SVDS). It is a distribution service for sending and receiving distributions to managed systems in a network from a central site. By its nature, SystemView Managed System Services/400 is required to use the function of SystemView Distribution Services.

SystemView Distribution Services implements a subset of SNADS function set 2 (or FS2) architecture to send and receive remote distributions. In other words, it is a part of SNADS that is specially made to handle change management message units. With this mechanism, Managed System Services/400 sends and receives objects and executes remote commands.

Managed System Services/400 uses special distribution queues, *SVDS distribution queues, to send distributions to other systems in the SNADS network. Each change management connection is normally an end-to-end connection. Each managed system should be defined as if it had a direct connection to a central site system either physically or logically. For this reason, a routing table entry is optional.

When a route exists in the routing table, the distribution is routed to the specified *SVDS queue in exactly the same manner as all SNADS Function Set 1 distributions (that is, traditional SNADS distributions) are routed. When SNADS does not find a route to the change management destination in the routing table, distributions are placed on *SVDS queues based on the destination name. In this case, the queue name for the *SVDS queue must be the destination system name. It consists of a CP name and a network ID of the destination system. SystemView Distribution Services directly sends the change distribution from *SVDS distribution queues to other systems without requiring intervention by remote system users. Unlike other SNADS queues (that is, *SNADS, *DLS, and *RPDS), *SVDS distribution queues have only one priority: normal priority.

Notes:

1. *SVDS distribution queues are created automatically at the central site system by adding service requesters with the Work with Service Requesters (WRKSRVRQS) command; *SVDS distribution queues are created automatically at the managed system when adding a service provider using the Work with Service Providers (WRKSRVPVD) command.
2. SNADS configuration allows you to control when distributions are sent to optimize line resource utilization. This capability applies to *SVDS queues, also. However, change management also controls when distributions are originated and how they are sequenced based on your plans (or change request activities in terms of Operations Control Center/400). Therefore, we recommend as a general practice, that you configure *SVDS queues to send with a queue depth of 1 and no time window to allow change management to control the sending of its distributions.

The SNADS, SNA/FS, and SNA/MS capabilities are internal services only and are not available to user applications.

Interoperability with Other Products

Since Operations Control Center/400 is a family member of NetView DM, it can interoperate with the following family members:

- NetView DM/MVS V1R5
- NetView DM/6000
- NetView DM/2

NetView DM/MVS

NetView Distribution Manager Release 5 for MVS (NetView DM/MVS) is a licensed program that provides services to centrally control the distribution of data files and the installation of software and licensed internal code and related changes in SNA networks. These networks are composed of a variety of distributed systems, subsystems, and programmable workstations directly connected to the S/390 system or through NetView DM/2, NetView DM/6000, or IBM SystemView Managed System Services/400 products.

The NetView DM supported SNA networks consist of one central site referred to as the focal point (or, often, as the host) where NetView DM (either MVS or VM) runs, and one or more distributed sites referred to as entry points (or, often, as end nodes, or simply nodes).

NetView DM/MVS Release 5, in conjunction with SystemView Managed System Services/400, extends distribution and change control support to an AS/400 system connected to the S/390 system. The AS/400 system with Managed System Services/400 installed can work as a managed system for NetView DM/MVS.

NetView DM/MVS Release 5 is the strategic IBM product for managing software distribution from an MVS central site system. It supports the following SystemView disciplines:

- Change management:
  - Distributes and installs software changes, PTFs, and new software.
  - Deletes old code.
  - Activates changes.
- Configuration management:
  - Modifies software base.
  - Modifies software levels.
- Operations management:
  - Plans transmissions.
  - Controls transmissions.
  - Reduces manual workload.
  - Executes CLISTs at node.
  - Activates node.
- Problem management:
  - Retrieves error logs.

- Retrieves traces.
- Retrieves dumps.

NetView DM/MVS Release 5 enhances its existing change control support by:

- Extending change control support to environments supported by NetView DM/6000 and IBM SystemView Managed System Services/400.
- Adding a new change control function, uninstall, that supports the removal of software packages from a NetView DM/6000 workstation.

A separate product and complementary member of the NetView family, NetView File Transfer Program for MVS, VSE, VM and OS/400 (5685-108, 5686-013, 5684-048, and 5730-082 respectively), provides direct, file-to-file, peer-to-peer transmission to achieve high performance bulk data transfer.

The two ways for the AS/400 system to interoperate with NetView DM/MVS Release 5 are LU0 or LU6.2.

To communicate with NetView DM/MVS Release 5 through an LU0 protocol, the AS/400 system must have:

- IBM OS/400 V1R3 (5728-SS1), or IBM OS/400 V2 (5738-SS1) installed. With either version, the node is defined as using direct connection (LU0) protocols, supporting the compression and decompression feature.

To communicate with NetView DM/MVS Release 5 through an LU6.2 protocol, the AS/400 system must have IBM OS/400 V2R3 or later and IBM SystemView Managed System Services/400 installed.

Another possible configuration is to connect the AS/400 system to the host system through an intermediate node:

- Through an AS/400 system equipped with OS/400 V2R3 or later, NetView DM/MVS Release 5 communicates with another AS/400 system with OS/400 V2R3 and SystemView Managed System Services/400 installed.

Table 3 shows how these distribution products are supported by Operations Control Center/400.

Table 3. Distribution Products Supported by Operations Control Center/400

Environment	Managing System Product	Managed System or Systems Product
AS/400 system managing other AS/400 systems, OS/2s, and RISC System/6000s	System Manager/400	Managed System Services/400, NetView DM/2, and NetView DM/6000
S/390 managing AS/400 systems, OS/2s, and RISC System/6000s	NetView DM/MVS	Managed System Services/400, NetView DM/2, and NetView DM/6000

NetView Distribution Manager/2 (NetView DM/2)

NetView Distribution Manager/2 (NetView DM/2) is a key product of IBM providing a scalable data and software distribution and change management solution for OS/2 driven distributed networks composed of IBM NetBIOS LANs including OS/2, DOS, and Windows client workstations.

NetView DM/MVS and IBM SystemView Operations Control Center/400 are IBM's key products for managing scalable data and software distribution and change management to large numbers of workstations implementing NetView DM/2 and NetView DM/6000. These products allow you to:

- Drive host distribution and installation processes through user-written, automated applications.
- Collect daily reports or user data from entry points, such as AS/400 system processors and distribute consolidated results.
- Centrally control distributed and retrieved data, as well as who distributes and retrieves the data.
- Use fill-in-the-blank menus to define, validate and start distributions, track their progress and results, and print reports.
- Retry a transmission until it is successful, turned off at the host, or reaches a predetermined date and time.
- Use a central repository to store and track data objects.

Remote Administration

The NetView DM/2 Remote Administrator uses SNA LU6.2 protocols to communicate with the NetView DM and Operations Control Center/400.

The Remote Administrator is a new package available with NetView DM/2 V2.1. It provides services to centrally manage, from an OS/2 site, the distribution and installation of software and data in a network of interconnected workstations. The Remote Administrator has the ability to submit distribution and change control requests to server workstations and change control requests to client workstations in different domains, and to track the results of the related operations. The workstations and the interconnections supported are:

- OS/2, DOS, and Windows workstations attached to a NetView DM/2 extended server in a LAN configuration where IBM NetBIOS is used. In this case, the workstations must have the NetView DM/2 client installed for the appropriate operating system.
- OS/2 workstations attached to a NetView DM/2 extended server in a LAN configuration where TCP/IP is used. In this case, the client workstations must have the NetView DM/2 OS/2 client installed, and both the NetView DM/2 server and clients must have the IBM NetBIOS for TCP/IP program installed.
- Single OS/2 workstations attached through an SNA LU6.2 connection to the Remote Administrator. In this case, the workstation should have the NetView DM/2 Entry package installed.
- Communications between the Remote Administrator and the NetView DM/2 extended and entry servers using SNA LU6.2 protocols. However, if the existing connections between these locations use TCP/IP, then the communications between the NetView DM/2 products are supported across

these connections by installing the IBM AnyNet/2 APPC over the TCP/IP feature.

- OS/2, DOS, and Windows workstations attached to a NetView DM/6000 CC server in a LAN configuration where TCP/IP is used. In this case, the client workstations must have the NetView DMA/2, the NetView DMA/DOS, or the NetView DMA for Windows agent programs installed, depending on the operating system.
- OS/2, DOS, and Windows workstations attached to a NetView DM for NetWare CC server in a LAN configuration where IPX is used. In this case, the client workstations must have NetView DMA/2, the NetView DMA/DOS, or the NetView DMA for Windows agent programs installed, depending on the operating system.
- Workstations where the NetView DM for NetWare CC servers and clients are installed.
- The communications between the Remote Administrator and both the NetView DM/6000 server and the NetView DM for NetWare server is SNA LU6.2.

The Remote Administrator capabilities of NetView DM/2 and NetView DM/6000 are appropriate for managing smaller networks (of less than 1,000 workstations), and do not require automation for frequent distribution and retrieval.

NetView DM/MVS or IBM SystemView Operations Control Center/400 should be used when managing an intermediate to large number of workstations, and where automation is required for frequent distribution and retrieval.

The Remote Administrator is also used at a central OS/2 site to administer the distribution and maintenance of Configuration Support C Licensed Internal Code (LIC) for the 3174 Establishment Controllers. While this support is similar in many ways to that provided by NetView DM/MVS, the user should be aware of certain limitations in the support provided by the NetView DM/2 Remote Administrator.

The services provided by the Remote Administrator to manage these various combinations of server and client workstations and 3174 Establishment Controllers include:

- The ability to specify a date and time when the distribution and change management requests must be scheduled.
- Full tracking of the results of the distribution and change control requests. In addition, the NetView DM/2 Remote Administrator can also work in conjunction with NetView DM/MVS in an enterprise-wide network by forwarding these reports coming from the sub-network under its responsibility. In this way, a central repository of the change control history for the entire network resides at the NetView DM/MVS focal point.
- The notification to a user program that requested reports have been received. This ability is then used by customer applications to perform automation procedures, for example, the sequencing and conditioning of the requests. Sample REXX programs are available with the product demonstrating how this process is provided. You can then tailor this sample code to meet the requirements for your specific environment.

In addition, NetView DM/2 provides the customer with the capability to distribute and collect application user data files, logs, dumps, configuration and customizing data, or other raw data across the network to feed applications and to help perform problem determination. These functions are performed in conjunction with the NetView DM/MVS, IBM SystemView Managed System Services/400, NetView DM/6000, and NetView DM for NetWare.

The CC server enables the following:

- Initiation of change control requests to install and maintain system and application software at IBM NetBIOS LAN-connected OS/2, DOS, and Windows workstations CC clients.
- NetView DM/MVS focal point, a NetView DM/2, a NetView DM/6000 Remote Administrator, or Operations Control Center/400 to initiate installation and maintenance of system and application software at the change control clients.
- Local tracking and reporting to the NetView DM focal point or Operations Control Center/400 of the results and status of the installation activity on each attached CC client.

If operating in stand-alone or interconnected LAN environments, CC server enables the user to fully control and maintain the system and application software used by the attached clients. The Change Distribution Manager function must be installed before installing the CC server function.

In conjunction with the CC server, CC client allows:

- NetView DM focal point, NetView DM/2 or NetView DM/6000 Remote Administrator, or NetView DM/2 local CC server initiated distribution and change control functions.
- Fully unattended upgrading and maintenance of the operating system (from OS/2 1.3 EE to 2.0 components) as well as of the OS/2 subsystems and application software.
- Reporting the results of the installation activity performed on the workstation to the CC server.

NetView DM/2 supports the following distribution functions at any workstation that has the Entry or Extended Base component installed:

- Send a data object to be stored as an OS/2 file.
- Retrieve an OS/2 file.
- Delete an OS/2 file.

These functions are originated by the NetView DM/MVS focal point, a NetView DM/2 or a NetView DM/6000 Remote Administrator, other NetView DM/2, NetView DM for NetWare servers, or Operations Control Center/400.

NetView DM/2 supports the following change management functions at any workstation that has the Entry Base, Extended Base, or Extended client component installed:

- Install a software package:
  - Unpack, decompress or decompact, and install the individual files of the package.
  - Execute, optionally, a supplied installed procedure.

  - Update the global catalog.
- Remove the results of a previous install (not supported for CID installs).
- Accept the results of a previous install (not supported for CID installs).
- Activate the results of a previous install (the installed software is activated through a re-IPL of the node).
- Initiate a command procedure (remote scheduling).
- Send and install (only applicable to workstations that have the Entry Base or Extended Base components installed).
- Send and initiate (only applicable to workstations that have the Entry Base or Extended Base components installed).

For any focal point request, a report is sent at request completion by NetView DM/2 to the originator of the request, for example, a NetView DM/MVS focal point, a NetView DM/2 or a NetView DM/6000 Remote Administrator, or Operations Control Center/400.

NetView Distribution Manager/6000 (NetView DM/6000)

NetView Distribution Manager/6000 (NetView DM/6000) is a licensed program product that provides services for software and data distribution and change control in a network of workstations from a central RISC System/6000 acting as CC server.

The supported network can be homogeneous or heterogeneous, and can include any combination of TCP/IP connected AIX/6000, OS/2, HP-UX, DOS, or Windows client.

Each client workstation must have installed a counterpart licensed program product acting as a change control client (or CC client) that operates in a client/server relationship with NetView DM/6000. The CC clients for AIX/6000, OS/2, HP-UX, and Windows are separately orderable licensed program products identified with the following names:

- NetView Distribution Management Agent/6000 (NetView DMA/6000) for AIX/6000
- NetView Distribution Management Agent/2 (NetView DMA/2) for the OS/2
- NetView Distribution Management Agent for HP-UX (NetView DMA for HP-UX)
- NetView Distribution Management Agent for Windows (NetView DMA for Windows)
- NetView Distribution Management Agent for DOS (NetView DMA for DOS)

NetView DM/6000 provides an administrator's scheduled *push* distribution and installation of data and software, and a client user-initiated installation (*pull*) and centralized control and tracking of the software packages installed in each workstation running within its domain.

Furthermore, NetView DM/6000 provides the capability to remotely administer and manage data and software distribution and change control in a network of interconnected CC servers or CC single nodes. This function enables the capability for change management between servers, single nodes, and clients of different domains. NetView DM/6000 supports both networks of interconnected CC domains through TCP/IP communications and networks of interconnected CC

domains through SNA communications. A designated NetView DM/6000 server or single node (Remote Administrator) has the ability to submit change management requests to servers and clients of different domains and to receive and handle the reports of related operations. With this configuration, each NetView DM/6000 still supports its own homogeneous or heterogeneous TCP/IP network, including any combination of AIX/6000, OS/2, Windows, and HP-UX workstations.

NetView DM/6000 also provides intermediate node capability when connected to other NetView DM/6000 servers or a single node, to NetView DM MVS, or to NetView DM/2.

In addition, NetView DM/6000 is used in conjunction with NetView DM/MVS Release 5 or Operations Control Center/400 to perform controlled distribution and installation of software and data from a central system acting as focal point or change control manager.

NetView DM/6000 communicates with NetView DM/MVS and Operations Control Center/400 through SNA LU6.2. The NetView DM/6000 domains can also be interconnected between themselves through TCP/IP communications or through SNA LU6.2 communications. NetView DM/6000 acts as gateway when two domains are connected over different communications protocols.

Finally, NetView DM/6000 and its CC clients enable distribution and collection of user data files, logs, dumps, snapshots, configuration and customizing data, or other raw data to or from homogeneous or heterogeneous target workstations, to support applications and help do problem determination.

NetView Remote Operations

Operations Control Center/400 also interoperates with the IBM NetView Remote Operations Manager MVS/ESA (5696-583) product that enables a S/390 system running NetView to send commands to AS/400 systems. When used with the NetView automation facilities, operations tasks may be automated.

Operations Control Center/400 includes the functions of the IBM NetView Remote Operations Agent/400 product. These functions have been enhanced to return output files and user spaces and to provide improved security.

Note: NetView Remote Operations Manager has not been enhanced to support this functions.

The NetView Remote Operations Agent/400 (5733-165) product is still available for those customers who need remote command capability but do not require centralized distribution, problem, and software management.

Product Positioning of Operations Control Center/400

Customers with AS/400 systems within networks have identified centralized systems management functions as a key requirement. The IBM SystemView Operations Control Center/400 integrated offering consists of the strategic AS/400 products that provide centralized management of user profiles, software, problem handling, data distribution, and operations. The products are:

- SystemView System Manager/400 for central site AS/400 systems that are managing other systems.

- SystemView Managed System Services/400 for managed and central site AS/400 systems.

Table 4 describes when System Manager/400 and Managed System Services/400 need to be installed on the central site system and when Managed System Services/400 is needed on the managed system.

Table 4. AS/400 Products Required

Task	**System Manager/400 Central Site System**	**Managed System Services/400 Central Site System**	**Managed System Services/400 Managed System**
Package product and PTFs	Y	N	N
Receive alertable messages (at SM/400)	Y	N	N
Reply to alertable messages	Y	Y	Y
Report problems	Y	N	N
Track problems	Y	N	N
Remote problem analysis	Y	N	N
Send PTFs	Y	N	N
Distribute files	Y	Y	Y
Install products	Y	Y	Y
Send/load/apply PTFs	Y	Y	Y
Run remote programs	Y	Y	Y
Remote IPL	Y	Y	Y
Manage user profiles centrally	Y	Y	Y
Discover topology	Y	Y	Y

Operations Control Center/400 supports a wide range of computing environments including:

- Networks with an AS/400 system as the manager of other AS/400 systems.
- Networks with an AS/400 system as the manager of RISC System/6000 systems and personal computers running OS/2, DOS, and Microsoft Windows where the NetView DM agent is installed.

  Note: Operations Control Center/400 communicates directly with the CC server workstation in these environments.
- Networks with a S/390 system as the manager that include AS/400 systems.

Table 5 on page 32 describes some of the tasks that are accomplished with Operations Control Center/400 and the environments in which they are supported.

Table 5. Operations Control Center/400 Environments			
Task	**AS/400 system manages AS/400 systems**	**AS/400 system manages OS/2s and RISC System/6000s**	**S/390 manages AS/400 systems**
Package software	X	X	X
Distribute software	X	X	X
Distribute file	X	X	X
Install software	X	X	X
Reply to alertable messages	X (1)		
Run remote programs	X	X	X
Run remote commands	X	X (1)	X
Remote IPL	X	X	X
Report problems	X	X	X
Track problems	X		
Remote problem analysis	X		
Manage user profiles centrally	X (1)		
Discover topology	X (1)	X (1)	

Notes:

1. Requires System Manager/400 GUI.

Operations Control Center/400 complements and works with several other IBM systems management products. The following sections describe how these products are related to Operations Control Center/400.

IBM OMEGAMON Services/400

IBM OMEGAMON Services/400 provides real-time collection of system operational information, automation of actions, and a workstation interface to monitor and control automation for the enterprise. The final goal of IBM OMEGAMON Services/400 is to provide a ″lights-out″ operation environment where the focus is on automation. IBM OMEGAMON Services/400 automatically takes action based on events.

In the areas of change and operation management, Operations Control Center/400 offers centralized control allowing centralized scheduled and tracking of change requests across the network and the ad hoc execution of commands.

Application Development Manager/400

Application Development Manager/400 (ADM/400) provides version control and software configuration management functions. With this program, application developers create, manage, and organize multiple versions of their application. Application Development Manager/400 automatically provides the information needed by SystemView System Manager/400 to package, distribute, and install application software.

System Management Tools/400

Operations Control Center/400 includes the functions to run remote commands, send objects, send libraries, and maintain user profiles that were previously provided by the System Management Tools/400 PRPQ.

IBM SystemView Operations Control Center/400 provides the following functions that are not covered by System Management Tools/400:

- Distribution management functions for the AS/400 system making it a member of the NetView Distribution Manager family.
- NetView remote operations functions for the AS/400 system.
- Software management support.
- Centralized problem management.
- Centralized user profile management.

The System Management Tools/400 PRPQ can function on OS/400 V3R1 but is no longer supported by the IBM Rochester Laboratory (problems cannot be reported for SMT running on OS/400 V3R1).

Operations Control Center/400 Functions

Distribution Management

IBM SystemView Operations Control Center/400 is a member of the NetView Distribution Manager family. Operations Control Center/400 provides products that enable a central AS/400 system to manage software and data distribution operations for an entire network. The AS/400 system can initiate data distribution or receive data distributed from other systems. The operations that are performed include:

- Sending, retrieving, or deleting objects such as files, programs, products, PTFs, libraries, documents, and folders.
- Installing products or applying PTFs.
- Running a remote program or performing an IPL.

Data is distributed between a variety of systems including the AS/400 system, S/390, RISC System/6000, and personal computers running OS/2. IBM SystemView Operations Control Center/400 interoperates with the NetView DM/MVS, NetView DM/2, and NetView DM/6000 products.

Change planning enables you to identify the distribution and installation activities that are to be performed and the systems on which they are to be performed. Activities may be made conditional upon the success or failure of previous activities, allowing backout operations to be specified. Activity start times are specified according to the time zone of the central site system or the managed system, allowing installations to be coordinated across large geographic areas. For situations where planning is not needed, simple fast path commands such as the Send Object and Retrieve Object commands are provided.

In all cases, tracking information is maintained at the central site system. High-level tracking information can be viewed to determine the status of the entire change request. If more detailed information is required, the status of a

particular activity (for example, send file) or of a particular node can be viewed. Returned messages can be viewed at any of these levels of detail.

The distribution functions fully utilize the capabilities of APPC (LU6.2) and APPN, including compression, security, and multi-hop routing. Communications error recovery allows retransmission to begin at the point of failure, enabling effective transmission of large objects and use of unreliable data links. Objects may be distributed directly to all of the managed systems or to intermediate systems that fan out the distribution, thereby reducing overall communication line utilization. Using the AnyNet/400 support, the AS/400 system can distribute software using TCP/IP communication networks.

For example, a retailer uses Operations Control Center/400 to distribute new pricing information and sales data. On a nightly basis, operations personnel retrieve the daily sales data from each store and consolidate it at their headquarters location. The sales data is summarized and reports are generated. The reports are then sent back to each store along with an updated price file.

Benefits

- Reduced personnel and communications costs:

  Remote systems operate unattended since all of the distribution control and tracking functions are performed from a central site. File compression, distribution fan-out, and checkpoint/restart capability reduce the communications bandwidth demand.

- Fewer errors:

  All of the operations are administered from a central site system where your most experienced operations personnel are located. Changes are planned in advance, allowing distribution procedures to be reviewed and tested.

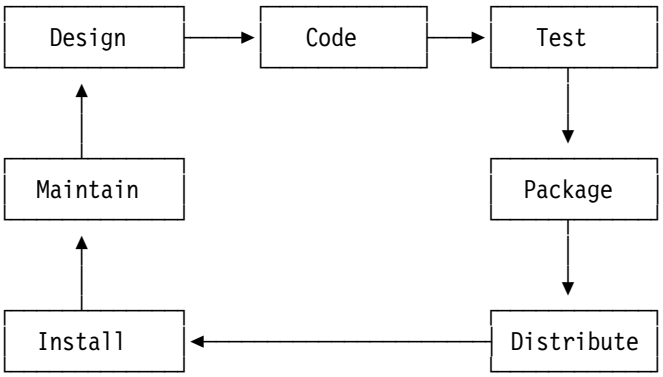
- Increased availability:

  Distribution and installation is scheduled for off-shifts to minimize disruption to end users.

Software Management

IBM SystemView Operations Control Center/400 provides a comprehensive solution for the management of software within distributed networks by customers and independent software vendors (ISVs). It enables software packaging, electronic distribution, and remote installation.

Software goes through a series of steps during its lifetime. Each of these steps is a task that needs to be performed to develop and support a software product that is to be sold or used internally. The life cycle can be broken down in a variety of ways but generally it follows the path:



IBM's application development products address the development steps (design, code, and test). Operations Control Center/400 addresses the remaining steps by providing support to package, distribute, install, and maintain software products. Product packages are created, distributed to one or more systems at a selected time, and automatically installed. Problems are reported back to the central location when the software does not work correctly. In response, fixes are sent and automatically applied to the system.

Operations Control Center/400 provides the capability for application objects, such as programs, message files, and command definitions, to be packaged together to form a product. The product is then distributed and installed as a unit, simplifying version control.

Customers or independent software vendors (ISVs) who are developing code for distribution can use Operations Control Center/400 to protect their applications from unauthorized use by creating license keys.

With Operations Control Center/400, an AS/400 system can initiate and control the distribution of products, applications, and fixes (PTFs) to one or more remote systems. AS/400 packaged products can be remotely installed. PTFs can be remotely loaded, applied, or removed. Installed products can then be maintained from the central site system using the problem management support provided by Operations Control Center/400.

For example, an application development department that produces and maintains a specialized point-of-sale application uses Operations Control Center/400 to package its application into a product for easy distribution and version control. New versions of the product are distributed electronically every six weeks. Unattended installation of new versions is scheduled and automatically performed at off-hours on the weekend.

Benefits

- Application integrity:

  The robust OS/400 support for installation of products and PTFs is utilized for applications. Version control of the application is maintained.

- Reduced distribution time and cost:

  Since complete software products are sent and installed electronically, the need for media-based distribution is eliminated.

- Asset protection:

Software vendors can ensure that they are properly compensated by using license keys to protect their applications.

Problem Management

IBM SystemView Operations Control Center/400 provides capabilities to centrally manage hardware and software problems in a distributed network of AS/400 systems and PC clients. Functions are provided to:

- Report problems to a central site.
- Maintain a central problem log for tracking.
- Analyze problems remotely.
- Maintain a central repository of software fixes (PTFs).
- Search for fixes for rediscovered problems automatically.
- Distribute fixes.

Problems are reported to a central site system where they are logged and tracked. The problems are reported manually or automatically through the use of OS/400 alert support. They are notified automatically to a central site AS/400 system operator through the GUI. Received problems are logged and tracked through resolution.

A central repository of software fixes (PTFs) for IBM and non-IBM products is maintained. The repository is kept up-to-date by downloading the latest PTFs from IBM electronically through the electronic customer support (ECS) communication line. Fixes for application problems are added to the fix repository.

An automatic search of known problems is performed when a problem report is received. If a software fix is available, it is automatically transmitted to the failing system. The fix is applied remotely using the software management support provided by Operations Control Center/400.

Reported problems may be analyzed remotely. The resulting problem analysis data is included in the central problem log.

Software fixes are distributed to all of the systems in the network and applied under central site control.

For example: A point-of-sale application problem is reported to the central site system and logged. A fix (PTF) is developed to correct the problem. The fix is sent to the system that experienced the problem, where it is applied. If the fix works properly, it is sent to and applied on all of the other systems.

Benefits

- Reduced operational costs:

  A fix for a previously discovered problem is automatically sent to a system that discovers it again. The need for remote site operations personnel to perform problem analysis is reduced.

- Reduced downtime potential:

  Sending fixes to all of the systems in a network when a problem is reported by one of them reduces the chance that other systems will be impacted by that problem.

- Increased availability:

  System availability is improved because hardware and software problems are resolved faster. Operations personnel at the central site system are automatically notified of problems so that they do not go unnoticed.

Operations Management

IBM SystemView Operations Control Center/400 provides the ability to run commands and programs on one or more systems in the network from the central site AS/400 system. This enables central site operators to perform tasks remotely on other AS/400 systems without the need to pass through to and sign on to the target systems.

A command is specified once on the central site AS/400 system no matter how many systems it is to run on. Once issued, the operational status of that command is tracked centrally for each system. The results of running the command are returned to the central site system and consolidated for viewing or printing.

Commands are saved for future use, enabling regularly-run commands to be performed without the need to re-specify the command, its parameters and the systems on which it is to run on each occasion. Groups of regularly-run commands and programs are combined into *Change Request Descriptions*, with dependency control on each individual system and across systems as necessary.

Through the Graphical User Interface, the ability to issue remote commands is extended to clients such as PCs and RISC System/6000s, in the same way as for AS/400 systems. Previously, this could only be achieved through the use of Application Programming Interfaces (APIs).

Benefits

- Reduced personnel costs:

  Remote systems can operate unattended as commands are issued and tracked from a central site. Personnel at the central site do not need to spend time signing on to individual systems in order to perform operational tasks. A command to be performed on multiple systems need only be issued once for all of the target systems combined.

- Fewer errors:

  Operations are performed from a central site system where your most experienced operations personnel are located. The ability to save commands for repeated use helps to achieve a high level of consistency and to minimize the risk of mistakes.

- Increased availability:

  Because commands are issued centrally to multiple systems without the need to sign on directly to those systems, the burden of monitoring systems is eased. Potential system impacts are identified and assessed more readily, and appropriate diagnostic or remedial action is taken on a timely basis by skilled operations staff.

User Profile Management

IBM SystemView Operations Control Center/400 provides, through the Graphical User Interface (GUI), powerful facilities for the central management of user profiles.

A centrally located security officer or administrator on the central site AS/400 system can add, copy, change, and delete user profiles on any number of AS/400 systems in the network through a single request.

User profile information for the central site system and managed systems is gathered at regular intervals and is stored in a database on the central site AS/400 system enabling a synchronized, network-wide inventory of users to be maintained.

Inquiries are made on the database relating to user profiles on a single system or on multiple systems in the network. The results are displayed or printed as required, to assist in both administration and audit tasks. Inquiries are defined once and saved for future use, thereby easing the burden of regular monitoring and auditing requirements.

Benefits

- Reduced personnel time:

  A security officer, administrator, or auditor can perform all of the tasks from a central site and is spared the time-consuming burden of signing on to individual systems for user profile inquiry and maintenance. Reports are readily obtained and consolidated, eliminating the need for manual collation and comparison.

- Asset protection:

  The ability to inquire on a central user profile database assists a security officer or administrator in monitoring and controlling the use of profiles across the entire network. User profiles are created and maintained centrally, and appropriate levels of authority given consistently and in accordance with business needs. The ease with which cross-system inquiries are carried out encourages regular and effective auditing of even very large numbers of AS/400 systems.

Requirements for Using Operations Control Center/400

Hardware Requirements

Both System Manager/400 and Managed System Services/400 run on all models of the AS/400 system.

The System Manager/400 GUI requires a PC with a 486 33MHz, or faster, processor and at least 24MB total random access memory (RAM). Approximately 8MB hard disk space must be available for the GUI.

Software Requirements

Operations Control Center/400 requires Version 3 Release 1 of the IBM Operating System/400 Licensed Program (5763-SS1).

SystemView System Manager/400 must be installed on central site systems and SystemView Managed System Services/400 must be installed on central site systems as well as managed systems in order to perform data distribution and remote command execution functions.

PCs on which the GUI runs must have OS/2 Version 2.1 or later installed. One of OS/2 Extended Services Communications Manager, Communications Manager/2, or Communications Manager/400 is required. Client Access/400 Version 3 Release 1 or later is required for the installation and future maintenance of the GUI. Client Access/400 must also be started if you are using a double-byte character set (DBCS) language.

Security, Auditability and Control

The security and auditability features of Operations Control Center/400 include:

- Facilities to accept or reject requests received from central site systems.
- Support for a user-written program to determine if requests are to be accepted.
- Ability to specify the user profile and password under which requests are to be performed (remote command only).
- Ability to delegate some operational tasks without authorizing users to sensitive data.
- Facilities to log commands received.

The products use the security and auditability features of the IBM Operating System/400 support. Use of these facilities is optional. The security measures supplied by Operations Control Center/400 are designed to reduce the risk of users changing or destroying resources, but do not prevent this occurrence.

Chapter 2. Configuring Operations Control Center/400 for Distribution and Remote Operations

This chapter describes the tasks we performed to set up our sample network of AS/400 systems. Our network has one central site system and multiple managed systems.

As additional topics, we discuss the relationship between SNADS and Operations Control Center/400, and how to group systems in a node list.

Sample Network

The scenarios described later in this redbook are based on the network shown in Figure 2.

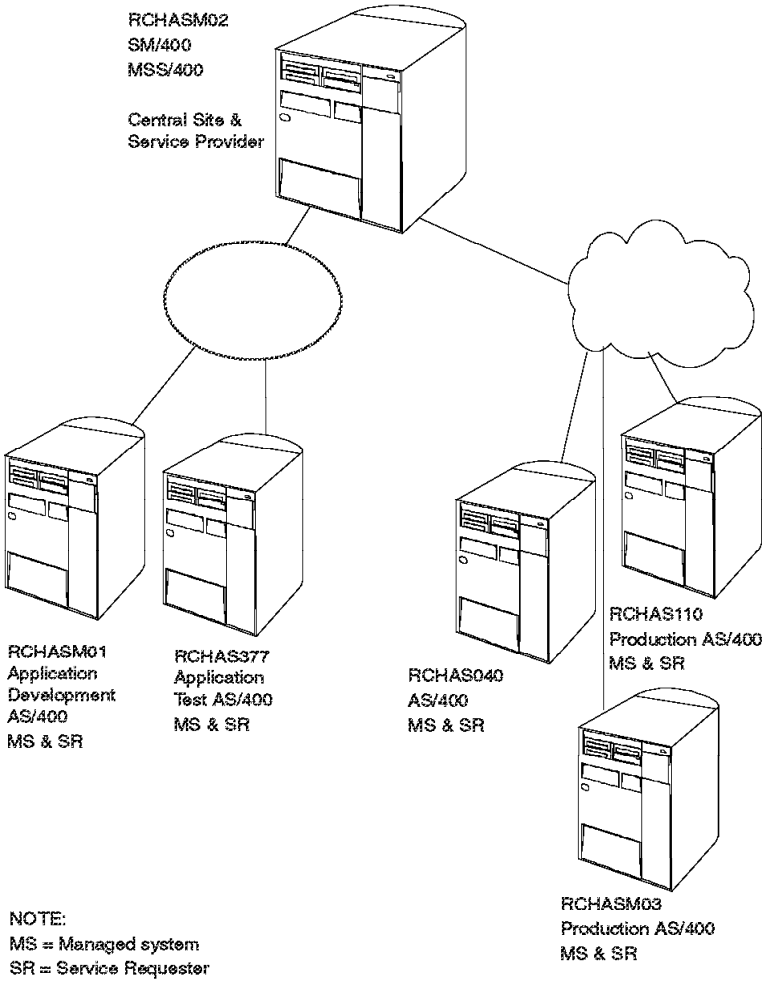


Figure 2. Sample Network

From a business perspective, the systems in the network shown in Figure 2 perform various roles:

- Manage problems at the central site.

- Plan, schedule, implement and track changes across the network, at remote operations (the central site system/service provider).
- Develop and maintain applications (development system - managed system/service requester).
- Test applications (test system - managed system/service requester).
- Run business applications (production systems - managed systems/service requester).

As explained in “AS/400 System as a Central Site System” on page 13, the roles of service provider or service requester and central site system or managed system do not necessarily need to be performed by the same system at the same time. However, we strongly recommend that networks implementing Operations Control Center/400 configure the central site system as a service provider and the managed systems as service requesters. We took this approach in all of the examples in this book and the configuration definitions included in this chapter. For general configuration options, refer to System Manager/400 Use, Managed System Services/400 Use, and SNA Distribution Services.

In our sample network, the systems are connected by a token-ring network. Operations Control Center/400 requires APPC/APPN and SNADS, so any network protocol that supports APPC/APPN is supported (Ethernet, X.25, SDLC, and ISDN).

AnyNet support provided with OS/400 in V3R1 allows you to run Operations Control Center/400 with a TCP/IP network.

Overview of the Configuration Tasks

We followed these steps to install and implement Operations Control Center/400 in our sample network:

- Central site system (service provider - RCHASM02)

  1. Install System Manager/400 (5763-SM1) and Managed System Services/400 (5763-MG1):

     – RSTLICPGM

     - or -

     – GO LICPGM and select menu option 11, Install licensed programs.

  2. Create APPC/APPN definitions:

     – CRTLINxxx

     – CRTCTLAPPC

  3. Enable alert support:

     – Change Network Attributes (CHGNETA)
     – Work with Sphere of Control (WRKSOC)

  4. Set up the system as a service provider:

     – Work with Service Requesters (WRKSRVRQS)
     – Change Service Provider Attributes (WRKSRVPVDA)
     – Work with Supported Products (WRKSPTPRD)

     Note: Configuring the system as a service provider automatically creates the necessary SNADS definitions.

5. Update managed system attributes:
   - Change Managed System Attributes (CHGMGDSYSA)
6. Activate the communications links:
   - Work with Configuration Status (WRKCFGSTS)
7. Start QSNADS subsystem (STRSBS).
8. Start Managed System Services (STRMGDSYS).
9. Start System Manager (STRSYSMGR).
10. Start Manager Services (STRMGRSRV).

- Each managed system (service requester - RCHASM01, RCHAS03, RCHAS040, RCHAS377, RCHAS110)
  1. Install Managed System Services/400 (5763-MG1):
     - RSTLICPGM

       - or -
     - GO LICPGM and select menu option 11, Install licensed programs.
  2. Create APPC/APPN definitions:
     - CRTLINxxx
     - CRTCTLAPPC
  3. Enable alert support:
     - Change Network Attributes (CHGNETA)
  4. Set up the system as a service requester:
     - Work with Service Providers (WRKSRVPVD)

     Note: Configuring the system as a service requester automatically creates the necessary SNADS definitions.
  5. Update the local service information:
     - WRKCNTINF
  6. Update managed system attributes:
     - Change Managed System Attributes (CHGMGDSYSA)
  7. Activate the communications links:
     - Work with Configuration Status (WRKCFGSTS)
  8. Start QSNADS subsystem (STRSBS).
  9. Start Managed System Services (STRMGDSYS).
  10. Verify the service requester - service provider configuration and connection:
      - SNDSRVRQS ACTION(*TEST) RMTCPNAME(RCHASM02)

Configuration Tasks at the Central Site System

The *central site system*, sometimes called the managing system, manager system, or focal point, is the system that you use to control other systems, the managed systems, in your network. The problem management functions of System Manager/400 define systems as *service providers* or *service requesters*. Although it is technically not necessary, we recommend that you configure the central site system as a service provider. If you plan to distribute PTFs using the SNDPTF fast path command, you *must* configure the central site system as a service provider and the managed systems as service requesters. If you do so, the necessary SNADS definitions are automatically created for you.

Create APPC/APPN Definitions

This topic describes very briefly the APPC/APPN configuration used in our examples. Refer to *Communications Configuration* or the redbook *Communications Definitions Examples* for more information.

Create a Line Description (CRTLINTRN Command)

Figure 3 shows the parameters we used to describe the token-ring line at the central site system.

```
                    Create Line Desc (Token-Ring) (CRTLINTRN)

 Line description . . . . . . . .   ITSCTRN       Name
 Resource name  . . . . . . . . . > LIN111        Name, *NWID, *NWSD
 Online at IPL  . . . . . . . . . > *YES          *YES, *NO
 Vary on wait . . . . . . . . . . > *NOWAIT       *NOWAIT, 15-180 (1 second)
 Maximum controllers  . . . . . . > 40            1-256
 Line speed . . . . . . . . . . . > 4M            4M, 16M, *NWI
 Maximum frame size . . . . . . . > 1994          265-16393, 265, 521, 1033...
 Local adapter address  . . . . . > 400000001002  400000000000-7FFFFFFFFFFF...
 Exchange identifier  . . . . . . > 056A1002      05600000-056FFFFF, *SYSGEN
 SSAP list:
   Source service access point  . > 04            02-FE, *SYSGEN
   SSAP maximum frame . . . . . . > *MAXFRAME     *MAXFRAME, 265-16393
   SSAP type  . . . . . . . . . . > *SNA          *CALC, *NONSNA, *SNA, *HPR
Text 'description' . . . . . . . > 'ITSC token ring line'
TRLAN manager logging level  . . > *OFF          *OFF, *MIN, *MED, *MAX
TRLAN manager mode . . . . . . . > *OBSERVING    *OBSERVING, *CONTROLLING
Log configuration changes  . . . > *NOLOG        *LOG, *NOLOG
Token-ring inform of beacon  . . > *NO           *YES, *NO
Error threshold level  . . . . . > *OFF          *OFF, *MIN, *MED, *MAX
Link speed . . . . . . . . . . . > 4M            *MIN, 1200, 2400, 4800...
Cost/connect time  . . . . . . . > 0             0-255
Cost/byte  . . . . . . . . . . . > 0             0-255
Security for line  . . . . . . . > *NONSECURE    *NONSECURE, *PKTSWTNET...
Propagation delay  . . . . . . . > *LAN          *MIN, *LAN, *TELEPHONE...
User-defined 1 . . . . . . . . . > 128           0-255
User-defined 2 . . . . . . . . . > 128           0-255
User-defined 3 . . . . . . . . . > 128           0-255
Autocreate controller  . . . . . > *YES          *YES, *NO
Autodelete controller  . . . . . > 1440          1-10000 (minutes), *NONE
Recovery limits:
  Count limit  . . . . . . . . . > 2             0-99, *SYSVAL
  Time interval  . . . . . . . . > 5             0-120 (minutes)
```

Figure 3. Create a Line Description for Token-Ring at Central Site System

Create a Controller Description

Figure 4 shows the parameters we used to create the controller description on the central site system that describes the physical connection to the managed system RCHASM03.

```
                    Create Ctl Desc (APPC) (CRTCTLAPPC)

Type choices, press Enter.

Controller description . . . . .   RCHASM03      Name
Link type  . . . . . . . . . . . > *LAN          *ANYNW, *FAX, *FR, *IDLC...
Online at IPL  . . . . . . . . . > *YES          *YES, *NO
APPN-capable . . . . . . . . . . > *YES          *YES, *NO
Switched line list . . . . . . . > ITSCTRN       Name
               + for more values
Maximum frame size . . . . . . . > 16393         265-16393, 256, 265, 512...
Remote network identifier  . . . > *NETATR       Name, *NETATR, *NONE, *ANY
Remote control point . . . . . . > RCHASM03      Name, *ANY
Exchange identifier  . . . . . .                 00000000-FFFFFFFF
Initial connection . . . . . . . > *DIAL         *DIAL, *ANS
Dial initiation  . . . . . . . . > *LINKTYPE     *LINKTYPE, *IMMED, *DELAY
Data link role . . . . . . . . . > *NEG          *NEG, *PRI, *SEC
LAN remote adapter address . . . > 400000001003  000000000001-FFFFFFFFFFFF
APPN CP session support  . . . . > *YES          *YES, *NO
APPN node type . . . . . . . . . > *ENDNODE      *ENDNODE, *LENNODE...
APPN/HPR capable . . . . . . . . > *YES          *YES, *NO
APPN transmission group number   > 1             1-20, *CALC
APPN minimum switched status . . > *VRYONPND     *VRYONPND, *VRYON
Autocreate device  . . . . . . . > *ALL          *ALL, *NONE
Autodelete device  . . . . . . . > 1440          1-10000, *NO
Model controller description . . > *NO           *NO, *YES
Text 'description' . . . . . . . > *BLANK
Character code . . . . . . . . . > *EBCDIC       *EBCDIC, *ASCII
Switched disconnect  . . . . . . > *YES          *YES, *NO
Disconnect timer:
  Minimum connect timer  . . . . > 170           0-65535 seconds
  Disconnection delay timer  . . > 30            0-65535 seconds
LAN DSAP . . . . . . . . . . . . > 04            04, 08, 0C, 10, 14, 18, 1C...
LAN SSAP . . . . . . . . . . . . > 04            04, 08, 0C, 10, 14, 18, 1C...
Recovery limits:
  Count limit  . . . . . . . . . > 2             0-99, *SYSVAL
  Time interval  . . . . . . . . > 5             0-120 (minutes)
```

Figure 4. Create a Controller Description for a Remote AS/400 System

Enable Alert Support

In our sample network, the central site system is also the service provider system. It is the system on which we centralize problem management for our network. Therefore, we configured the central site system as an *alert focal point*. This allows the operator at the service provider to create a problem record from the alert, either manually or automatically. You can then use the problem record to start remote problem analysis and track the answer to remote problems from a central site in the network.

If a problem record on the service requester has an alert associated with it, the problem is automatically opened at the central site system. For more information on how to set up and use alerts and a problem log, see *System Manager/400 Use* and *Network and System Management*

Change the Network Attributes (CHGNETA Command)

Use the Change Network Attributes command to set up the central site system as an alert focal point:

```
CHGNETA ALRSTS(*ON) ALRLOGSTS(*ALL) ALRPRIFP(*YES)
```

Figure 5 shows the network attributes of the central site system used in our examples.

```
                          Display Network Attributes
                                                          System:   RCHASM02
 Current system name  . . . . . . . . . . . . . . . :   RCHASM02
   Pending system name  . . . . . . . . . . . . . . :
 Local network id . . . . . . . . . . . . . . . . . :   ITSCNET
 Local control point name . . . . . . . . . . . . . :   RCHASM02
 Default local location . . . . . . . . . . . . . . :   RCHASM02
 Default mode . . . . . . . . . . . . . . . . . . . :   BLANK
 APPN node type . . . . . . . . . . . . . . . . . . :   *NETNODE
 Data compression . . . . . . . . . . . . . . . . . :   *NONE
 Intermediate data compression  . . . . . . . . . . :   *NONE
 Maximum number of intermediate sessions  . . . . . :   200
 Route addition resistance  . . . . . . . . . . . . :   128
 Server network id/control point name . . . . . . . :   *LCLNETID   *ANY
                                                                       More...
 Press Enter to continue.

 F3=Exit   F12=Cancel
```

Figure 5 (Part 1 of 2). Display Network Attributes (DSPNETA)

```
                          Display Network Attributes
                                                          System:   RCHASM02
 Alert status . . . . . . . . . . . . . . . . . . . :   *ON
 Alert logging status . . . . . . . . . . . . . . . :   *ALL
 Alert primary focal point  . . . . . . . . . . . . :   *YES
 Alert default focal point  . . . . . . . . . . . . :   *NO
 Alert backup focal point . . . . . . . . . . . . . :
   Network id . . . . . . . . . . . . . . . . . . . :     *NONE
 Alert focal point to request . . . . . . . . . . . :
   Network id . . . . . . . . . . . . . . . . . . . :     *NONE
 Alert controller description . . . . . . . . . . . :   *NONE
 Alert hold count . . . . . . . . . . . . . . . . . :   0
 Alert filter . . . . . . . . . . . . . . . . . . . :   *NONE
   Library  . . . . . . . . . . . . . . . . . . . . :
```

Figure 5 (Part 2 of 2). Display Network Attributes (DSPNETA)

Work with Sphere of Control (WRKSOC Command)

Use the WRKSOC command at the service provider to add service requesters to the service provider's alert sphere of control.

```
                      Work with Sphere of Control (SOC)
                                                                System:   RCHASM02
Position to  . . . . . . . .             Control Point
  Network id . . . . . . . .

Type options, press Enter.
  1=Add   4=Remove


     Control
Opt  Point     Network id  Current Status
                *NETATR
 _   RCHASM03   ITSCNET    Active
 _   RCHAS040   ITSCNET    Active
 _   RCHAS110   ITSCNET    Active
 _   RCHAS377   ITSCNET    Active
```

Figure 6. Work with Sphere of Control (WRKSOC)

Set Up the System as a Service Provider

To set up the system as a service provider, you must define all of the service requesters that are entitled to receive service from the service provider system.

Work with Service Requesters (WRKSRVRQS Command)

The Work with Service Requesters (WRKSRVRQS) command defines a list of service requesters entitled to receive service from this system.

To define a new service requester to your service provider (the central site system in our case), do either of the following:

- Display the System Manager/400 main menu by entering:

  GO SVSM

- Select option 1, Configure System Manager/400.
- Select option 3, Work with service requesters.

-or-

- On any command line, enter the command:

  WRKSRVRQS

A panel such as the one shown in Figure 7 on page 48 is shown on your display.

```
                         Work with Service Requesters
                                                                System:   RCHASM02
Position to  . . . . .   ________   Control point
  Network id . . . . .    ________

Type options, press Enter.
  1=Add   2=Change   3=Copy   4=Remove   5=Display

        Control
Opt     Point        Network id     Description
 1      RCHASM03      ITSCNET_      Production AS/400_________________

  (No service requesters defined.)


                                                                          Bottom
F3=Exit   F5=Refresh   F12=Cancel   F13=Configure Distribution Services
```

Figure 7. Work with Service Requesters (WRKSRVRQS)

Select option 1, Add. Enter the control point name and network ID of the service requester to be configured. Press Enter. A panel such as the one in Figure 8 is displayed.

Enter the machine type and serial number of the new managed system, but *do not press Enter.* Advance to the next panel by pressing the Page Down key. The latter is important for adding systems that do *not* have Managed System Services/400 installed.

```
                          Add Service Requester
                                                                System:   RCHASM02
Control point . . . . . . . . . . :   RCHASM03
  Network id  . . . . . . . . . . :     ITSCNET
Description . . . . . . . . . . . :   :Production AS/400

Type information, press Enter.

  Contact . . . . . . . . . . . . .   Wilfried Blankertz_______________
  Contact telephone numbers:
    Primary . . . . . . . . . . . .   507-286-0000_______
    Alternative . . . . . . . . . .   507-286-9999________
  Mailing address:
    Street address  . . . . . . . .   Any Street__________________________
                                      ____________________________________
                                      ____________________________________
    City/State  . . . . . . . . . .   ANYCITY/AS___________________________
    Country . . . . . . . . . . . .   Germany_____________
    Zip code  . . . . . . . . . . .   88901_______
  Machine type  . . . . . . . . . .   9404
  Serial number . . . . . . . . . .   10-10003__
                                                                          More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel
```

Figure 8 (Part 1 of 2). Add Service Requester

```
                              Add Service Requester
                                                                 System:   RCHASM02
 Control point . . . . . . . . . . :   RCHASM03
   Network id  . . . . . . . . . . :     ITSCNET
 Description . . . . . . . . . . . :   System for Application Tests

 Type information, press Enter.

   Distribution queue type . . . . .   *SVDS__        *SVDS, *SNADS
   Service attributes:
     Log remote problems . . . . . .   *SRVPVDA       *SRVPVDA, *NONE, *SRVRQS,
                                                        *ALERT, *ALL
     Send PTFs automatically . . . .   *SRVPVDA       *SRVPVDA, *NO, *YES
     Message queue . . . . . . . . .   *SRVPVDA       Name, *SRVPVDA
       Library . . . . . . . . . . .                  Name, *LIBL, *CURLIB
     Maximum distribution  . . . . .   *SRVPVDA       1-5000, *SRVPVDA, *NOMAX
     Cover letter language . . . . .   *SRVPVDA       *SRVPVDA, F4 for List
     Forward requests automatically    *SRVPVDA       *SRVPVDA, *NO, *YES

                                                                          Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel
```

Figure 8 (Part 2 of 2). Add Service Requester

The distribution queue type parameter actually determines whether Managed System Services/400 is used on the service requester.

***SVDS** Managed System Services/400 must be installed on the service requester. All of the distribution services provided by Operations Control Center/400 can be used for that system.

***SNADS** Managed System Services/400 is not used on the service requester. The Operations Control Center/400 distribution services is only used to distribute PTFs to that system.

Note

In this book, we are focusing on Operations Control Center/400. Therefore we assume that System Manager/400 and Managed System Services/400 are installed at the central site system and Managed System Services/400 is installed on all of the managed systems that we set up as service requesters. When Managed System Services/400 is installed on the system, setting up the system as a service provider or service requester automatically configures SNADS for you. We do not show how to configure SNADS, since it was automatically configured. If the managed system does *not* have Managed System Services/400 installed, you can only send PTFs to that system. In this case, you *cannot* use Operations Control Center/400 to:

- Send objects other than PTFs.
- Install PTFs or products.
- Delete objects or PTFs.
- Retrieve any objects.
- Run a command or a program.
- IPL the managed system.

While the central site system *requires* System Manager/400 and OS/400 at V3R1 to perform those functions previously mentioned, Managed System Services/400 can also be installed on an OS/400 V2R3 system. See "Release Compatibility" on page 20 for more information on compatibility between releases.

Change Service Provider Attributes (CHGSRVPVDA Command)

The Change Service Provider Attributes command allows you to display or change the configuration attributes of the service provider. You can specify when remote problem log entries are created (LOGRMTPRB), whether fixes are sent automatically in response to a program temporary fix (PTF) order or service request (SNDPTFAUTO), and so forth.

```
                    Change Service Provider Attr (CHGSRVPVDA)

 Type choices, press Enter.

 Log remote problems  . . . . . .   *ALL          *SAME, *NONE, *SRVRQS..
 Send PTFs automatically  . . . .   *YES          *SAME, *NO, *YES
 Message queue  . . . . . . . . .   QSYSOPR       Name, *SAME
   Library  . . . . . . . . . . .     QSYS        Name, *LIBL, *CURLIB
 Maximum distribution . . . . . .   005000        1-5000, *SAME, *NOMAX
 Hold PTFs received . . . . . . .   *NO           *SAME, *NO, *YES
 Cover letter language  . . . . .   2924          F4 for list
 Forward requests automatically     *YES          *SAME, *NO, *YES
```

Figure 9. Change Service Provider Attributes

Work with Supported Products (WRKSPTPRD Command)

The Work with Supported Products command (WRKSPTPRD) allows the operator at the service provider to specify the list of products for which service is provided. In other words, this list contains those products for which the service provider distributes PTFs *to* the services requesters (SNDPTF) or accepts PTFs orders *from* the service requesters (SNDPTFORD).

Use the following procedure to set up product support on your AS/400 service provider:

1. Type the WRKSPTPRD command on any command line and press F4, prompt.
2. In the Release level field, enter the version, release, and modification of the products you are planning to support. Then press Enter. The value *CURRENT refers to products that are at the same VRM as OS/400. Notice however, that programming request for price quotations (PRPQs), licensed program offerings (LPOs), and System Manager/400 packaged products cannot be displayed or printed using *CURRENT. Therefore, we selected *ALL for this parameter.
3. Press F14 (support additional products) to add products to the list of products you currently support. A list of all products and product options for which you can add product support is displayed.
4. Type a 1 (Support) in the Opt field of every product and product option you want to support and press Enter.
5. Press Enter again to return to the Work with Supported Products display. Press F5 (Refresh) to show the products for which you added support.

Figure 10 shows the sequence of steps previously described.

```
                    Work with Supported Products (WRKSPTPRD)

Type choices, press Enter.

Output . . . . . . . . . . . . .   *             *, *PRINT
Release level  . . . . . . . . .   *ALL          *CURRENT, *ALL, VxRxMx




F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 10 (Part 1 of 4). Work with Supported Products (WRKSPTPRD)

```
                         Work with Supported Products
                                                                System:   RCHASM02
Release:   *ALL

Type options, press Enter.
  4=Remove support   5=Display   6=Print
  8=Work with supported language features

              Product
Opt  Product  Option   Description
     5763SV1   *BASE   ADSTAR Distributed Storage Manager/400
     5763UB1   1       Business Conferencing/400 - Windows
     5763UB1   2       Business Conferencing/400 - OS/2
     5763UB1   3       Person to Person - OS/2
     5763UB1   4       Person to Person - Windows


                                                                          Bottom
Command
===>
F3=Exit   F5=Refresh   F6=Print list   F11=Display releases   F12=Cancel
F14=Support additional products        F17=Position to
```

Figure 10 (Part 2 of 4). Work with Supported Products (WRKSPTPRD)

```
                         Support Additional Products
                                                                System:   RCHASM02
Release:   *ALL

Type options, press Enter.
  1=Support

              Product
Opt  Product  Option   Description
 _   5799MPG   *BASE   Performance Management/400
 _   5799MPG   *BASE   Performance Management/400
 _   5799PRG   *BASE   Performance Investigator/400
 _   5799PRG   *BASE   Performance Investigator/400
 _   5799XBK   *BASE   AS/400 Optical Library Support
 _   5799XBK   *BASE   AS/400 Optical Library Support
 _   5799XBL   *BASE   Application Performance Tuning Aid
 _   5799XBL   *BASE   Application Performance Tuning Aid
 1   9AOCC01   *BASE   OCC/400 HANDS-ON LAB PRODUCT


                                                                          Bottom
Command
===>
F3=Exit   F5=Refresh   F11=Display releases   F12=Cancel   F17=Position
```

Figure 10 (Part 3 of 4). Work with Supported Products (WRKSPTPRD)

```
                          Work with Supported Products
                                                                 System:   RCHASM02
 Release:   *ALL

 Type options, press Enter.
   4=Remove support   5=Display   6=Print
   8=Work with supported language features

               Product
 Opt  Product  Option   Description
      5763SV1   *BASE   ADSTAR Distributed Storage Manager/400
      5763UB1   1       Business Conferencing/400 - Windows
      5763UB1   2       Business Conferencing/400 - OS/2
      5763UB1   3       Person to Person - OS/2
      5763UB1   4       Person to Person - Windows
      9AOCC01   *BASE   OCC/400 HANDS-ON LAB PRODUCT

                                                                        Bottom

 Command
 ===>
 F3=Exit   F5=Refresh   F6=Print list   F11=Display releases   F12=Cancel
 F14=Support additional products        F17=Position to
```

Figure 10 (Part 4 of 4). Work with Supported Products (WRKSPTPRD)

Update Managed System Attributes

Managed system attributes are configuration values that affect the entire operation of the managed system.

Change Managed System Attributes (CHGMGDSYSA Command)

You must specify some parameters with the Change Managed System Attributes (CHGMGDSYSA) command to set up and control the functions of Managed System Services/400. As we mentioned earlier, Managed System Services/400 must be installed on both the central site and the managed systems. Most of the parameters of the CHGMGDSYSA command are used to set up Managed System Services/400 at the managed system. However, a few are relevant to the central site system as well. Figure 11 on page 54 highlights those parameters.

To change the Managed System Attributes, either:

- Type CHGMGDSYSA on any command line.
- Press function F4 to prompt:

-or-

- At the Managed System Services/400 main menu (SVMSS), select option 1, Configure Managed System Services/400.
- At the Configure Managed System Services/400 menu (CFGSVMSS), select option 2, Change managed system attributes.

```
                    Change Managed System Atr (CHGMGDSYSA)

Type choices, press Enter.

Accept received activities . . . > *YES_          *SAME, *NO, *YES
Distribution security pgm  . . . > *NONE_____     Name, *SAME, *DFT, *NONE
  Library  . . . . . . . . . . .    __________    Name, *LIBL, *CURLIB
Default user profile . . . . . .   QSVMSS____     Name, *SAME, *NONE
Inactive user time-out . . . . .   10________     0-999 minutes, *SAME, *NONE
Send intermediate responses  . .   *YES_         *SAME, *NO, *YES
Global name prefix tokens  . . . > ITSCNET_________
               + for more values > STANDARD________
Remote command security pgm  . .   *DFT______     Name, *SAME, *DFT
  Library  . . . . . . . . . . .    __________    Name, *LIBL, *CURLIB
Maximum return data  . . . . . .   *NOMAX_____   1-99999 Kilo bytes, *NOMAX...
Delete spool file  . . . . . . .   *SUCCESS      *SAME, *YES, *NO, *SUCCESS
Remote command key . . . . . . . > *NONE_________________________________________
_________________________________

                                                                          Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 11. Change Managed System Attributes (CHGMGDSYSA) at a Central Site System

Accept Received Activities (ACCRCVCRQA): Specifies whether change request activities are to be accepted for processing. Assuming that the central site system is the system where you submit the change request, you must set this parameter to *YES if you want to process activities locally. For example, your change request description includes activities to retrieve a file from the managed systems. If the file has been successfully retrieved from all of the nodes, then run a change request activity to process the files at the central site system. For this last activity to run successfully, ACCRCVCRQA *must* be set to *YES.

Global Name Prefix Tokens (PFXTOKEN): A global name is the unique name by which an object is known in a network. Global names consist of 1 to 10 tokens. The format of a global name is:

`token1 token2 token3 .... tokenn`

See “Concept of Global Names” on page 17 and *Managed System Services/400 Use* for more information on global names and Chapter 5, “Using the Distribution Repository and Global Naming” on page 211.

Prefix tokens are a special set of tokens that indicate that an AS/400 standard object name is found in the global name.

When AS/400 standard names are specified in fast path commands or change request activities, a global name is created by the system automatically.

Tip

- If the prefix tokens do not match:
  - If you set different prefix tokens at the central and managed systems, you can still send objects and you will NOT receive any error message. The object is stored in the distribution repository of the managed system with a global name that starts with the prefix tokens as defined on the central site system. You must copy it to an AS/400 library using the Copy Distribution Repository Object (CPYDSTRPSO) command.
  - Some functions, such as RUNSMGOBJ, fail with an error message SMU16C1 if the prefix tokens do not match.
  - If you do not set prefix tokens at the central site system, PFXTOKEN(*NONE), any object activity that specifies AS/400 standard object names fails with the message SMU1695.
- Prefix tokens are used *only* for global names created by the system. This means that prefix tokens cannot be used when defining a global name with the Add Distribution Catalog Entry (ADDDSTCLGE) command.
- You should *not* change prefix tokens after entries have been added to the distribution catalog.

You need to specify only one prefix token. We recommend that you specify the Network ID or the enterprise ID as prefix tokens. This helps to uniquely identify the global names when exchanging objects between networks.

Remote Command Key (KEY): When you submit a request to run a remote command (see page 84), you may request encoding of the command string, user profile, and password in the process of transmission. That is, the data is not visible to anyone looking at a communication trace.

The remote command key (KEY) parameter specifies the key that is used for encoding or decoding the remote command request. This value must be the same value on the system that sends the remote command as the value on the system that receives the remote command.

This key is used to encode the command whenever a command activity is submitted with the parameter ENCODE(*YES) for the Run SMG Command (RUNSMGCMD) or Add Command CRQ Activity (ADDCMDCRQA) command.

Activate the Communications Links (WRKCFGSTS Command)

Figure 12 on page 56 shows the status of the line, controller, and device that connects the central site system (RCHASM02) to one of the managed systems (RCHASM03).

```
                         Work with Configuration Status                RCHASM02
                                                              11/14/94  16
 Position to  . . . . .               Starting characters

 Type options, press Enter.
   1=Vary on   2=Vary off   5=Work with job   8=Work with description
   9=Display mode status ...

 Opt  Description       Status                -------------Job-----------
      ITSCTRN           ACTIVE
        RCHASM03        ACTIVE
          RCHASM03      ACTIVE


                                                                   Bottom

 Parameters or command
 ===>
 F3=Exit   F4=Prompt   F12=Cancel   F23=More options   F24=More keys
system
```

Figure 12. Work with Configuration Status (WRKCFGSTS) at the Central Site

Start QSNADS Subsystem (STRSBS Command)

Enter the command:

```
STRSBS QSNADS
```

We recommend that you include this command in the system startup program specified in the system value QSTRUPPGM. The default startup program is QSYS/QSTRUP. We recommend that you use the default as an example but create your own startup program. See "Change the Startup Program at the Managed Systems" on page 208 for an example of a CRQD that can be used to update the program on several managed systems.

Start Managed System Services (STRMGDSYS Command)

Managed System Services/400 uses several jobs on the central site system to send commands and data to the managed system and to receive status information from the managed systems. The jobs run in the system work subsystem QSYSWRK. Refer to chapter 11 in *Managed System Services/400 Use* for a description of the jobs started in QSYSWRK.

The jobs are:

QCQEPMON Monitors scheduled jobs.

QCQRCVDS Sends requests to other systems, handles requests to be run on this system, and receives distributions from SNADS.

QVARRCV Accepts the remote commands from (other) central site systems.

Use the STRMGDSYS command to start the jobs; use the ENDMGDSYS command to end them in a controlled way.

After you have started the managed system services for the first time, it automatically is started at each IPL. That is, you do *not* need to include the STRMGDSYS command in the startup program.

If you need to save, delete, or install Managed System Services/400 a second time on your system, you must end managed system services first.

Start System Manager (STRSYSMGR Command)

The Start System Manager (STRSYSMGR) command starts the jobs in the QSYSWRK subsystem that runs the System Manager/400 program functions. The jobs are:

QNSCRMON Processes submitted change requests. This job also starts activities based on start time and conditioning criteria.

QECS Receives PTF requests, service requests, and test requests from service requesters.

QNSSDSTR Performs initialization and cleanup steps required before running system management functions.

Note: The QNSSDSTR job runs just for a short time after the STRSYSMGR command is issued and then it ends.

Initially, you must start those jobs by entering the Start System Manager (STRSYSMGR) command. Subsequently, they are started automatically at each IPL. You can end the system manager functions with the End System Manager (ENDSYSMGR) command.

The jobs QNSCRMON, QECS, and QNSSDSTR are always run under user profile QSVSM.

Start Manager Services (STRMGRSRV Command)

By starting manager services, you make a system capable of sending commands to managed systems. One additional job is activated in subsystem QSYSWRK:

QCQROMGR Sends remote commands to managed systems.

The End Manager Services command (ENDMGRSRV) discontinues the system's ability to send commands to remote systems.

Note: Unlike STRSYSMGR and STRMGDSYS, the STRMGRSRV is not automatically started with each IPL. You can include the STRMGRSRV command in your startup program as defined in the system value QSTRUPPGM.

If you try to send a remote command (using the RUNSMGCMD fast path command or by submitting a change request containing a command activity), but did not start the manager services at the central site system, the submitted change request fails with message MSS0619:

```
                        Additional message information

Message ID . . . . . . :   MSS0619       Severity . . . . . . . :   40
Date Sent  . . . . . . :   01/30/95      Time Sent  . . . . . . :   14:30:10

Message . . . . :   Command cannot be sent to a managed system.

Cause . . . . . :   A command cannot be sent to a managed system because
  support for this operation is not enabled.
Recovery  . . . :   Enable support for this operation by calling the Start
  Remote Manager (QCQSTRRM) API.  Then try the request again.
```

Figure 13. MSS0619 Command Cannot be Sent to a Managed System

Note, that the second level text for message MSS0619 (Figure 13) does not mention the STRMGRSRV command, but the equivalent Start Remote Manager (QCQSTRRM) API instead.

Configuration Tasks at the Managed System

The *managed system*, sometimes called the *remote system*, is the system controlled by the central site system. The problem management functions of System Manager/400 define systems as *service providers* or *service requesters*. Although it is technically not necessary, we recommend that you configure the *managed system* also as a *service requester*. If you plan to distribute PTFs using the SNDPTF fast path command, you *must* configure the central site system as a service provider and the managed systems as service requesters. If you do so, the necessary SNADS definitions are automatically created for you.

Create APPC/APPN Definitions

This topic describes briefly the APPC/APPN configuration used in our examples. Refer to *Communications Configuration* or the redbook *Communications Definitions Examples* for more information.

Create a Line Description (CRTLINTRN Command)

Figure 14 shows the parameters we used to describe the token-ring line at the managed system .

```
                    Create Line Desc (Token-Ring) (CRTLINTRN)

 Line description . . . . . . . .   ITSCTRN       Name
 Resource name  . . . . . . . . . > LIN131        Name, *NWID, *NWSD
 Online at IPL  . . . . . . . . . > *YES          *YES, *NO
 Vary on wait . . . . . . . . . . > *NOWAIT       *NOWAIT, 15-180 (1 second)
 Maximum controllers  . . . . . . > 40            1-256
 Line speed . . . . . . . . . . . > 4M            4M, 16M, *NWI
 Maximum frame size . . . . . . . > 1994          265-16393, 265, 521, 1033...
 Local adapter address  . . . . . > 400000001003  400000000000-7FFFFFFFFFFF...
 Exchange identifier  . . . . . . > 05643592      05600000-056FFFFF, *SYSGEN
 SSAP list:
   Source service access point  . > 04            02-FE, *SYSGEN
   SSAP maximum frame . . . . . . > *MAXFRAME     *MAXFRAME, 265-16393
   SSAP type  . . . . . . . . . . > *SNA          *CALC, *NONSNA, *SNA, *HPR
Text 'description' . . . . . . . > 'ITSC token ring line'
TRLAN manager logging level  . . > *OFF          *OFF, *MIN, *MED, *MAX
TRLAN manager mode . . . . . . . > *OBSERVING    *OBSERVING, *CONTROLLING
Log configuration changes  . . . > *NOLOG        *LOG, *NOLOG
Token-ring inform of beacon  . . > *NO           *YES, *NO
Error threshold level  . . . . . > *OFF          *OFF, *MIN, *MED, *MAX
Link speed . . . . . . . . . . . > 4M            *MIN, 1200, 2400, 4800...
Cost/connect time  . . . . . . . > 0             0-255
Cost/byte  . . . . . . . . . . . > 0             0-255
Security for line  . . . . . . . > *NONSECURE    *NONSECURE, *PKTSWTNET...
Propagation delay  . . . . . . . > *LAN          *MIN, *LAN, *TELEPHONE...
User-defined 1 . . . . . . . . . > 128           0-255
User-defined 2 . . . . . . . . . > 128           0-255
User-defined 3 . . . . . . . . . > 128           0-255
Autocreate controller  . . . . . > *YES          *YES, *NO
Autodelete controller  . . . . . > 1440          1-10000 (minutes), *NONE
Recovery limits:
  Count limit  . . . . . . . . . > 2             0-99, *SYSVAL
  Time interval  . . . . . . . . > 5             0-120 (minutes)
```

Figure 14. Create a Line Description for Token-Ring

Create a Controller Description (CRTCTLAPPC Command)

Figure 15 shows the parameters we used to create the controller description on the managed system (RCHASM03). This command describes the physical connection to the central site system (RCHASM02).

```
                    Create Ctl Desc (APPC) (CRTCTLAPPC)

Type choices, press Enter.

Controller description . . . . .   RCHASM02      Name
Link type  . . . . . . . . . . . > *LAN          *ANYNW, *FAX, *FR, *IDLC...
Online at IPL  . . . . . . . . . > *YES          *YES, *NO
APPN-capable . . . . . . . . . . > *YES          *YES, *NO
Switched line list . . . . . . . > ITSCTRN       Name
               + for more values
Maximum frame size . . . . . . . > 16393         265-16393, 256, 265, 512...
Remote network identifier  . . . > *NETATR       Name, *NETATR, *NONE, *ANY
Remote control point . . . . . . > RCHASM02      Name, *ANY
Exchange identifier  . . . . . .                 00000000-FFFFFFFF
Initial connection . . . . . . . > *DIAL         *DIAL, *ANS
Dial initiation  . . . . . . . . > *LINKTYPE     *LINKTYPE, *IMMED, *DELAY
Data link role . . . . . . . . . > *NEG          *NEG, *PRI, *SEC
LAN remote adapter address . . . > 400000001002  000000000001-FFFFFFFFFFFF
APPN CP session support  . . . . > *YES          *YES, *NO
APPN node type . . . . . . . . . > *NETNODE      *ENDNODE, *LENNODE...
APPN/HPR capable . . . . . . . . > *YES          *YES, *NO
APPN transmission group number   > 1             1-20, *CALC
APPN minimum switched status . . > *VRYONPND     *VRYONPND, *VRYON
Autocreate device  . . . . . . . > *ALL          *ALL, *NONE
Autodelete device  . . . . . . . > 1440          1-10000, *NO
Model controller description . . > *NO           *NO, *YES
Text 'description' . . . . . . . > *BLANK
Character code . . . . . . . . . > *EBCDIC       *EBCDIC, *ASCII
Switched disconnect  . . . . . . > *YES          *YES, *NO
Disconnect timer:
  Minimum connect timer  . . . . > 170           0-65535 seconds
  Disconnection delay timer  . . > 30            0-65535 seconds
LAN DSAP . . . . . . . . . . . . > 04            04, 08, 0C, 10, 14, 18, 1C...
LAN SSAP . . . . . . . . . . . . > 04            04, 08, 0C, 10, 14, 18, 1C...
Recovery limits:
  Count limit  . . . . . . . . . > 2             0-99, *SYSVAL
  Time interval  . . . . . . . . > 5             0-120 (minutes)
```

Figure 15. Create a Controller Description for the Central Site System

Enable Alert Support

As explained in “Enable Alert Support” on page 45, we configured the central site system as an alert focal point. We must enable alert support on the managed systems to forward alerts to the central site.

Change the Network Attributes (CHGNETA Command)

Use the Change Network Attributes command to enable alert support at the managed system:

```
CHGNETA ALRSTS(*ON) ALRLOGSTS(*LOCAL)
```

Figure 16 on page 60 shows the network attributes of the managed system used in our examples.

```
                          Display Network Attributes
                                                                System:   RCHASM03
 Current system name  . . . . . . . . . . . . . . . :   RCHASM03
   Pending system name  . . . . . . . . . . . . . . :
 Local network id . . . . . . . . . . . . . . . . . :   ITSCNET
 Local control point name . . . . . . . . . . . . . :   RCHASM03
 Default local location . . . . . . . . . . . . . . :   RCHASM03
 Default mode . . . . . . . . . . . . . . . . . . . :   BLANK
 APPN node type . . . . . . . . . . . . . . . . . . :   *NETNODE
 Data compression . . . . . . . . . . . . . . . . . :   *NONE
 Intermediate data compression  . . . . . . . . . . :   *NONE
 Maximum number of intermediate sessions  . . . . . :   200
 Route addition resistance  . . . . . . . . . . . . :   128
 Server network id/control point name . . . . . . . :   *LCLNETID   *ANY
                                                                          More...
 Press Enter to continue.

 F3=Exit   F12=Cancel
```

Figure 16 (Part 1 of 2). Display Network Attributes (DSPNETA)

```
                          Display Network Attributes
                                                                System:   RCHASM02
 Alert status . . . . . . . . . . . . . . . . . . . :   *ON
 Alert logging status . . . . . . . . . . . . . . . :   *LOCAL
 Alert primary focal point  . . . . . . . . . . . . :   *NO
 Alert default focal point  . . . . . . . . . . . . :   *NO
 Alert backup focal point . . . . . . . . . . . . . :
   Network id . . . . . . . . . . . . . . . . . . . :     *NONE
 Alert focal point to request . . . . . . . . . . . :
   Network id . . . . . . . . . . . . . . . . . . . :     *NONE
 Alert controller description . . . . . . . . . . . :   *NONE
 Alert hold count . . . . . . . . . . . . . . . . . :   0
 Alert filter . . . . . . . . . . . . . . . . . . . :   *NONE
   Library  . . . . . . . . . . . . . . . . . . . . :
```

Figure 16 (Part 2 of 2). Display Network Attributes (DSPNETA)

Set Up the Managed System as a Service Requester

To set up the managed system as a service requester, you must define its service provider system.

Work with Service Providers (WRKSRVPVD Command)

The Work with Service Providers (WRKSRVPVD) command allows you to add, change, copy, display, or remove information about the service providers that provide service and support for the system.

To define a new service provider to your service requester (and managed system in our example):

- Display the Managed System Services/400 main menu by entering:

  `GO SVMSS`

- Select option 1, Configure Managed System Services/400.
- Select option 3, Work with service providers:

- or -

- Enter the command:

  `WRKSRVPVD`

on any command line. A display such as the one shown in Figure 17 on page 61 is shown.

```
                          Work with Service Providers
                                                                 System:   RCHASM03
 Position to  . . . . .   ________   Control point
   Network id . . . . .     ________

 Type options, press Enter.
   1=Add   2=Change   3=Copy   4=Remove   5=Display

         Control
 Opt     Point        Network id     Description
  1      RCHASM02      ITSCNET_      Central Site System - Rochester ITSO
  _      *IBMSRV                     IBM Service Support









                                                                          Bottom
 F3=Exit   F5=Refresh   F12=Cancel   F13=Configure distribution services
 F22=Change IBM service route
```

Figure 17. Work with Service Providers (WRKSRVPVD)

Select option 1, Add. Enter the control point name and network ID of the service provider to be defined. Press Enter. A display such as the one shown in Figure 18 is shown.

```
                            Add Service Provider
                                                                 System:   RCHASM03
 Control point . . . . . . . . . . :   RCHASM02
   Network id  . . . . . . . . . . :     ITSCNET
   Description . . . . . . . . . . :     Central Site System - Rochester ITSO

 Type information, press Enter.

   Contact . . . . . . . . . . . . .   Marcela Adan_______________________
   Contact telephone numbers:
     Primary . . . . . . . . . . . .   507-286-1111_______
     Alternative . . . . . . . . . .   507-286-0000_______
   Mailing address:
     Street address  . . . . . . . .   101 Center St_____________________
                                       ___________________________________
                                       ___________________________________
     City/State  . . . . . . . . . .   Rochester/MN_______________________
     Country . . . . . . . . . . . .   USA_________________
     Zip code  . . . . . . . . . . .   55901-2219__


                                                                          Bottom
 F3=Exit   F5=Refresh   F12=Cancel
```

Figure 18. Add Service Provider

If Managed System Services/400 is installed at the service requester, the SNADS configuration required for the distribution functions of Operations Control Center/400 is created automatically.

Update Local Contact Information

You must specify the local contact information that must be supplied to a service provider when you report a problem or request a PTF. From the Work with Support Contact Information (WRKCNTINF) menu, select option 2, Work with local service information and then option 2 again, Change service contact information. Type the information in a display such as the one shown in Figure 19.

```
                      Change Service Contact Information
                                                          System:   RCHASM03
Type changes, press Enter.

  Company . . . . . . . . . .   ANYCO
  Contact . . . . . . . . . .   Wilfried Blankertz
  Contact telephone numbers:
    Primary . . . . . . . . .   507-286-0000
    Alternative . . . . . . .   507-286-9999
  Fax telephone numbers:
    Primary . . . . . . . . .
    Alternative . . . . . . .
  Mailing address:
    Street address  . . . . .   Any Street
                                Bldg 663-3

    City/State  . . . . . . .   AnyCity/AS
    Country . . . . . . . . .   Germany
    Zip code  . . . . . . . .   88901
                                                                   More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel
```

Figure 19. Change Service Contact Information

Update Managed System Attributes

Use the Change Managed System Attributes (CHGMGDSYSA) command to update the system-wide attributes that are unique to the Managed System Services/400 licensed program.

These attributes enable the user to control which activities are to be accepted by the managed system and under which user profile the activity is to be run.

Change Managed System Attributes (CHGMGDSYSA Command)

To change the Managed System Attributes:

- Type CHGMGDSYSA on any command line and press function F4 to prompt,

-or-

- At the Managed System Services/400 main menu (SVMSS), select option 1, Configure Managed System Services/400.
- At the configure Managed System Services/400 menu (CFGSVMSS), select option 2, Change managed system attributes.

```
                    Change Managed System Attr (CHGMGDSYSA)

 Type choices, press Enter.

 Accept received activities . . . > *YES_          *SAME, *NO, *YES
 Distribution security pgm  . . . > *NONE_____     Name, *SAME, *DFT, *NONE
   Library  . . . . . . . . . . .    __________    Name, *LIBL, *CURLIB
 Default user profile . . . . . .   QSVMSS____     Name, *SAME, *NONE
 Inactive user time-out . . . . .   10________     0-999 minutes, *SAME, *NONE
 Send intermediate responses  . .   *YES_         *SAME, *NO, *YES
 Global name prefix tokens  . . . > ITSCNET_________
                + for more values > STANDARD ________
 Remote command security pgm  . .   *DFT______     Name, *SAME, *DFT
   Library  . . . . . . . . . . .    __________    Name, *LIBL, *CURLIB
 Maximum return data  . . . . . .   *NOMAX_____   1-99999 Kilo bytes, *NOMAX...
 Delete spool file  . . . . . . .   *SUCCESS      *SAME, *YES, *NO, *SUCCESS
 Remote command key . . . . . . . > *NONE__________________________________
 __________________________________

                                                                        Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 20. Change Managed System Attributes (CHGMGDSYSA) at the Managed System

Accept Received Activities (ACCRCVCRQA): Specifies whether change request activities are to be accepted for processing.

If this parameter was set to *NO, any request received from a central site system is rejected with SNA Sense Code 080F0983.

Distribution Security Program (SECPGM): Specifies the program to run when a request is received to determine which requests are accepted and under which user profile they will run.

Distribution security program examples are provided with Managed System Services/400 in the source file QSVMSS/QACQSRC.

If you specify *NONE for this parameter, all activities are accepted when ACCRCVACT(*YES) is specified and the default user profile is used to process the activity.

Tip

The default distribution security program allows PTFs or products to be received, but not applied or installed on the managed system. This program does not allow other objects to be manipulated. If the distribution security program (SECPGM) parameter is set to *DFT, any distribution of objects (except for sending PTF or products) fails with the error message MSS001F and SNA Sense Code 080F0983.

Default User Profile (DFTUSRPRF): Specifies the default user profile used for the change request activity if no distribution security program has been specified.

The user profiles QSECOFR, QSPL, QDOC, QDBSHR, QRJE, QSYS, QLPAUTO, QLPINSTALL, QTSTRQS, and QDFTOWN are not valid entries for this parameter.

The default value for this parameter is QSVMSS. The user profile QSVMSS provided with Managed System Services/400 V3R1 has a user class of *SYSOPR

with *JOBCTL special authority. No directory entry is automatically added for this user profile.

The user profile QSVMSS provided with Managed System Services/400 V2R3 has a user class of *USER with no special authority.

Tip

- QSVMSS, or the user profile specified in the DFTUSRPRF parameter, must have the required authority for each object on which you intend to perform the function.
- For some activities, the user profile under which the activity is executed must be enrolled in the system distribution directory. For example, activities executing the Restore Document Library Object (RSTDLO) command or Send Network Message (SNDNETMSG) command must run under a user profile enrolled in the system distribution directory.

Inactive User Time-out (INACTITV): Specifies the number of minutes jobs should wait to receive a remote command request or a change request activity. The job is ended if both of the following are true:

- No activity is received during the specified time period.
- Another profile has activities pending and is not at the maximum number of jobs for the profile.

A new job starts when a new activity is received provided there is no job available (already started) for the same profile when the new activity is received. Server jobs cannot remain active indefinitely. There is a fix maximum: after 48 hours without receiving new activities, the server job ends execution. Every time a new activity is processed, the counters for minimum (specified in the INACTITV attributes) and maximum (48 hours) active time are reset.

Send Intermediate Responses (SNDINTRSP): Specifies whether intermediate responses are sent to the central site system. Intermediate responses may require activation of switched communication links. The SNDINTRSP parameter applies to requests submitted for execution at a future time (execution time at the remote node). It is only in these cases when intermediate (as opposed to final) responses may be generated.

Any of the following actions can be used to see the difference between SNDINTRSP(*YES) and SNDINTRSP(*NO):

- *APY (ADDPTFCRQA command)
- *APY (ADDPTFCRQA command, when the Extent of Change parameter is specified as *PERM)
- *RUN (ADDOBJCRQA command)
- *RESTART (ADDRSCCRQA command)

Typically, when one of these activities is received at a managed system, a response is generated indicating that the request is attempted (intermediate response) and a job is scheduled for that request. When the request is performed, a final response is sent, indicating the results (SUCCESSFUL or UNSUCCESSFUL).

Activities not having a future execution window time do not generate intermediate responses. They are performed when received, thus generating a final response only. The same applies to those requests that are rejected for any reason at the managed systems, regardless of the execution time.

Global Name Prefix Tokens (PFXTOKEN): A global name is the unique name by which an object is known in a network. Global names consist of 1 to 10 tokens. The format of a global name is:

```
token1 token2 token3 .... tokenn
```

See "Concept of Global Names" on page 17 and *Managed System Services/400 Use* for more information on global names and Chapter 5, "Using the Distribution Repository and Global Naming" on page 211 for information on how to use global names.

Prefix tokens are a special set of tokens that indicate that an AS/400 standard object name is found in the global name.

When AS/400 standard names are specified in fast path commands and change request activities, a global name is created by the system automatically.

You need to specify only one prefix token. Specify the Network ID or the enterprise ID as prefix tokens. This helps to uniquely identify the global names when exchanging objects between networks.

Remote Command Security Program (RMTSECPGM): Specifies the remote command security program to be used. The specified program is run when a request to run a command is received from the central site system. This program determines if the request is accepted and under which user profile it should be run.

Remote command security program examples are provided with Managed System Services/400 in the source file QSVMSS/QACQSRC.

If you specify *DFT for this parameter, the default command security program is used. This security program allows all commands to be received and run on the system.

Maximum Return Data (MAXDTA): Specifies the limitation in Kilobytes for the maximum amount of data that can be returned to the request sender when a remote command request is processed.

If you specify *NOMAX for this parameter, there is no limitation on the amount of returned data.

Delete Spool File (DLTSPLF): Specifies whether the spool file is deleted after a remote command request is completed.

If you specify *SUCCESS for this parameter, the spool file is deleted only when the request completes successfully.

Note: Spool files in output queue QEZJOBLOG can be deleted regularly by using the Operational Assistant cleanup function. Other spool files may remain at the managed system for a long time if they are not printed. Use the Change Cleanup (CHGCLNUP) command to activate the cleanup function by specifying parameter ALWCLNUP(*YES) and SYSPRT(number-of-days) to define when to delete the job logs.

Remote Command Key (KEY): When you submit a request to run a remote command (see page 84), you may request to encode the command string, user profile, and password in the process of transmission. That is, the data is not visible to anybody looking at a communication trace.

The remote command key (KEY) parameter specifies the key that is used for encoding or decoding the remote command request. This value must be the same value on the system that sent the remote command as the value on the system that receives the remote command.

This key is used to encode the command whenever a command activity is submitted with the parameter ENCODE(*YES) for the Run SMG Command (RUNSMGCMD) or Add Command CRQ Activity (ADDCMDCRQA) command.

Activate the Communications Links (WRKCFGSTS Command)

Figure 21 shows the status of the line, controller, and device that connects the managed system (RCHASM03) to the central site system (RCHASM03).

```
                         Work with Configuration Status                RCHASM03
                                                              11/14/94  16
 Position to  . . . . .               Starting characters

 Type options, press Enter.
   1=Vary on   2=Vary off   5=Work with job   8=Work with description
   9=Display mode status ...

 Opt  Description       Status                -------------Job-----------
      ITSCTRN           ACTIVE
        RCHASM02        ACTIVE
          RCHASM02      ACTIVE


                                                                    Bottom

 Parameters or command
 ===>
 F3=Exit   F4=Prompt   F12=Cancel   F23=More options   F24=More keys
```

Figure 21. Work with Configuration Status (WRKCFGSTS) at the Managed System

Start QSNADS Subsystem (STRSBS Command)

Enter the command:

```
STRSBS QSNADS
```

We recommend that you include this command in the system start up program specified in the system value QSTRUPPGM. The default is QGPL/QSTRUP.

Start Managed System Services (STRMGDSYS Command)

Use the Start Managed System Services (STRMGDSYS) command to start the jobs that perform managed system functions. For a description of these jobs, see Managed System Services/400 Use, Chapter 11.

Configuration Summary

This section summarizes the configuration objects discussed in previous sections of this chapter.

- Central site system (service provider - RCHASM02)
  1. Install System Manager/400 (5763-SM1) and Managed System Services/400 (5763-MG1):
     - RSTLICPGM

       - or -
     - GO LICPGM and select menu option 11, Install licensed programs.
  2. Create APPC/APPN definitions:
     - CRTLINxxx **1**
     - CRTCTLAPPC **2**
  3. Enable alert support:
     - Change Network Attributes (CHGNETA) **3**
     - Work with Sphere of Control (WRKSOC) **4**
  4. Set up the system as a service provider:
     - Work with Service Requesters (WRKSRVRQS) **5**
     - Change Service Provider Attributes (CHGSRVPVDA) **6**
     - Work with Supported Products (WRKSPTPRD) **7**

     Note: Configuring the system as a service provider automatically creates the necessary SNADS definitions **8**.
  5. Update managed system attributes:
     - Change Managed System Attributes (CHGMGDSYSA) **9**
  6. Activate the communications links:
     - Work with Configuration Status (WRKCFGSTS)
  7. Start QSNADS subsystem (STRSBS).
  8. Start Managed System Services (STRMGDSYS).
  9. Start System Manager (STRSYSMGR).
  10. Start Manager Services (STRMGRSRV).
- Managed systems (service requester)
  1. Install Managed System Services/400 (5763-MG1):
     - RSTLICPGM

       - or -
     - GO LICPGM and select menu option 11, Install licensed programs.
  2. Create APPC/APPN definitions:
     - CRTLINxxx **1**
     - CRTCTLAPPC **2**
  3. Enable alert support:
     - Change Network Attributes (CHGNETA) **3**
  4. Set up the system as a service requester:

– Work with Service Providers (WRKSRVPVD) **10**

Note: Configuring the system as a service requester automatically creates the necessary SNADS definitions **8**.

5. Update the local service information:
   – WRKCNTINF **11**
6. Update managed system attributes:
   – Change Managed System Attributes (CHGMGDSYSA) **9**
7. Activate the communications links:
   – Work with Configuration Status (WRKCFGSTS)
8. Start QSNADS subsystem (STRSBS).
9. Start Managed System Services (STRMGDSYS).
10. Verify the service requester - service provider configuration and connection:
    – SNDSRVRQS ACTION(*TEST) RMTCPNAME(RCHASM02)

***Line Descriptions - CRTLINTRN* 1 :**

```
Parameter   RCHASM02      RCHASM03
----------  -------       -------
LIND      : ITSCTRN       ITSCTRN
CATEGORY  : *TRLAN        *TRLAN

RSRCNAME  : LIN111        LIN131
ONLINE    : *YES          *YES
VRYWAIT   : *NOWAIT       *NOWAIT
NETCTL    : ITSCTNET      ITSCTNET
MAXCTL    : 40            40
LINESPEED : 4M            4M
MAXFRAME  : 1994          1994
TRNLOGLVL : *OFF          *OFF
            *OFF          *OFF
TRNMGRMODE: *OBSERVING    *OBSERVING
LOGCFGCHG : *LOG          *LOG
TRNINFBCN : *YES          *YES
ADPTADR   : 400000001002  400000001003
EXCHID    : 056A1002      05643592
TEXT      : ITSC Token R  ITSC TRN line
LINKSPEED : 4M            4M
AUTOCRTCTL: *YES          *YES
AUTODLTCTL: 1440          1440
```

***APPC Controller Descriptions - CRTCTLAPPC* 2 :**

```
PARAMETER   RCHASM02     RCHASM03
----------  --------      --------
CTLD      : RCHASM03     RCHASM02
CATEGORY  : *APPC         *APPC
LINKTYPE  : *LAN          *LAN
ONLINE    : *YES          *YES
SWITCHED L: ITSCTRN       ITSCTRN
CODE      : *EBCDIC       *EBCDIC
MAXFRAME  : 16393         16393
RMTNETid  : ITSCNET       ITSCNET
RMTCPNAME : RCHASM03     RCHASM02
```

```
INLCNN    : *DIAL         *DIAL
DIALINIT  : *LINKTYPE     *LINKTYPE
SWTDSC    : *YES          *YES
ROLE      : *NEG          *NEG
ADPTADR   : 400000001003  400000001002
DSAP      : 04            04
SSAP      : 04            04
AUTOCRTDEV: *ALL          *ALL
TEXT      :
SWTLINLST : ITSCTRN       ITSCTRN
APPN      : *YES          *YES
CPSSN     : *YES          *YES
NODETYPE  : *CALC         *CALC
HPR       : *YES          *YES
TMSGRPNBR : *CALC         *CALC
MINSWTSTS : *VRYONPND     *VRYONPND
AUTODLTDEV: 1440          1440
MDLCTL    : *NO           *NO
CTLOWN    : *USER         *USER
```

Network Attributes - CHGNETA **3** ***:***

```
SYSNAME:....: RCHASM02       RCHASM03
LCLNETID....: ITSCNET        ITSCNET
LCLCPNAME...: RCHASM02       RCHASM03
LCLOCNAME...: RCHASM02       RCHASM03
DFTMODE.....: BLANK          BLANK
NODETYPE....: *NETNODE       *NETNODE
DTACPR......: *NONE          *NONE
DTACPRINM...: *NONE          *NONE
MAXINTSSN...: 200            200
RAR.........: 128            128
NETSERVER...: *LCLNETID *ANY *LCLNETID
ALRSTS......: *ON            *ON
ALRLOGSTS...: *ALL           *LOCAL
ALRPRIFP....: *YES                *NO
ALRDFTFP....: *NO            *NO
ALRBCKFP....:
Net id......: *NONE          *NONE
ALRRQSFP....:
Net id . . .: *NONE          *NONE
ALRCTLD.....: *NONE          *NONE
ALRHLDCNT...: 0              0
ALRFTR......: *NONE          *NONE
ALRFTRLIB...:
MSGQ........: QSYSOPR        QSYSOPR
MSGQLIB.....: QSYS           QSYS
OUTQ........: QPRINT         QPRINT
OUTQLIB.....: QGPL           QGPL
JOBACN......: *FILE          *FILE
MAXHOP......: 16             16
DDMACC......: *OBJAUT        *OBJAUT
DDMACCLIB...:
PCSACC......: *OBJAUT        *OBJAUT
PCSACCLIB...:
DFTNETTYPE..:
DFTCNNLIST..: QDCCNNLANY     QDCCNNLANY
ALWANYNET...: *YES           *YES
NWSDOMAIN...: FS400TST       FS400TST
```

Alert Sphere of Control - WRKSOC **4** ***:***

```
                      Work with Sphere of Control (SOC)
                                                              System:   RCHASM02
 Position to  . . . . . . . .             Control Point
   Network id . . . . . . . .

 Type options, press Enter.
   1=Add   4=Remove


      Control
 Opt  Point     Network id  Current Status
                 *NETATR
      RCHASM03   ITSCNET    Active
      RCHAS040   ITSCNET    Active
```

Work with Service Requesters - WRKSRVRQS **5** ***:***

```
                              Display Service Requester
                                                            System:   RCHASM02
Control point . . . . . . . . . . :   RCHASM03
  Network id  . . . . . . . . . . :     ITSCNET
Description . . . . . . . . . . . :   Production AS/400

Type information, press Enter.

  Contact . . . . . . . . . . . . . .   Wilfried Blankertz_______________
  Contact telephone numbers:
    Primary . . . . . . . . . . . . .   507-286-0000_______
    Alternative . . . . . . . . . . .   507-286-9999________
  Mailing address:
    Street address  . . . . . . . . .   Any Street_______________________
                                        ________________________________
                                        ________________________________
    City/State  . . . . . . . . . . .   ANYCITY/AS_______________________
    Country . . . . . . . . . . . . .   Germany_____________
    Zip code  . . . . . . . . . . . .   88901_______
  Machine type  . . . . . . . . . . .   9404
  Serial number . . . . . . . . . . .   10-10003__
   Distribution queue type . . . . .    *SVDS__        *SVDS, *SNADS
   Service attributes:
     Log remote problems . . . . . .    *SRVPVDA       *SRVPVDA, *NONE, *SRVRQS,
                                                         *ALERT, *ALL
     Send PTFs automatically . . . .    *SRVPVDA       *SRVPVDA, *NO, *YES
     Message queue . . . . . . . . .    *SRVPVDA       Name, *SRVPVDA
       Library . . . . . . . . . . .                   Name, *LIBL, *CURLIB
     Maximum distribution  . . . . .    *SRVPVDA       1-5000, *SRVPVDA, *NOMAX
     Cover letter language . . . . .    *SRVPVDA       *SRVPVDA, F4 for List
     Forward requests automatically     *SRVPVDA       *SRVPVDA, *NO, *YES
```

Change Service Provider Attributes **6** ***:***

```
                    Change Service Provider Attr (CHGSRVPVDA)

 Type choices, press Enter.

 Log remote problems  . . . . . .   *ALL          *SAME, *NONE, *SRVRQS..
 Send PTFs automatically  . . . .   *YES          *SAME, *NO, *YES
 Message queue  . . . . . . . . .   QSYSOPR       Name, *SAME
   Library  . . . . . . . . . . .     QSYS        Name, *LIBL, *CURLIB
```

```
Maximum distribution . . . . . .   005000        1-5000, *SAME, *NOMAX
Hold PTFs received . . . . . . .   *NO           *SAME, *NO, *YES
Cover letter language  . . . . .   2924          F4 for list
Forward requests automatically     *YES          *SAME, *NO, *YES
```

Work With Supported Products - WRKSPTPRD **7** ***:***

```
                         Work with Supported Products
                                                              System:   RCHASM02
Release:   *ALL

Type options, press Enter.
  4=Remove support   5=Display   6=Print
  8=Work with supported language features

              Product
Opt  Product  Option   Description
     5763SV1   *BASE   ADSTAR Distributed Storage Manager/400
     5763UB1   1       Business Conferencing/400 - Windows
     5763UB1   2       Business Conferencing/400 - OS/2
     5763UB1   3       Person to Person - OS/2
     5763UB1   4       Person to Person - Windows
     9AOCC01   *BASE   OCC/400 HANDS-ON LAB PRODUCT
```

SNADS Configuration - Automatically Created **8** ***:***

```
 SYSTEM NAME                     RCHASM02               RCHASM03

Queue . . . . . . . . . . . :   RCHASM03ITSCNET        RCHASM02ITSCNET
Queue type  . . . . . . . . :   *SVDS                  *SVDS
Remote location name  . . . :   RCHASM03               RCHASM02
Mode  . . . . . . . . . . . :   *NETATR                *NETATR
Remote net id . . . . . . . :   ITSCNET                *LOC
Local location name . . . . :   *LOC                   *LOC
Normal priority:
  Send time:
    From/To . . . . . . . . :    :        :             :        :
    Force . . . . . . . . . :    :                      :
  Send depth  . . . . . . . :    1                      1

Number of retries . . . . . :    3                      3
Number of minutes
  between retries . . . . . :    5                      5
To ignore time/depth values
  while receiving:
  Send queue  . . . . . . . :    N                      N
```

Change Managed System Attributes - CHGMGDSYSA **9** ***:***

```
SYSTEM NAME                        RCHASM02              RCHASM03

 Distribution attributes:
   Accept received activities . :   *YES                 *YES
   Distribution security pgm  . :   *NONE                *NONE
     Library  . . . . . . . . . :
   Default user profile . . . . :   QSVMSS               QSVMSS
   Inactive user time-out . . . :   30                   10
   Send intermediate responses  :   *YES                 *YES
   Global name prefix tokens  . :   ITSCNET STANDARD     ITSCNET STANDARD
 Remote command attributes:
   Remote command security pgm  :   *DFT                 *DFT
```

```
    Library  . . . . . . . . . :
  Maximum return data  . . . . :   *NOMAX                *NOMAX
  Delete spool file  . . . . . :   *SUCCESS              *SUCCESS
  Remote command key . . . . . :   *NONE                 *NONE
```

Work with Service Providers - WRKSRVPVD **10** ***:***

```
                            Display Service Provider

 Control point . . . . . . . . . :   RCHASM02
   Network id  . . . . . . . . . :     ITSCNET
   Description . . . . . . . . . :     Central Site Service Provider

 Contact . . . . . . . . . . . . :   Marcela Adan
 Contact telephone numbers:
   Primary . . . . . . . . . . . :   507-286-1111
   Alternative . . . . . . . . . :   507-286-0000
 Mailing address:
   Street address  . . . . . . . :   101 Center St


   City/State  . . . . . . . . . :   Rochester/MN
   Country . . . . . . . . . . . :   USA
   Zip code  . . . . . . . . . . :   55901
```

Work with Contact Information - WRKCNTINF **11** ***:***

```
                      Change Service Contact Information
                                                          System:   RCHASM03
Type changes, press Enter.

  Company . . . . . . . . . .   ANYCO
  Contact . . . . . . . . . .   Wilfried Blankertz
  Contact telephone numbers:
    Primary . . . . . . . . .   507-286-0000
    Alternative . . . . . . .   507-286-9999
  Fax telephone numbers:
    Primary . . . . . . . . .
    Alternative . . . . . . .
  Mailing address:
    Street address  . . . . .   Any Street
                                Bldg 663-3

    City/State  . . . . . . .   AnyCity/AS
    Country . . . . . . . . .   Germany
    Zip code  . . . . . . . .   88901
```

SNADS and Operations Control Center/400

SNADS provides facilities to send information (such as network files, network messages, or documents) asynchronously from one *user* to another. Originally, you could only send distributions to another *system* by addressing a recipient user profile enrolled in the system directory. The intention of Operations Control Center/400, however, is to distribute objects to a system rather than to a user.

To send or receive PTFs, System Manager/400 for V2R2 and earlier must have a directory entry added for user QSRVBAS on every AS/400 system acting as a service provider or service requester. User ID and address for that directory must be CP name and network ID, unlike the usual convention where the User ID

equals the user profile name and the address equals the system name. Also, the primary system name is not used for that entry; a two part secondary system name has to be defined instead by combining the CP name and network ID.

This setup for SNADS allows System Manager/400 to distribute PTFs to *systems* (as opposed to users), by using the IBM supplied user profile QSRVBAS as a representative for each managed system within the network. With V3R1, however, some enhancements to SNADS have been introduced to simplify configuration of Operations Control Center/400. To describe these enhancements, we need to review some SNADS concepts:

Whenever a user distributes an object using Object Distribution Facility commands, for example:

```
SNDNETF mylib/myfile ((userID address))
```

SNADS routes the distribution by performing the following steps:

1. Uses the system directory to determine the recipient's system name.
2. Searches with the system name for an entry in the routing table to find the name of a distribution queue.
3. Places the data to be distributed on the found distribution queue.
4. Establishes an APPC connection to the remote location found in the description for the distribution queue.
5. Sends the data over that APPC connection to the remote location.

Figure 22 on page 74 shows the relationship of the data elements used in steps 1 through 5.

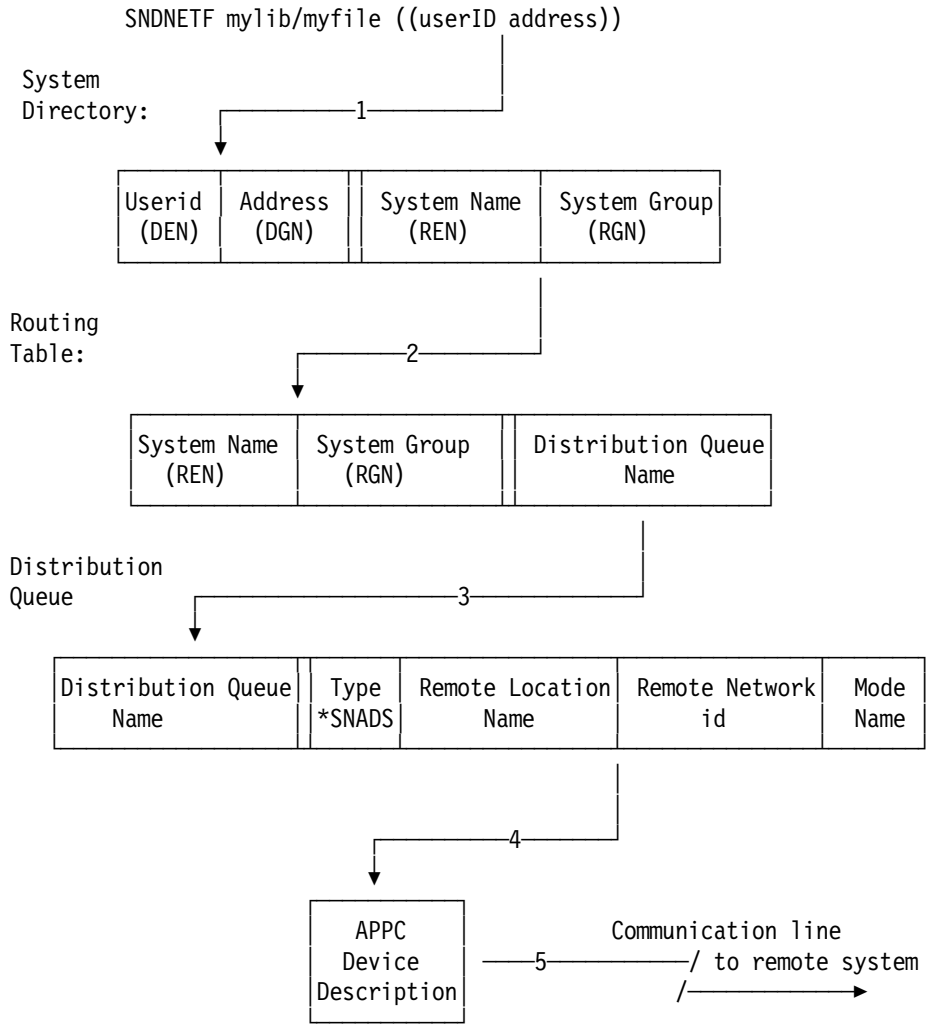


Figure 22. SNADS Routing for SNADS Object Distribution

A new type of distribution queue for SystemView Distribution Services (*SVDS) has been implemented in SNADS in V3R1. The queue type *SVDS is only used by Managed System Services/400.

Using SVDS queues, Managed System Services/400 actually distributes to a system rather than to a user. Steps 1 and 2 of the routing process are avoided.

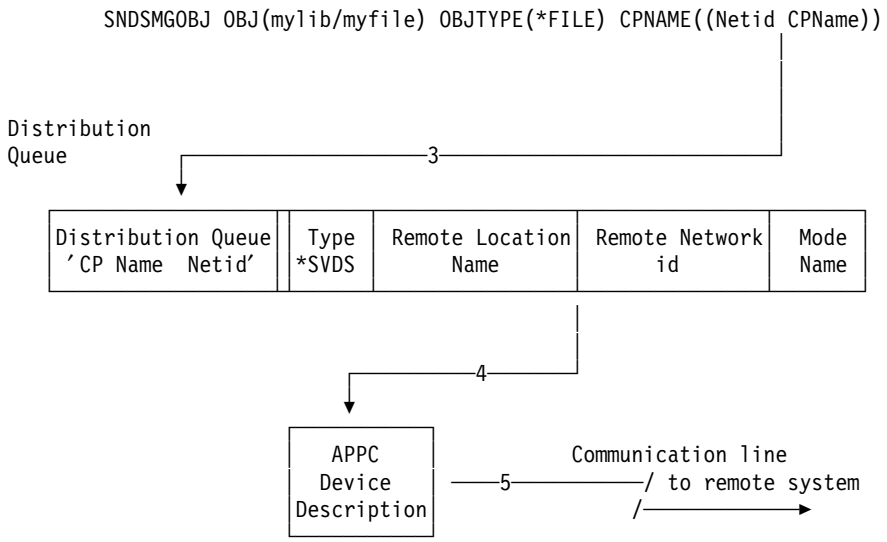


Figure 23. SNADS Routing for SVDS Object Distribution

An entry in the routing table is not required as long as the name of the *SVDS distribution queue is equal to the CP name and network ID of the destination system, including blanks. Blanks must be included if the CP name has less than eight characters. For example, if the CP name of your managed system were SYSA and its network ID were APPN, you could create an SVDS distribution queue by entering:

```
ADDDSTQ DSTQ('SYSA    APPN') RMTLOCNAME(SYSA) +
                 DSTQTYPE(*SVDS) RMTNETid(APPN)
```

Creating such a distribution queue is exactly what the system does for you when you configure a system as a service provider or a service requester as discussed in "Set Up the System as a Service Provider" on page 47 and "Set Up the Managed System as a Service Requester" on page 60.

In the following topic, we describe the tasks that you need to perform to set up the SNADS configuration manually. This description should also help you understand what is done by the system automatically.

Using the Fan-out Capability of SNADS: Although not needed, you may add an entry to the routing table pointing to an *SVDS queue. In that case, the *system name* in that entry must be equal to the *CP name*, and the *system group name* must be equal to the *network ID*. The distribution can have any arbitrary name. The routing entry must be used if your network contains intermediate nodes and you want to use the *fan-out* capabilities of SNADS. When you want to distribute the same object to multiple systems using the SNADS fan-out feature, only one copy of the object is distributed to the adjacent or intermediate system. That system, in turn, distributes it to the other systems.

Creating *SVDS Distribution Queues

There must be an *SVDS distribution queue on the central site system for each managed system to be controlled by it.

Use the Add Distribution Queue (ADDDSTQ) command or the Configure Distribution Services (CFGDSTSRV) command to create an *SVDS distribution queue. Figure 24 on page 76 shows how to create a SNADS queue type *SVDS.

```
                          Add Distribution Queue                Page 1 of 2

Type choices, press Enter.

  Queue  . . . . . . . . . . .   RCHASM03ITSCNET   Name
  Queue type . . . . . . . . .   *SVDS___           *SNADS, *RPDS, *SVDS, *DLS
  Remote location name . . . .   RCHASM03           Name
  Mode . . . . . . . . . . . .   *NETATR_           Name, *NETATR
  Remote net id  . . . . . . .   *LOC____           Name, *LOC, *NONE
  Local location name  . . . .   *LOC____           Name, *LOC
  Normal priority:
    Send time:
      From/To  . . . . . . . .   __ : __  __ : __   00:00-23:59
      Force  . . . . . . . . .   __ : __            00:00-23:59
    Send depth . . . . . . . .   __1                1-999, blank
  High priority:
    Send time:
      From/To  . . . . . . . .   __ : __  __ : __   00:00-23:59
      Force  . . . . . . . . .   __ : __            00:00-23:59
    Send depth . . . . . . . .   __1                1-999, blank

                                                                      More...
F3=Exit      F12=Cancel
```

*Figure 24. Add a *SVDS Distribution Queue*

Tip

- If you use the naming convention[1] *Queue name=CPNameNetid*, you do not need to configure the corresponding routing entry.
- If you are planning to use Object Distribution Facility functions (SNDNETMSG, SNDNETF) along with Operations Control Center/400, you must also define routing entries and distribution queues type *SNADS.

Using Node Lists

A node list is a system object that contains a list of SNA (IP) nodes identified by an APPN network ID and control point name. All of the entries in a node list used by System Manager/400 *must* be SNA nodes (address type *SNA). The object type is *NODL.

Node lists allow you to group systems in your network. If you specify a node list name in the Operations Control Center/400 distribution commands, the function is performed in all of the systems in the list.

The Work with Node Lists (WRKNODL) command allows you to work with a list of node list objects, to create a new node list, delete existing node lists, and to work with node list entries. Figure 25 on page 77 shows the node list that we used in the examples of this redbook.

[1] Blanks have to be included between CPName and Netid if the CP Name is shorter than eight characters. In that case, you must use quotes whenever you refer to the queue name (for example: WRKDSTQ 'MYAS400 ITSCNET').

```
                          Work with Node List Entries
                                                                  System:   RCHASM02
 Node list  . . . . . . . . . . :   MGD_SYS
   Library  . . . . . . . . . . :     GG244372

 Type options, press Enter.
   1=Add   4=Remove   5=Display

      Node                    Address
 Opt  Name                    Type        Text

      ITSCNET.RCHASM03        *SNA        Application Test
      ITSCNET.RCHAS040        *SNA        ITSC Production
      RPC.RCHAS110            *SNA        Production System - Bldg 110
      RPC.RCHAS377            *SNA        Production System - Bldg 377
```

Figure 25. Work with Node List Entries (WRKNODLE)

The commands that are used to manipulate node list objects are:

- Work with Node List (WRKNODL)
- Add Node List Entry (ADDNODLE)
- Remove Node List Entry (RMVNODLE)
- List Node List Entries (QFVLSTNL) API

Tip

The network ID in the node name defaults to the local system network ID. You only need to specify the network ID if the node in the node list entry is in a different APPN network.

Chapter 3. Using Fast Path Commands for Distribution Activities

There are two ways to invoke the distribution functions of Operations Control Center/400:

- Change request descriptions
- Fast path commands

This chapter introduces the concept of fast path commands and provides examples of how to use them.

What Are Fast Path Commands?

The easiest way to get started using the Operations Control Center/400 distribution capabilities is to use the fast path commands. With fast path commands you can send objects, retrieve objects, apply remote PTFs, send products, retrieve products, and more. These commands are useful when you want to execute a change management or operation management task on managed systems on an ad hoc basis.

If you want to plan operations and changes in advance or perform a complex series of tasks, then you need to create a change request description that is discussed in Chapter 4, “Using CRQD for Complex Remote Operation Scenarios” on page 127.

When you select option 5 (Fast path distribution commands) on the System Manager/400 menu, the following display is shown:

```
FPDST                    Fast Path Distribution Commands
                                                          System:   RCHASM02
Select one of the following:

     1. Send SMG Object
     2. Retrieve SMG Object
     3. Delete SMG Object
     4. Run SMG Object
     5. Run SMG Command

    10. Send PTF
    11. Retrieve PTF
    12. Apply Remote PTF
    13. Remove Remote PTF
    14. Delete Remote PTF

    20. Send product
                                                                  More...
    21. Retrieve product
    22. Install remote product

    50. Change request administration

Selection or command
===> ____________________________________________________________________

 F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=User support
 F16=AS/400 main menu
```

Figure 26. Fast Path Distribution Commands Menu

When a fast path command is executed, a change request description with a *single* activity is automatically created and submitted. The CRQD can be viewed to determine the status of the command. A message is returned identifying the name of the change request. The change request description that is automatically created by the system when running a fast path command cannot be resubmitted.

A change request description consists of one or more activities. Each activity has a type. The activity type specifies the type of operation to be performed by the activity. Currently, the following activity types are available:

***CHGMGT**
Change management generic activity type

***CMD** Run command

***OBJ** Distribute object, run object

***PRD** Distribute product

***PTF** Distribute PTF

***RSC** Activate resource

There are fast path commands for all of the activity types except for resource activation.

For each fast path command, Table 6 contains a description of the corresponding action and activity type for a change request description activity.

Table 6. Relationship between Activity/Actions Types and Fast Path Commands

Activity Type	Add a CRQA using	Action	Used by Fast Path
Object	ADDOBJCRQA	*SND	SNDSMGOBJ
		*SNDRUN	SNDSMGOBJ
		*SNDRUN	SNDSMGOBJ
		*RUN	RUNSMGOBJ
		*DLT	DLTSMGOBJ
Command	ADDCMDCRQA	-	RUNSMGCMD
PTF	ADDPTFCRQA	*SND	SNDPTF
		*SNDAPY	SNDPTF
		*RTV	RTVPTF
		*APY	APYRMTPTF
		*RMV	RMVRMTPTF
		*DLT	DLTRMTPTF
Product	ADDPRDCRQA	*SND	SNDPRD
		*SNDINS	SNDPRD
		*RTV	RTVPRD
		*INS	INSRMTPRD
Resource	ADDRSCCRQA	*RESTART	

After you have entered a fast path command, the system performs the following steps for you:

1. Creates a CRQD with your user profile's name in library QTEMP of your job.
2. Adds one activity to that CRQD. Depending on which of the fast path commands you called, it is the same as using one of the following commands:
   - ADDOBJCRQA
   - ADDCMDCRQA
   - ADDPTFCRQA
   - ADDPRDCRQA
3. Submits the CRQ (SBMCRQ).

4. Deletes the CRQD (DLTCRQD).

Fast Path Command Summary

The following fast paths distribution commands are available with Operations Control Center/400 V3R1:

- Send SMG Object (SNDSMGOBJ)

  Provides the capability of sending an AS/400 object from the central site system to one or more managed systems.

  Most AS/400 object types, including entire libraries, are sent using this command. The object cannot reside in QTEMP. If the object is an AS/400 program object or a file member such as *REXX, *CL, or *UNSPEC, the RUNPGM parameter is set to specify whether or not the object is to be run when received by the managed systems.

- Retrieve SMG Object (RTVSMGOBJ)

  Provides the capability of retrieving an AS/400 object from a managed system. The object cannot reside in QTEMP and can only be retrieved from a single managed system. Most object types, including entire libraries, can be retrieved.

- Delete SMG Object (DLTSMGOBJ)

  Provides the capability of deleting an AS/400 object on a managed system. The object cannot reside in QTEMP. Most object types can be deleted using this command.

- Run SMG Object (RUNSMGOBJ)

  Enables an operator on the central site system to specify that a program or file member is to be run on one or more managed systems.

- Run SMG Command (RUNSMGCMD)

  Provides the capability of sending a command from the central site system to one or more remote systems. The command can be any command that runs in batch. The RTNSPLF (Return Spooled File) parameter is used to specify one of the following:

  – *YES - all spooled files created from the remote command are returned to the central site system from the remote system.
  – *NO - no output data is returned to the central site system.
  – *FAIL - the spooled file job log is returned to the central site system if the command fails when running.

- Send PTF (SNDPTF)

  This command sends a program temporary fix (PTF) to a specific service requester or a list of service requesters. Cover letters are also sent if they are available.

Tip

- The SNDPTF command is the *only* fast path command that is directed to service requesters that do *not* have Managed System Services/400 installed (distribution queue type *SNADS in the service requester configuration).
- The following options are supported *only* when submitting the SNDPTF command to a system with Managed System Services/400 installed (SNADS queue type *SVDS):
  - Apply PTF permanently (*PERM) or temporarily (*TEMP) (Extent of the change).
  - Date and time when the apply can occur on the service requester (Remote apply time).
  - IPL the remote system when the PTF is applied (IPL remote system).
  - IPL date and time at the service requester (remote IPL time).

- Retrieve PTF (RTVPTF)

  Enables an operator on the central site system to retrieve remote PTFs and cover letters from a service requester system. The language of the cover letter is specified in the command.

- Apply Remote PTF (APYRMTPTF)

  Allows a service provider to remotely apply PTFs on the service requester system. When using this command, an IPL of the service requester system is also specified. The dates and times of the apply PTF and IPL are specified.

  Tip

  - Requisite PTFs must have already been applied on the service requester.
  - PTFs are applied in the order that they are listed in the command.

- Remove Remote PTF (RMVRMTPTF)

  Allows a service provider to remotely remove PTFs from one or more selected service requester systems. When using this command, an IPL of the service requester system is also specified. The dates and times of the remove PTF and IPL are specified.

  Tip

  - PTFs are always removed temporarily except VLIC PTFs which are removed permanently.
  - Dependent PTFs must already be removed on the service requester. PTFs are removed in the order that they are listed in the command.

- Delete Remote PTF (DLTRMTPTF)

  Allows a service provider to remotely delete PTFs from one or more selected service requesters that have Managed System Services/400 installed.

- Send Product (SNDPRD)

Provides the capability to send a product packaged with the AS/400 packaging support from the central site system to one or more managed systems. Products can also be installed with this command.

- Retrieve Product (RTVPRD)

  Provides the capability to retrieve a product packaged with the AS/400 product packaging support from a managed system.

- Install Remote Product (INSRMTPRD)

  Provides the capability to install a product packaged with the AS/400 product packaging support from the central site system on one or more managed systems.

Tip

- When executing fast path commands, a change request description automatically created by the system is submitted.
- The execution of activities as a result of submitting fast path commands is independent of each other and asynchronous; if you are submitting fast path commands through a CL program, for example, you can not assume that they are executed or completed in the order of submission.
- There is no message reporting the success or failure of a fast path command. You must use the Work with Submitted Change Request (WRKSBMCRQ) command to track the execution of a fast path command. The name assigned to CRQDs generated through fast path commands is the submitter's user profile, so in order to track them, it is easier to use the following syntax: `WRKSBMCRQ <your_userid>`.
- There are some error conditions that you can monitor immediately after submitting a fast path command. For example, if you want to distribute an object that does not exist, an escape message is sent and the CRQD is not submitted. See *System Manager/400 Use*, SC41-3321, Appendix A for a list of escape messages that are monitored for each fast path command.
- Up to 50 control point names can be specified in a fast path command (except for RTVSMGOBJ, RTVPTF and RTVPRD). If node lists are used, the maximum number of nodes in a node list is 500.

Using Fast Path Commands

This section includes examples of how to use fast path commands.

If you have followed the instructions in Appendix B, "Programming Examples Used in this Book" on page 463 to install the diskette delivered with this redbook and you have set up at least two systems in your network as described in Chapter 2, "Configuring Operations Control Center/400 for Distribution and Remote Operations" on page 41, you should be able to reproduce the examples in this chapter. To do so, sign on at the central site system using the user profile and password OCC400. Follow the examples; change the control point names, system names, and network ID to match your network configuration.

Sample Node List

Refer to “Using Node Lists” on page 76 for a description of node lists.

In our examples, we used the node list GG244372/PRODUCTION. Use the following steps:

- Enter the Work Node List command:

  WRKNODL GG244372/PRODUCTION

- Select option 5, Work with entries.

```
                              Work with Node Lists

Type options, press Enter.
  1=Create   4=Delete   5=Work with entries

     Node
Opt  List        Library     Text

 5   PRODUCTION  GG244372    All Productions Systems
```

- Add new entries to the node list matching your system’s CP name and network ID, and remove our sample entries.

```
                         Work with Node List Entries
                                                                System:   RCHASM02
Node list  . . . . . . . . . :   PRODUCTION
  Library  . . . . . . . . . :     GG244372

Type options, press Enter.
  1=Add   4=Remove   5=Display

     Node                    Address
Opt  Name                    Type        Text
 1   NETID.CPNAME            *SNA        Add your own
 4   ITSCNET.RCHASM03        *SNA        ITSC Production
 4   ITSCNET.RCHAS040        *SNA        9404 E25 Managed System - Production
 4   RPC.RCHAS110            *SNA        Production System at Site 110
```

Remote Operations Fast Path Commands

The Run SMG Command (RUNSMGCMD) fast path command allows you to run AS/400 commands on remote systems.

The following list highlights the main features of the RUNSMGCMD:

- Using RUNSMGCMD, you can run all of the AS/400 commands that allow batch execution.
- You can run programs on the remote systems by executing the Call Program (CALL) command; the program must exist on the remote system.
- The spooled files created by that command are returned to the central site system. This includes the job logs if specified.
- The mechanism for sending the command and receiving results is MS Transport. SNADS is not used.
- You may specify a user ID and password to be used on the managed system to execute the command.
- You can specify Start After Time, and the agent holds the request until it is time to run.

The following parameters are unique to the RUNSMGCMD fast path

command:

Start Time on Managed System (RMTSTRTIME) Command: This parameter allows you to specify the window (date and time) within which the command can begin execution on the managed system. That is, after the activity has been submitted at the central site system and Managed System Services/400 sent the request to the managed systems:

- The execution is delayed if the specified earliest time has not yet been reached,

  - or -

- It does not start at all if the specified latest time has already passed.

You can use this function, for example, if you want to ensure that the command runs after the normal working hours at night or must not start after the working time begins again the next morning.

Return Spooled File (RTNSPLF) Command: By default, all of the spooled files created on the managed system are returned to the central site system (see "Retrieving System Values from the Managed Systems" on page 86 for an example). The parameter RTNSPLF allows you to suppress this function for all cases (*NO), or to request a spooled file only in case an error occurs (*FAIL).

User Profile (USRPRF) Command: You can specify under which user profile the job executing the command on the managed system runs. If you leave the default (*NONE), and the default command security program is specified (CHGMGDSYSA command, parameter RMTSECPGM = *DFT the user profile is determined by the security table file QSVMSS/QAVARRQF (see "Default User Profile (DFTUSRPRF)" on page 63).

Password (PASSWORD) Command: If you specify a user profile, you must also supply the proper password. The user profile must have the same password on each managed system where this activity is executed.

Encode (ENCODE) Command: You can specify whether or not the command, user profile, and password are encoded when sent to the remote systems. If the remote system is running the NetView Remote Operations Agent/400 product, this parameter must be set to *NO.

Before you can use this function by specifying ENCODE(*YES), you must set the key for encoding and decoding using the Change Managed System Attributes (CHGMGDSYSA) on the central site system and the managed systems. See "Change Managed System Attributes (CHGMGDSYSA Command)" on page 53.

Remote Command Related Topics

The following lists contain additional commands and APIs related to the remote command fast path and change request activity type *CMD.

Change Manager Services Attributes (CHGMGRSRVA) Command: Using the CHGMGRSRVA command, you can control the cleanup time interval, the maximum time command requests stay active, and the maximum time requests are stored in the history file. The CHGMGRSRVA command updates the cleanup configuration attribute that is unique to the Managed System Services/400 licensed program.

```
                    Change Manager Services Atr (CHGMGRSRVA)

Type choices, press Enter.

Remote command cleanup:
  Cleanup interval . . . . . . .   *STARTUP      0-999 hours, *SAME, *STARTUP
  Maximum active time  . . . . .   48            1-999 hours, *SAME
  Maximum history days . . . . .   7             0-999 days, *SAME, *NOMAX
```

Figure 27. Change Manager Services Attributes (CHGMGRSRVA)

Display Received Commands (DSPRCVCMD) Command: The Display Received Commands (DSPRCVCMD) command shows a list of commands received by the managed system from the central site system. Each request describes a command to be processed on the managed system and some related information about the request:

- Request Status
- Reply Type
- Request Start After Time
- Request Start Before Time

Using this information, you can tell, at a glance, whether a request was replied to, when it was requested, and the status of the request.

Remote Command APIs: The following remote command APIs are available with Managed System Services/400. Refer to Managed System Services/400 Use for more information on these APIs.

- Cancel Remote Command (QCQCRCMD) API
- End Remote Command Manager (QCQENDRM) API
- List Remote Commands (QCQLRCMD) API
- Send Remote Command (QCQSRCMD) API
- Start Remote Command Manager (QCQSTRRM) API

EXAMPLE 1

Retrieving System Values from the Managed Systems

When managing multiple systems, an important aspect is to keep centralized control of the managed systems configurations. There are many configuration objects on the AS/400 system that influence the system′s work management, for example, system values, network attributes, subsystem descriptions, and so on.

It is very difficult to manage multiple systems if those configuration objects are different on every system or if the current setting is unknown at the central site system. For example, if you have decided to increase the ″Initial Number of Active Jobs″, you might want to ensure that the system value QACTJOB has been set properly on every system.

In this example, we use the RUNSMGCMD to collect the current settings of a set of system values from two managed systems in our network:

1. Enter RUNSMGCMD and press F4:

```
                          Run SMG Command (RUNSMGCMD)

 Type choices, press Enter.

 Command to run . . . . . . . . . > WRKSYSVAL SYSVAL(*ALC) OUTPUT(*PRINT)_______
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_______________________________________________________________________________
_____________________________________________________________________________ ...
 Managed systems node list:
   Node list  . . . . . . . . . .   *NONE_____     Name, *NONE
     Library  . . . . . . . . . .    __________    Name, *LIBL, *CURLIB
 Managed system node names:       +
   Network identifier . . . . . . > *NETATR_       Name, *NONE, *NETATR
   Control point  . . . . . . . . > RCHASM03       Name
               + for more values _
   Network identifier . . . . . . > *NETATR_       Name, *NONE, *NETATR
   Control point  . . . . . . . . > RCHAS040       Name
               + for more values _
                                                                       More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 28 (Part 1 of 2). Run SMG Command (RUNSMGCMD) - Example with WRKSYSVAL

```
                          Run SMG Command (RUNSMGCMD)

 Type choices, press Enter.


                            Additional Parameters

 Start time on managed system:
   Time zone  . . . . . . . . . .   *LCLSYS       *LCLSYS, *MGDSYS
   Start after:
   Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
   Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
   Start before:
   Time . . . . . . . . . . . . .   *ANY____      Time, *ANY, *CURRENT
   Date . . . . . . . . . . . . .   *ANY____      Date, *ANY, *CURRENT, *NEXT
 Return spooled file  . . . . . .   *YES_         *YES, *NO, *FAIL
 User profile . . . . . . . . . . > QSYSOPR __    Name, *NONE
 Password . . . . . . . . . . . . > MyPassword   Name, *USRPRF, *NONE
 Encode command . . . . . . . . . > *NO_         *YES, *NO           ,

                                                                       Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 28 (Part 2 of 2). Run SMG Command (RUNSMGCMD) - Example with WRKSYSVAL

Note: To display additional parameters, press F9 or F10 followed by Page Down.

2. An operator at the managed system can display the commands that are received by entering the Display Received Commands (DSPRCVCMD) command:

```
QDVARDRO                Display Received Commands
                                                          11/23/94  18
Type options, press Enter.
  5=Display details

                                                Received  Received
Opt  Origin System          Command     Status     Date      Time
 5   ITSCNET.RCHASM02       WRKSYSVAL   Ready      11/25/94  18:20:19
```

Figure 29. Display Received Commands (DSPRCVCMD)

```
QVARDDRS                  Display Request Details
                                                          11/23/94  18
Origin system . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
Origin operator ID  . . . . . . . . . . . . . . . . . :   ADAN
Request user profile  . . . . . . . . . . . . . . . . :   QSYSOPR
Job name  . . . . . . . . . . . . . . . . . . . . . . :   003745/QSYSOPR/QCQSVSRV

Request received/start date/time  . . . . . . . . . . :   11/25/94  18:34:
Request type  . . . . . . . . . . . . . . . . . . . . :   OPERATE
Request start after date/time . . . . . . . . . . . . :
Request start before date/time  . . . . . . . . . . . :
Application name  . . . . . . . . . . . . . . . . . . :   FP_OPS
Reply type  . . . . . . . . . . . . . . . . . . . . . :   *ALL
Request status  . . . . . . . . . . . . . . . . . . . :   Running
Command . . . . . . . . . . . . . . . . . . . . . . . :   WRKSYSVAL SYSVAL(*ALC)
```

Figure 30. Display Received Commands (DSPRCVCMD) - Display Details

3. At the central site system, you can now display or print the combined information returned from the managed systems.

   The combined spooled file resulting from a RUNSMGCMD (or a Command Change Request Activity) is produced by a *server job* running in subsystem QSYSWRK. That job runs under the user profile of the job that submitted the change request and its name is QCQSVSRV.

   There are several ways to find the spooled file:

   - Enter the Work with Submitted Change Request (WRKSBMCRQ) command.

     a. Select 8, Work with activities.

```
                    Work with Submitted Change Requests
                                                          System:   RCHASM01
Type options, press Enter.
  3=Hold   4=Delete   5=Display details   6=Release   8=Work with activities
  10=Display messages   13=End ...

                                              Highest  Last
     Change                                     End    End
Opt  Request     Number  Status                Code    Code
8    WBL         000070  Ended                  00      00
```

     b. Select 5, Display details.

```
                    Work with Submitted CRQ Activities
                                                              System:   RCHASM01
Change request  . . . . . :   WBL
  Number  . . . . . . . . :     000070
Text  . . . . . . . . . . :

Type options, press Enter.
  3=Hold   5=Display details   6=Release   8=Work with nodes for activity
  10=Display messages          13=End
                                                                     Highest
     Activity                                                          End
Opt  Name        Type        Node               Status                Code
5    QACT000010  *CMD        ITSCNET.RCHASM02   Ended                  00
```

c. Press F11, Display type specific data.

```
                   Display Submitted CRQ Activity Details
                                                              System:   RCHASM01
Change request . . . . . . . . . . . . . . :   WBL
  Number . . . . . . . . . . . . . . . . . :     000070
Activity name  . . . . . . . . . . . . . . :   QACT000010
Activity text  . . . . . . . . . . . . . . :   Run a command


Activity type  . . . . . . . . . . . . . . :   *CMD
Node . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
Scheduled start:
  Start after date and time  . . . . . . . :   01/30/95  14:45:43
  Start before date and time . . . . . . . :   *ANY        *ANY
Actual start date and time . . . . . . . . :   01/30/95  14:45:54
Actual end date and time . . . . . . . . . :   01/30/95  14:46:32
                                                                        More...
Press Enter to continue.

F3=Exit   F5=Refresh   F9=Display conditions   F10=Display nodes
F11=Display type specific data   F12=Cancel
```

d. Press F11, Display spooled file.

```
                         Display Type Specific Data
                                                              System:   RCHASM01
Change request . . . . . . . . . . . . . . :   WBL
  Number . . . . . . . . . . . . . . . . . :     000070
Activity name  . . . . . . . . . . . . . . :   QACT000010
Activity text  . . . . . . . . . . . . . . :   Run a command
Action . . . . . . . . . . . . . . . . . . :   Run command

Command  . . . . . . . . . . . . . . . . . :   WRKSYSVAL OUTPUT(*PRINT)

Managed system start time:
Time zone  . . . . . . . . . . . . . . . . :   *LCLSYS
  Start after date and time  . . . . . . . :     *CURRENT    *CURRENT
  Start before date and time . . . . . . . :     *ANY        *ANY


                                                                         More...
Press Enter to continue.
F3=Exit   F11=Display spooled file  F12=Cancel
```

- or -

- Enter the command:

  WRKSPLF UserProfile

where `UserProfile` is the user profile of the user that submitted the RUNSMGCMD at the central site system.

Note: You can use the Work with System Values (WRKSYSVAL) command to print or work with either:

- All system values by specifying SYSVAL(*ALL); this is the default.
- A set of system values; in our example we use SYSVAL(*ALC), which provides all ″Allocation System Values″.
- Just one system value by specifying its name: SYSVAL(Q.....).

To limit the size of the printout for the example, we only used a subset of system values (*ALC) and sent the request to two managed systems only. In your environment, you might want to collect the settings of *all* of the system values of *all* of the managed systems in your network. You can also use the Send Remote Command (QCQSRCMD) API and retrieve the data in a user space or output file.

The spooled file that is returned as a result of running the RUNSMGCMD on multiple managed systems contains the combined output.

The parameter RTNSPLF of the RUNSMGOBJ (and ADDCMDCRQA) command controls if and when spooled files are returned to the central system.

```
                                        Returned Spooled File Data                                                  Page     1
 1   5763SM1 V3R1M0  940909                                                                  RCHASM02  06/21/94  18:46:55
     Change Request . . . . . . . . . . . . . . . :   ITSCID11
       Number . . . . . . . . . . . . . . . . . . :     000230
     Activity name  . . . . . . . . . . . . . . . :   QACT000010
     Command:
     WRKSYSVAL SYSVAL(*ALC) OUTPUT(*PRINT)

 2     Control point  . . . . . . . . . . . . . . . :   RCHAS040
     Network ID . . . . . . . . . . . . . . . . . . :   ITSCNET
     Status . . . . . . . . . . . . . . . . . . . . :   Successful
     Spooled file . . . . . . . . . . . . . . . . . :   QSYSPRT


                                                System Values                                                   Page     1
 3   5763SS1 V3R1M0  940909                                                                          RCHAS040  06/20/94
                    Current                        Shipped
      Name          value                          value                          Description
      QACTJOB     >  30                             20                             Initial number of active jobs
      QADLACTJ      10                              10                             Additional number of active jobs
      QADLSPLA      2048                            2048                           Spooling control block additional storage
      QADLTOTJ      10                              10                             Additional number of total jobs
      QJOBMSGQFL    *NOWRAP                         *NOWRAP                        Job message queue full action
      QJOBMSGQMX    16                              16                             Maximum size of job message queue
      QJOBMSGQSZ    16                              16                             Job message queue initial size
      QJOBMSGQTL    24                              24                             Job message queue maximum initial size
      QJOBSPLA      1536                            1536                           Spooling control block initial size
      QRCLSPLSTG    8                               8                              Reclaim spool storage
      QTOTJOB     >  100                            30                             Initial total number of jobs
          Note:  > means current value is different from the shipped value
                                          * * * * *  E N D  O F  L I S T I N G  * * * * *

 4     Control point  . . . . . . . . . . . . . . . :   RCHASM03
     Network ID . . . . . . . . . . . . . . . . . . :   ITSCNET
     Status . . . . . . . . . . . . . . . . . . . . :   Successful
     Spooled file . . . . . . . . . . . . . . . . . :   QSYSPRT
                                                System Values                                                   Page     1
 5   5763SS1 V3R1M0  940909                                                                          RCHASM03  06/21/94
                    Current                        Shipped
      Name          value                          value                          Description
      QACTJOB     >  30                             20                             Initial number of active jobs
      QADLACTJ      10                              10                             Additional number of active jobs
      QADLSPLA      2048                            2048                           Spooling control block additional storage
      QADLTOTJ      10                              10                             Additional number of total jobs
      QJOBMSGQFL    *NOWRAP                         *NOWRAP                        Job message queue full action
      QJOBMSGQMX    16                              16                             Maximum size of job message queue
      QJOBMSGQSZ    16                              16                             Job message queue initial size
      QJOBMSGQTL    24                              24                             Job message queue maximum initial size
      QJOBSPLA      1536                            1536                           Spooling control block initial size
      QRCLSPLSTG  >  3                              8                              Reclaim spool storage
      QTOTJOB     >  300                            30                             Initial total number of jobs
          Note:  > means current value is different from the shipped value
                                          * * * * *  E N D  O F  L I S T I N G  * * * * *

                                        * * * * *  E N D  O F  L I S T I N G  * * * * *
```

Figure 31. Collect the System Values of More Than One System

Figure 31 shows the single spooled file received at the central site system containing the output from each managed system where the command was executed.

1 This section identifies the change request description created by the system when the fast path command RUNSMGCMD was executed and the command that was submitted to the managed systems.

2 This section identifies RCHAS040 output. A single CL command can also create more than one spooled file. (Remember, CALL UserPgm is a valid command also.) Also note that this is printed output created by user written applications.

3 This section actually contains the output created by system RCHAS040.

Note: Not all printed output carries the system name. So it might be necessary to refer to part **2**, in order to determine on which system the output was created.

Parts **2** and **3** are repeated for each managed system where the command has been executed.

4 This section identifies RCHASM03 output.

5 This section contains the output created by system RCHASM03.

EXAMPLE 2

Changing the Default User Profile in the Managed System Attributes

The default user profile shipped with Managed System Services/400 is QSVMSS, belongs to user class *SYSOPR, and has special authority *JOBCTL. To follow the examples in this redbook, you must create a new user profile with special authorities *ALLOBJ, *JOBCTL, and *SAVSYS, and change the managed system attributes to replace QSVMSS with the ″redbook′s user profile″. By doing so, you are able to experiment with our examples without modifying the defaults shipped with the product.

Note: Before changing the default user profile, review your specific environment to make sure this change does not create a security exposure.

In this example, we centrally:

- Create the user profile SVMSS on the managed systems.
- Change the managed system attributes so that SVMSS becomes the default user profile.

Note: We need to perform the following tasks on all of the systems in the network, including the central site system. For that reason, in this example we used the node list ALLNODES that includes the central site system.

Follow these steps:

1. Create the user profile SVMSS on the managed system (user class = *SYSOPR). You must specify a user ID and password with *SECADM special authority on the managed systems.

```
                          Run SMG Command (RUNSMGCMD)

 Type choices, press Enter.

 Command to run . . . . . . . . . > CRTUSRPRF USRPRF(SVMSS) STATUS(*DISABLED)
 USRCLS(*SYSOPR)  SPCAUT(*ALLOBJ *SAVSYS *JOBCTL)
 TEXT('MSS Default User Profile for redbook's example')

 Managed systems node list:
   Node list  . . . . . . . . . . > ALLNODES      Name, *NONE
     Library  . . . . . . . . . . >   GG244372    Name, *LIBL, *CURLIB
 Managed system node names:
   Network identifier . . . . . .   *NONE         Name, *NONE, *NETATR
   Control point  . . . . . . . .                 Name
                + for more values
```

Figure 32 (Part 1 of 2). Create User Profile SVMSS

```
                          Run SMG Command (RUNSMGCMD)

 Type choices, press Enter.


                           Additional Parameters

 Start time on managed system:
   Time zone  . . . . . . . . . .   *LCLSYS       *LCLSYS, *MGDSYS
   Start after:
   Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
   Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
   Start before:
   Time . . . . . . . . . . . . .   *ANY          Time, *ANY, *CURRENT
   Date . . . . . . . . . . . . .   *ANY          Date, *ANY, *CURRENT, *
 Return spooled file  . . . . . .   *YES          *YES, *NO, *FAIL
 User profile . . . . . . . . . . > SECADMIN      Name, *NONE
 Password . . . . . . . . . . . .   *USRPRF       Name, *USRPRF, *NONE
 Encode command . . . . . . . . . > *NO           *YES, *NO
```

Figure 32 (Part 2 of 2). Create User Profile SVMSS

2. Verify that the command was executed successfully on all of the managed systems.

   Enter the WRKSBMCRQ command and locate the change request that was created by the system when you entered the RUNSMGCMD fast path command:

   a. Select 8, Work with activities.
   b. Select 5, Display details.
   c. Press F11, Display specific data.
   d. Press F11, Display spooled file.

   A display similar to the one in Figure 33 is shown.

```
                             Display Spooled File
 File  . . . . . :   QSYSPRT                        Page/Line   1/1
 Control . . . . .                                  Columns     1 - 78
 Find  . . . . . .
 *...+....1....+....2....+....3....+....4....+....5....+....6....+....7..

                                            Returned Spooled File Data
 5763SM1 V3R1M0  940909
  Change Request . . . . . . . . . . . . . . :   ADAN
    Number . . . . . . . . . . . . . . . . . :     000060
  Activity name  . . . . . . . . . . . . . . :   QACT000010
  Command:
  CRTUSRPRF USRPRF(SVMSS) STATUS(*DISABLED) USRCLS(*SYSOPR) TEXT('MSS Def
  Control point  . . . . . . . . . . . . . . :   RCHASM03
  Network ID . . . . . . . . . . . . . . . . :   ITSCNET
  Status . . . . . . . . . . . . . . . . . . :   Successful
  Spooled file . . . . . . . . . . . . . . . :
  Control point  . . . . . . . . . . . . . . :   RCHAS040
  Network ID . . . . . . . . . . . . . . . . :   ITSCNET
  Status . . . . . . . . . . . . . . . . . . :   Successful
 Spooled file . . . . . . . . . . . . . . . :
                                   * * * * *   E N D   O F   L I S T I N G
                                                                   Bottom
F3=Exit   F12=Cancel   F19=Left   F20=Right   F24=More keys
```

Figure 33. Create User Profile SVMSS - Display Spooled File

3. Change the managed system attributes specifying SVMSS in the default user profile parameter of the Change Managed System Attributes (CHGMGDSYSA) command:

```
RUNSMGCMD CMD(CHGMGDSYSA DFTUSRPRF(SVMSS)) NODL(GG244372/PRODUCTION) +
USRPRF(ADAN) PASSWORD() ENCODE(*NO)

 Change request ADAN 000080 submitted.
```

4. Verify that the command was executed successfully on all of the managed systems:

   ```
   WRKSBMCRQ CRQ(ADAN 000080)
   ```

   a. Select 8, Work with activities.
   b. Select 5, Display details.
   c. Press F11, Display specific data.
   d. Press F11, Display spooled file.

   A display similar to the one in Figure 34 is shown.

```
                              Display Spooled File
File  . . . . . :   QSYSPRT
Control . . . . .
Find  . . . . . .
*...+....1....+....2....+....3....+....4....+....5....+....6....+....7..
                                            Returned Spooled File Data
5763SM1 V3R1M0  940909
 Change Request . . . . . . . . . . . . . . :   ADAN
   Number . . . . . . . . . . . . . . . . . :     000080
 Activity name  . . . . . . . . . . . . . . :   QACT000010
 Command:
 CHGMGDSYSA DFTUSRPRF(SVMSS)
 Control point  . . . . . . . . . . . . . . :   RCHAS040
 Network ID . . . . . . . . . . . . . . . . :   ITSCNET
 Status . . . . . . . . . . . . . . . . . . :   Successful
 Spooled file . . . . . . . . . . . . . . . :
 Control point  . . . . . . . . . . . . . . :   RCHASM03
 Network ID . . . . . . . . . . . . . . . . :   ITSCNET
 Status . . . . . . . . . . . . . . . . . . :   Successful
 Spooled file . . . . . . . . . . . . . . . :
```

Figure 34. Change Managed System Attributes - Display Spooled File

Object Fast Path Commands

The fast path commands for object activities are used to:

- Send an AS/400 object to the managed systems (see “Send SMG Object (SNDSMGOBJ)” on page 97).
- Send an AS/400 object to the managed system and run the program or job stream on the managed system once it arrives (see “Send and Run a Program (SNDSMGOBJ)” on page 103).
- Run an object on managed systems (see “Run SMG Object (RUNSMGOBJ)” on page 106).
- Retrieve an AS/400 object from one[2] managed system (see “Retrieve SMG Object (RTVSMGOBJ)” on page 104).
- Delete an AS/400 object on the managed systems (see “Delete SMG Object (DLTSMGOBJ)” on page 105).

[2] Using a fast path command, you cannot retrieve an object from more than one system at a time. However, you can retrieve one object from multiple managed systems in one operation by using change request descriptions and global names.

All of the object fast path commands create and submit a temporary CRQD with a single activity type *OBJ.

The following topics describe the object fast path commands. Refer to "Capabilities of CRQs Not Available with Fast Path Commands" on page 133 for those facilities not provided by fast paths and for more complex examples.

Only standard AS/400 object names are used in fast path commands; if you want to specify global names, you must use change request descriptions.

Supported AS/400 Object Types for Activity Type *OBJ

Not all AS/400 objects that are saved and restored are supported by Managed System Services/400[3] distribution services. These are the standard AS/400 object types supported by activity type *OBJ in fast path commands and change request descriptions:

Table 7. AS/400 Object Types Supported by Object Activities

*ALRTBL	*FILE	*MSGQ	*QRYDFN
*BNDDIR	*FNTRSC	*NODL	*SBSD
*CLD	*FORMDF	*OUTQ	*SCHIDX
*CLS	*FTR	*OVL	*SRVPGM
*CMD	*GSS	*PAGDFN	*SSND
*CRQD	*JOBD	*PAGSEG	*TBL
*CSI	*JOBQ	*PDG	*USRIDX
*CSPMAP	*LIB	*PGM	*USRSPC
*CSPTBL	*MENU	*PNLGRP	*WSCST
*DTAARA	*MODULE	*QMFORM	
*FCT	*MSGF	*QMQRY	

Tip

To group multiple objects together or to include objects not supported by Managed System Services/400 distribution services, use save files:

1. Create a save file.
2. Save the objects to the save file.
3. Send (retrieve) the save file to (from) the managed system.
4. Restore the objects to the target library.

See "Distribution of Multiple Objects" on page 167 for a totally automated example of using a CL program to create a CRQD.

The object type *FILE includes all AS/400 file types:

- *Physical files* are treated as *FILE or *FILEDATA (see "Special Object Type *FILEDATA" on page 96).

[3] The fast path commands and the ADDOBJCRQA command are part of System Manager/400, but the actual distribution is performed by Managed System Services/400. For that reason, the level of support provided by Managed System Services/400 determines which object types are supported.

- *Source physical files* are treated as *FILE or *FILEDATA (see “Special Object Type *FILEDATA” on page 96).
- *Logical file* descriptions are sent or retrieved, but the underlying physical files must exist on the target system.
- *Save files* are used as a ″container″ to transport other objects.
- *Device files*, such as printer files, display files, and ICF files do not contain any data, so only the descriptions are sent. This is similar to what happens when you save a device file.

See Chapter 10 ″Operational Tips″ in *Managed System Services/400 Use*, SC41-3323, for more information on supported object types.

Special Object Type *FILEDATA

Besides the standard AS/400 object types, you can also specify type *FILEDATA. This means only the *data* of the file member is sent. The objective is to exchange data with non-AS/400 platforms, but *FILEDATA is also used to send or retrieve data to or from other AS/400 systems. In this case, the following holds true:

- Only the content of one member is sent, retrieved, or deleted.
- No description of the AS/400 object is sent or retrieved; for example, the following information is not sent or retrieved when using *FILEDATA:
  - Object owner
  - Descriptive text
  - Creation, change, or save date
- No description of the file member is sent or retrieved; for example, the following information is not sent or retrieved when using *FILEDATA:
  - Member text
  - Member type (in the case of source files)
  - Creation, change, or save date

Parameters Common to All Object Activities

The parameters OBJ and OBJTYPE are mandatory for each object activity fast path.

Object (OBJ) Command: Specifies the qualified name for the AS/400 object to be sent, retrieved, deleted, or run.

You can provide a library name or use the special values *LIBL or *CURLIB. The library name is always resolved at the central site system. However, *LIBL cannot be specified to run, retrieve, or delete an object. A library name or *CURLIB must be specified for those actions.

Since global names cannot be used with fast path commands, the same library name is used at both the central site system and the managed system. If you want to use fast path commands and different libraries on the central site and managed system, you can use a save file and perform a remote RSTOBJ at the target using the RUNSMGCMD.

Object Type (OBJTYPE) Command: Specifies the standard AS/400 object type or the special type *FILEDATA. See Table 7 on page 95 and “Special Object Type *FILEDATA” for more information.

Send SMG Object (SNDSMGOBJ)

The Send SMG Object (SNDSMGOBJ) allows you to send a single AS/400 object from the central site system to one or more managed systems.

When you enter command SNDSMGOBJ on any command line and press key F4 (Prompt) or select option 1 in Fast Path Distribution Commands (FPDST) menu, only the parameters that apply to the object to be sent are displayed (see Figure 35).

```
                          Send SMG Object (SNDSMGOBJ)

 Type choices, press Enter.

 Object . . . . . . . . . . . . .   _________    Name
   Library  . . . . . . . . . . .     *LIBL_____  Name, *LIBL, *CURLIB
 Object type  . . . . . . . . . .   _________    F4 for list


                                                                      Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
 F13=How to use this display        F24=More keys
```

Figure 35. Send SMG Object (SNDSMGOBJ)

The parameter's object and object type are mandatory. See "Parameters Common to All Object Activities" on page 96 for a description of those two parameters. After you enter the object name and type, press Enter or command key F10. Depending on the type of object and whether you press Enter or F10 some parameters are not shown.

If you press command key F9, you see all of the parameters as shown in Figure 36.

```
                          Send SMG Object (SNDSMGOBJ)

 Type choices, press Enter.

 Object . . . . . . . . . . . . . > WEEKLYSALE    Name
   Library  . . . . . . . . . . . >   APPLLIB___  Name, *LIBL, *CURLIB
 Object type  . . . . . . . . . . > *FILE_____    F4 for list
 Member . . . . . . . . . . . . .   *ALL          Name, *ALL, *FIRST, *LAST
 Data type  . . . . . . . . . . .   *UNSPEC       *UNSPEC, *CL, *REXX
 Managed systems node list:
   Node list  . . . . . . . . . .   *NONE_____    Name, *NONE
     Library  . . . . . . . . . .                            Name, *LIBL, *CURLIB
 Managed system node names:
   Network identifier . . . . . .   *NONE___      Name, *NONE, *NETATR
   Control point  . . . . . . . .   ________      Name
                + for more values
 Target release . . . . . . . . .   *CURRENT      *PRV, V2R3M0, V3ROM5...
 Data compression . . . . . . . .   *NONE         *NONE, *SNA
 Run program  . . . . . . . . . .   *NO_          *NO, *YES
 Replace object . . . . . . . . .   *NO_          *NO, *YES

                                                                      Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 36. Send SMG Object (SNDSMGOBJ)

Note: The Replace object (REPLACE) parameter is never shown, unless you press command key F9 or F10.

Member (MBR) Command: Specifies the AS/400 physical file member name. It is ignored unless the object type is *FILE or *FILEDATA. You may specify:

- A member name.
- The first member (*FIRST), the oldest member.
- The last member (*LAST), the most recently created member.
- All of the members of the file to be sent (*ALL).

Data type (DATATYPE) Command: This parameter is only needed when you *send and run* a CL job stream or a REXX procedure of type *FILEDATA. See "Data Type (DATATYPE) Command" on page 104 for a description.

EXAMPLE 3

Sending the Redbook Library

All object activities operate on just one object. However, by specifying an object type *LIB, you are sending the library and all of the objects in that library.

You cannot specify libraries that cannot be saved such as QSYS, QDLO, or QTEMP.

Tip

When sending a library specifying Replace Object *YES, the user profile under which the activity is executed on the managed system must have *ALLOBJ special authority. (This is imposed by the RSTLIB command).

To send the redbook library (GG244372) from the central site system to the managed systems, enter the SNDSMGOBJ command.

```
                          Send SMG Object (SNDSMGOBJ)

 Type choices, press Enter.

 Object . . . . . . . . . . . . . > GG244372      Name
   Library  . . . . . . . . . . . >   QSYS        Name, *LIBL, *CURLIB
 Object type  . . . . . . . . . . > *LIB
 Managed systems node list:
   Node list  . . . . . . . . . . > PRODUCTION    Name, *NONE
     Library  . . . . . . . . . . >   GG244372    Name, *LIBL, *CURLIB
 Managed system node names:
   Network identifier . . . . . .   *NONE         Name, *NONE, *NETATR
   Control point  . . . . . . . .                 Name
                + for more values
 Target release . . . . . . . . .   *CURRENT      *PRV, V2R3M0, V3R0M5...

                            Additional Parameters

 Replace object . . . . . . . . .   *NO           *NO, *YES
```

Figure 37. Send SMG Object (SNDSMGOBJ) - Sending the Redbook Library

```
FPDST                    Fast Path Distribution Commands
                                                          System:   RCHASM02
Select one of the following:

     1. Send SMG Object
     2. Retrieve SMG Object
     3. Delete SMG Object
     4. Run SMG Object
     5. Run SMG Command

    10. Send PTF
    11. Retrieve PTF
    12. Apply Remote PTF
    13. Remove Remote PTF
    14. Delete Remote PTF

    20. Send product
                                                                   More...
Selection or command
===> ____________________________________________________________________

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=User support
F16=AS/400 main menu
Change request OCC400 000010 submitted.
```

Figure 38. Message SMU1604 Change Request ITSCID11 000010 Submitted

Message SMU1604 (Change request OCC400 000010 submitted) shown at the bottom of Figure 38 helps you identify the change request for tracking purposes. Note the change request name and number (OCC400 000010 in our example) this is a unique identification that you can use to quickly find the submitted change request and track its status.

EXAMPLE 4

Tracking the Status of a Distribution

There are several ways to track the status of a submitted change request:

- "Work with Submitted CRQs (WRKSBMCRQ) for all CRQs."
- "Work with Submitted CRQs (WRKSBMCRQ) for Selected CRQs" on page 101.
- "Work with Submitted CRQ Activities (WRKSBMCRQA)" on page 102.
- "Work with Nodes for Activity" on page 103 to track the status of one change request activity.

Note: The Display Submitted Change Requests (DSPSBMCRQ) and the Display Submitted CRQ Activities (DSPSBMCRQA) commands are also used for tracking purposes. They accept the same parameters as their ″Work with ...″ counterparts.

The first three ″Work with ...″ displays previously mentioned may be called directly by entering a command or by selecting an option of another display. To get to the "Work with Nodes for Activity" display, you must select option 8 on the "Work with Submitted CRQ Activities (WRKSBMCRQA)" display.

It is very helpful to note the submitted change request name and number to quickly identify it for tracking purposes. Enter the name and number of the submitted change request and then go directly to the "Work with Submitted CRQ Activities (WRKSBMCRQA)" on page 102.

Work with Submitted CRQs (WRKSBMCRQ) for all CRQs: If you enter the WRKSBMCRQ command without specifying a change request description name and number, or if you Select option 10 of the Change Request Administration (CRQADM) menu, all of the CRQs submitted since the last CRQ history clean up are displayed.

Tip

- To really display ALL CRQs submitted, the user needs *JOBCTL special authority. For users without this authority, WRKSBMCRQ or DSPSBMCRQ only displays their own submitted CRQs.
- Operational Assistant cleans up (deletes) submitted change requests as specified on the system journals and system logs (SYSLOG) parameter on the CHGCLNUP command.

```
                    Work with Submitted Change Requests
                                                                System:   RCHASM02
Type options, press Enter.
  3=Hold   4=Delete   5=Display details   6=Release   8=Work with activities
  10=Display messages   13=End ...

                                                 Highest  Last
     Change                                        End    End
Opt  Request     Number  Status                   Code    Code
__   ITSCID11    000010  Ended                     20      20
__   ITSCID11    000020  Ended                     20      20
8_   ITSCID11    000030  Ended                     20      00
__   OCCLAB01    000010  Active

                                                                          Bottom
Parameters or command
===> ____________________________________________________________________________
F3=Exit      F4=Prompt         F5=Refresh   F6=Print list   F11=Display user
F12=Cancel   F17=Position to   F23=More options   F24=More keys
(C) COPYRIGHT IBM CORP. 1990, 1994.
```

Figure 39. Work with Submitted Change Requests

If the status of the change request you want to track is "Ended" and the highest end code is "00", it means that all of the change request activities ended successfully on all of the nodes and therefore, you do not need any further investigation.

If the Highest End Code is higher than "00", you probably need to determine why; refer to Chapter 10, "Problem Determination" on page 421 or follow the procedure explained in "Work with Submitted CRQ Activities (WRKSBMCRQA)" on page 102 for problem determination examples.

Tip

Usually each change request has multiple activities that run on multiple managed systems. Therefore, it might run successfully on some systems and fail on others. The highest end code displayed in the Work with Submitted Change Request display is the most severe status code returned by an activity.

Work with Submitted CRQs (WRKSBMCRQ) for Selected CRQs: If you want to display only a subset of the submitted change requests, specify your selection criteria in the Work with Submitted Change Requests (WRKSBMCRQ) command; see Figure 40 on page 102.

```
                    Work with Submitted CRQs (WRKSBMCRQ)

Type choices, press Enter.

Change request:
  Name . . . . . . . . . . . . .   *ALL______    Name, generic*, *ALL
  Sequence number  . . . . . . .   *ALL_______   1-999999, *ALL
Status . . . . . . . . . . . . .   *ALL____      *ALL, *SBM, *ACTIVE, *ENDED
Change request description . . .   *ALL______    Name, generic*, *ALL
  Library  . . . . . . . . . . .     *ALL______  Name, *ALL
Submitter  . . . . . . . . . . .   *ALL______    Name, *ALL
Period:
  Start time and date:
  Start time . . . . . . . . . .   *AVAIL__      Time, *AVAIL
  Start date . . . . . . . . . .   *BEGIN__      Date, *BEGIN, *CURRENT
  End time and date:
  Ending time  . . . . . . . . .   *AVAIL__      Time, *AVAIL
  Ending date  . . . . . . . . .   *END____      Date, *END, *CURRENT
Problem identifier . . . . . . .   *ALL______    Character value, *ALL

Problem origin:
  Network identifier . . . . . .   *ALL____      Name, *ALL, *NETATR
  Control point  . . . . . . . .   *ALL____      Name, *ALL, *NETATR

                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 40. Work with Submitted CRQs (WRKSBMCRQ)

Work with Submitted CRQ Activities (WRKSBMCRQA): The Work with Submitted CRQ Activities (WRKSBMCRQA) command is the most powerful tool for tracking the status of a change request. You can call it by selecting option 8 on the Work with Submitted Change Requests display (Figure 39 on page 101), or by entering the WRKSBMCRQA command with the name and number of the CRQ on any command line, as follows:

```
WRKSBMCRQA (OCC400 000010)
```

Figure 41 shows the status of the activity submitted in Figure 37 on page 98.

```
                    Work with Submitted CRQ Activities
                                                          System:   RCHASMO2
Change request  . . . . . :   ITSCID11
  Number  . . . . . . . . :     000010
Text  . . . . . . . . . . :


Type options, press Enter.
  3=Hold   5=Display details   6=Release   8=Work with nodes for activity
  10=Display messages          13=End

                                                                  Highest
     Activity                                                       End
Opt  Name        Type        Node               Status             Code
__   QACTOOOOIO  *OBJ        ITSCNET.RCHASO...  Running


                                                                    Bottom
Parameters or command
===> ____________________________________________________________________
F3=Exit   F4=Prompt      F5=Refresh   F6=Print list     F9=Retrieve
F11=Display conditions   F12=Cancel   F17=Position to   F24=More keys
(C) COPYRIGHT IBM CORP. 1990, 1994.
```

Figure 41. Work with Submitted CRQ Activities

Work with Nodes for Activity: In order to see the status of that change request activity for each node, you must select option 8 on the Work with Submitted CRQ Activities display; see Figure 41. There is no command to go to this display directly. Figure 42 on page 103 shows the Work with Nodes for Activity for our example.

```
                          Work with Nodes for Activity
                                                                 System:   RCHASM02
Change request  . . . . . :   ITSCID11
  Number  . . . . . . . . :     000040
Activity name . . . . . . :   QACT000010


Type options, press Enter.
  3=Hold   6=Release   8=Display conditions for node   10=Display messages
  13=End

     Control   Network                          End
Opt  point     ID        Status                 Code
__   RCHAS040  ITSCNET   Ended                   00
__   RCHASM03  ITSCNET   Ended                   20
__   RCHAS110  RPC       Running


                                                                          Bottom
Parameters or command
===> ____________________________________________________________________________
F3=Exit           F4=Prompt    F5=Refresh   F6=Print list   F9=Retrieve
F11=Display job   F12=Cancel   F16=Repeat position to       F17=Position to
```

Figure 42. Work with Nodes for Activity

Send and Run a Program (SNDSMGOBJ)

The Send SMG Object (SNDSMGOBJ) fast path command is used to send a program object or a file member containing CL or REXX statements and execute it on the managed system. After running that object, it is deleted at the managed system.

You may choose to use this function when you need to run a program or job stream on the managed systems only once or very few times, or the program or job stream you are running requires minor changes every time it runs, and therefore, you do not want to store it permanently on the managed system. Another reason to use the Send and Run activity type is security; you might not want to store sensitive programs on the managed systems.

```
                          Send SMG Object (SNDSMGOBJ)

Type choices, press Enter.

Object . . . . . . . . . . . . . > MYPROGRAM     Name
  Library  . . . . . . . . . . . >   MYLIB_____  Name, *LIBL, *CURLIB
Object type  . . . . . . . . . . > *PGM          F4 for list
Member . . . . . . . . . . . . .   *ALL          Name, *ALL, *FIRST, *LAST
Data type  . . . . . . . . . . .   *UNSPEC       *UNSPEC, *CL, *REXX
Managed systems node list:
  Node list  . . . . . . . . . .   *NONE____     Name, *NONE
    Library  . . . . . . . . . .                 Name, *LIBL, *CURLIB
Managed system node names:
  Network identifier . . . . . .   *NONE_____    Name, *NONE, *NETATR
  Control point  . . . . . . . .   __________    Name
               + for more values
Target release . . . . . . . . .   *CURRENT      *PRV, V2R3M0, V3ROM5...
Run program  . . . . . . . . . . > *YES          *NO, *YES
Parameters . . . . . . . . . . .   ________________________
               + for more values   ________________________


                                                                   Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 43. Send SMG Object (SNDSMGOBJ)

Note: The Run program (RUNPGM) parameter only applies to object type (OBJTYPE) *PGM, *FILE, or *FILEDATA. If Run Program *YES is specified, the parameters to be passed to the program are entered in the Parameters (PARM) parameter.

Data Type (DATATYPE) Command: Specifies the data type of the member. This parameter needs to be specified only when sending a source file that runs on the managed system. DATATYPE is specified only when running *FILEDATA.

***UNSPEC** Unspecified file member type. If the source file is named QCLSRC or the member type is CLP, the data type is assumed to be CL. If the source file is named QREXSRC or the member type is REXX, the data type is assumed to be an REXX program.

***CL** The file member contains control language such as the AS/400 CL input stream.

***REXX** Specifies the file member contains a REXX EXEC.

Retrieve SMG Object (RTVSMGOBJ)

The Retrieve SMG Object (RTVSMGOBJ) fast path command and the action type retrieve (*RTV) for an activity type object (*OBJ) are used to retrieve an object from the managed system to the central site system.

Tip

When using AS/400 standards names, only one object is retrieved from one managed system. If you want to retrieve an object from multiple managed systems, you need to use a change request and global names.

Figure 44 on page 105 shows the Retrieve SMG Object (RTVSMGOBJ) display.

```
                        Retrieve SMG Object (RTVSMGOBJ)

Type choices, press Enter.

Object . . . . . > MYDTAARA__    Name
  Library  . . . . . . . . . .     *CURLIB___     Name, *CURLIB
Object type  . . . . . . . . . > *DTAARA       F4 for list
Managed system node names:
  Network identifier . . . . . .   *NETATR_      Name, *NETATR
  Control point  . . . . . . . .   ________      Name
Target release . . . . . . . . .   *CURRENT      *PRV, V2R3M0, V3ROM5...

                            Additional Parameters

Replace object . . . . . . . . .   *NO_          *NO, *YES

                                                                        Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 44. Retrieve SMG Object (RTVSMGOBJ)

Delete SMG Object (DLTSMGOBJ)

This command and the related activity types allow you to delete an object at the managed system.

If you specify OBJTYPE(*FILE) and only one member name (or *FIRST or *LAST), or if you specify OBJTYPE(*FILEDATA), only a single member is removed from the file and the file is not deleted.

If you specify OBJTYPE(*LIB), the library and all of the objects in that library are deleted. If the object being deleted is a library but some library objects cannot be deleted (locking or authority problems), then the activity fails; the library objects that have been successfully deleted are not restored.

Figure 45 shows the parameters for the Delete SMG Object (DLTSMGOBJ) fast path command.

```
                        Delete SMG Object (DLTSMGOBJ)

Type choices, press Enter.

Object . . . . . > MYFILE        Name
  Library  . . . . . . . . . .     *CURLIB___   Name, *CURLIB
Object type  . . . . . . . . . > *FILE         F4 for list
Member . . . . . . . . . . . . .   *ALL______    Name, *ALL, *FIRST, *LAST
Managed systems node list:
  Node list  . . . . . . . . . .   *NONE_____    Name, *NONE
    Library  . . . . . . . . . .     _________   Name, *LIBL, *CURLIB
Managed system node names:
  Network identifier . . . . . .   *NONE_____    Name, *NONE, *NETATR
  Control point  . . . . . . . .     ________    Name
              + for more values


                                                                        Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 45. Delete SMG Object (DLTSMGOBJ)

Run SMG Object (RUNSMGOBJ)

The Run SMG Object (RUNSMGOBJ) fast path command and run object activity are similar to the Send and Run activity type (see “Send and Run a Program (SNDSMGOBJ)” on page 103); the difference is that the object must exist at the managed system and is not deleted after running.

As with the Send and Run activity, you can run:

- A program object, that is a compiled program of any language.
- A source file member containing CL statements.
- A source file member containing REXX statements.

Figure 46 through Figure 48 on page 107 show how to use the Run SMG Object (RUNSMGOBJ) fast path command.

```
                          Run SMG Object (RUNSMGOBJ)

 Type choices, press Enter.

 Object . . . . . . . . . . . . . > MYPGM         Name
   Library  . . . . . . . . . . .     *CURLIB___  Name, *CURLIB
 Object type  . . . . . . . . . . > *PGM_____      *FILE, *FILEDATA, *PGM
 Managed systems node list:
   Node list  . . . . . . . . . .   *NONE_____    Name, *NONE
     Library  . . . . . . . . . .     __________  Name, *LIBL, *CURLIB
 Managed system node names:       _
   Network identifier . . . . . .   *NONE___      Name, *NONE, *NETATR
   Control point  . . . . . . . .     ________    Name
                + for more values _
 Parameters . . . . . . . . . . .   ________________________
                + for more values   ________________________

                                                                      Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 46. Run SMG Object (RUNSMGOBJ)

```
                          Run SMG Object (RUNSMGOBJ)

 Type choices, press Enter.

 Object . . . . . . . . . . . . . > MYFILE____    Name
   Library  . . . . . . . . . . .     *CURLIB___  Name, *CURLIB
 Object type  . . . . . . . . . . > *FILEDATA     *FILE, *FILEDATA, *PGM
 Member . . . . . . . . . . . . .   __________    Name
 Data type  . . . . . . . . . . .   *CL____       *UNSPEC, *CL, *REXX
 Managed systems node list:
   Node list  . . . . . . . . . .   *NONE_____    Name, *NONE
     Library  . . . . . . . . . .     __________  Name, *LIBL, *CURLIB
 Managed system node names:       _
   Network identifier . . . . . .   *NONE___      Name, *NONE, *NETATR
   Control point  . . . . . . . .   ________      Name
                + for more values _
 Parameters . . . . . . . . . . .   ________________________
                + for more values   ________________________

                                                                      Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 47. Run CL Job Stream (RUNSMGOBJ)

```
                          Run SMG Object (RUNSMGOBJ)

Type choices, press Enter.

Object . . . . . . . . . . . . > MYREXX____    Name
  Library  . . . . . . . . . .     *CURLIB___  Name, *CURLIB
Object type  . . . . . . . . . > *FILEDATA     *FILE, *FILEDATA, *PGM
Member . . . . . . . . . . . .   __________    Name
Data type  . . . . . . . . . .   *REXX__       *UNSPEC, *CL, *REXX
Managed systems node list:
  Node list  . . . . . . . . .   *NONE_____    Name, *NONE
    Library  . . . . . . . . .     __________  Name, *LIBL, *CURLIB
Managed system node names:       _
  Network identifier . . . . . .  *NONE___      Name, *NONE, *NETATR
  Control point  . . . . . . . .  ________      Name
               + for more values _
Parameters . . . . . . . . . . .  ________________________
               + for more values  ________________________

                                                                   Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 48. Run REXX Program (RUNSMGOBJ)

Product Fast Path Commands

In this context, a *product* means one of the following:

- An IBM licensed program

  - or -

- A user-written application that has been packaged using the software management features of System Manager/400.

Prior to Version 3 Release 1, a product could only be installed from a tape by using the Restore Licensed Program (RSTLICPGM) command. There was no easy way to send and install products electronically.

The Save Licensed Program (SAVLICPGM) and Restore Licensed Program (RSTLICPGM) commands have been enhanced in V3R1, allowing you to save and restore licensed programs to or from save files.

The fast path commands for products and the product activity type allow you to manage the software packages at the systems in your network without handling tapes. The following action types are supported and described in the next sections:

- “Send a Product (SNDPRD Command).”
- “Retrieve Product (RTVPRD)” on page 114.
- “Install Remote Product (INSRMTPRD)” on page 111.

Send a Product (SNDPRD Command)

The Send Product (SNDPRD) fast path command allows you to send a product to one or more managed systems. The product must be previously packaged on the central site system.

If you specify Install *NO in the SNDPRD command, the product is stored in the distribution repository of the managed system but is *not* installed and, therefore,

cannot be used. However, you can optionally request (with parameter INSTALL(*YES)) that it is installed immediately. Otherwise, you must install it at a later time using the Install Remote Product (INSRMTPRD) fast path command or a change request with an install product activity.

Tip

Use the SNDPRD command with option Install *NO when you want to replace an already installed version of a product during off hours. Send the product during the day, track the product distribution, and schedule the install at a later time.

Internally, the Send Product (SNDPRD) command is executed in two steps:

1. The product is packaged for distribution, that is all of the objects for that licensed program are saved in a save file and stored in the distribution repository at the central site system. The Package Product for Distribution (PKGPRDDST) command is called during this step.
2. A change request with product activity of action type *send* (or *send and install*) is submitted, which actually sends the product out of the distribution repository to the managed system.

If the product was packaged for distribution before, that is, it already resides in the distribution repository of the central site system, step 1 is not performed again, unless you specify parameter PKGPRDDST(*REPLACE).

This command is shipped with public authority *EXCLUDE.

Tip

Since this command calls the PKGPRDDST and ADDPRDCRQA commands, you must be authorized to use these commands. *USE Authority to the following command processing programs in library QSVMSS is also required:

- QCQFVACE (ADDDSTCLGE command)
- QCQFVACE (ADDDSTCLGE command)
- QCQFVACE (CPYDSTRPSO command)
- QCQFVVAD (CPYDSTRPSO command)
- QCQEPPPD (PKGPRDDST command)
- QCQEPVPP (PKGPRDDST command)

The products 9AOCC01 and 9AOCC02 were installed in your central site system after following the instructions in Appendix B, “Programming Examples Used in this Book” on page 463.

EXAMPLE 5

Sending the Product 9AOCC01 to Your Managed Systems

To send the product 9AOCC02 to your managed systems, use the following steps:

1. Enter the SNDPRD command.

```
                              Send Product (SNDPRD)

Type choices, press Enter.

Product ID . . . . . . . . . . . > 9AOCC01       Character value
Release level  . . . . . . . . .   *ONLY_        VxRxMx, *ONLY.
Product option . . . . . . . . .   *BASE_        1-99, *BASE
Product load type  . . . . . . .   *ALL_         *ALL, *CODE, *LNG
Load ID  . . . . . . . . . . . .   *ALL_         2900-2999, *ALL, *CODE
Managed systems node list:
  Node list  . . . . . . . . . .   PRODUCTION    Name, *NONE
    Library  . . . . . . . . . .     GG244372__  Name, *LIBL, *CURLIB
Managed system node names:
  Network identifier . . . . . . > *NONE___       Name, *NONE, *NETATR
  Control point  . . . . . . . . > ________       Name
              + for more values
Install  . . . . . . . . . . . .   *NO_           *NO, *YES
Keep catalog entry . . . . . . .   *NO_           *NO, *YES
Package product  . . . . . . . .   *NOREPLACE    *NOREPLACE, *REPLACE

                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 49. Send Product (SNDPRD)

A change request description with the same name as your user profile is created and submitted. A message is returned indicating a change request name and number:

Change request OCC400 000010 submitted.

2. Track the progress of the distribution at the central site system:
   - GO SVSM (option 6, Change request administration).
   - From the Change Request Administration Menu, select option 10, Work with submitted change requests

   - or-

   - Enter the Work with Submitted Change Request (WRKSBMCRQ) command.

```
                      Work with Submitted Change Requests
                                                          System:   RCHASM02
Type options, press Enter.
  3=Hold   4=Delete   5=Display details   6=Release   8=Work with activities
  10=Display messages   13=End ...

                                              Highest  Last
     Change                                     End    End
Opt  Request     Number  Status                 Code    Code
8    OCC400      000010  Active



                                                                     Bottom

Parameters or command
===>
F3=Exit      F4=Prompt         F5=Refresh   F6=Print list   F11=Display
F12=Cancel   F17=Position to   F23=More options   F24=More keys
```

Figure 50. Work with Submitted Change Request (WRKSBMCRQ) Command

3. Select option 8, Work with activities.

```
                      Work with Submitted CRQ Activities
                                                                System:   RCHASM02
Change request  . . . . . :   OCC400
  Number  . . . . . . . . :     000010
Text  . . . . . . . . . . :


Type options, press Enter.
  3=Hold   5=Display details   6=Release   8=Work with nodes for activity
  10=Display messages          13=End

                                                                        Highest
     Activity                                                             End
Opt  Name        Type        Node               Status                  Code
8    QACT000010  *PRD        ITSCNET.RCHASM...  Running
```

Figure 51. Work with Activities

4. Select option 8, Work with nodes for activity.

```
                         Work with Nodes for Activity
                                                                System:   RCHASM02
Change request  . . . . . :   OCC400
  Number  . . . . . . . . :     000010
Activity name . . . . . . :   QACT000010


Type options, press Enter.
  3=Hold   6=Release   8=Display conditions for node   10=Display message
  13=End

     Control   Network                            End
Opt  point     ID        Status                   Code
     RCHASM03  ITSCNET   Ended                     00
     RCHAS040  ITSCNET   Running
     RCHAS110  RPC       Running
```

Figure 52. Work with Nodes for Activity

Figure 52 shows that the activity is still running in RCHAS040 and RCHAS110 but has ended successfully (return code 00) in RCHASM03.

5. You can also track the progress of the activity at the managed system:
   - GO SVMSS (option 5, Work with received CRQ activities)

   - or-

   - Enter the Work with Received Change Request Activities (WRKRCVCRQA) command.

```
                      Work with Received CRQ Activities                RCHAS040
                                                                11/23/94  17:30:14
Type options, press Enter.
  3=Hold   4=End   5=Display details   6=Release

     Control   Network   Current
Opt  Point     ID        Status           Activity
     RCHASM02  ITSCNET   Ready            Send product
```

Figure 53. Work with Received Change Request Activities

6. Display the distribution catalog at the managed system by entering:

```
WRKDSTCLGE
```

```
                         Work with DST Catalog Entries
                                                                 System:   RCHAS040
Type options, press Enter.
  1=Add   3=Copy DST repository object   4=Remove   5=Display detail
  6=Print detail   8=Display token attributes
Opt     Global Name

        I3IBM1 AS400 9AOCC01 V1R0M0 BASE ALL ALL REF 001 V3R1M0
```

Figure 54. Work with Distribution Catalog Entries (WRKDSTCLGE) Command

7. Verify that the product is not yet installed on the managed system.

   Enter the Display Software Resources (DSPSFWRSC) command at the managed system. Look for a resource ID (product) of 9AOCC01; you should not find it (if you followed our example and specified INSTALL(*NO) in the SNDPRD command!!).

```
                           Display Software Resources
                                                                 System:   RCHAS040
Resource
   ID     Option  Feature  Description
5763999   *BASE    5050    AS/400 Licensed Internal Code
5763SS1   *BASE    5050    Operating System/400
5763SS1   *BASE    2924    Operating System/400
5763SS1   *BASE    2932    Operating System/400
5763SS1   1        5050    OS/400 - Extended Base Support
5763SS1   1        2924    OS/400 - Extended Base Support
5763SS1   1        2932    OS/400 - Extended Base Support
5763SS1   2        5050    OS/400 - Online Information
5763SS1   2        2924    OS/400 - Online Information
5763SS1   2        2932    OS/400 - Online Information
```

Figure 55. Display Software Resources (DSPSFWRSC) Command

Install Remote Product (INSRMTPRD)

If you send a product to a managed system without installing it, using the Send Product (SNDPRD) command with parameter INSTALL(*NO). You can use the Install Remote Product (INSRMTPRD) fast path command to install the product at a later time.

This is similar to using the Restore Licensed Program (RSTLICPGM) command. While the RSTLICPGM command restores from tape or save file, INSRMTPRD installs the product stored in the distribution repository at the managed system.

Tip

The user profile under which the Install Product runs (activity type *PRD action *INS) must be authorized to:

- The Restore Licensed Program (RSTLICPGM) command.
- The Remove Distribution Catalog Entry (RMVDSTCLGE) command (if Keep distribution catalogue entry *NO is specified).
- The following processing programs in library QSVMSS:
  - QCQFVRCE (RMVDSTCLGE command)
  - QCQFVVTY (RMVDSTCLGE command)

EXAMPLE 6

Installing Product 9AOCC01 on Your Managed Systems

To install the product that you sent to the managed systems in the previous example, use the following steps:

1. Run the fast path command INSRMTPRD.

```
                        Install Remote Product (INSRMTPRD)

 Type choices, press Enter.

 Product ID . . . . . . . . . . . > 9AOCC01       Character value
 Release level  . . . . . . . . .   *ONLY_        VxRxMx, *ONLY.
 Product option . . . . . . . . .   *BASE_        1-99, *BASE
 Product load type  . . . . . . .   *ALL_         *ALL, *CODE, *LNG
 Load ID  . . . . . . . . . . . .   *ALL_         2900-2999, *ALL, *CODE
 Managed systems node list:
   Node list  . . . . . . . . . .   PRODUCTION    Name, *NONE
     Library  . . . . . . . . . .     GG244372__  Name, *LIBL, *CURLIB
 Managed system node names:         _
   Network identifier . . . . . . > *NONE___      Name, *NONE, *NETATR
   Control point  . . . . . . . . > ________      Name
              + for more values _
Keep catalog entry . . . . . . .  *NO           *NO, *YES



                                                                      Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 56. Install Remote Product (INSRMTPRD)

2. Track the progress of the distribution at the central site system with the WRKSBMCRQ command.
3. If you want, you can watch the received activities at the managed system by using the WRKRCVCRQA command.

```
                        Work with Received CRQ Activities              RCHAS040
                                                              11/23/94  17:40:13
  Type options, press Enter.
    3=Hold   4=End   5=Display details   6=Release

      Control   Network   Current
  Opt Point     ID        Status          Activity
      RCHASM02  ITSCNET   Running         Install product
```

4. Once the submitted change request has successfully ended, verify that the catalog entry has been removed from the managed system (remember we specified KEEPCLGE *NO in the INSRMTPRD fast path command).

```
                        Work with DST Catalog Entries
                                                          System:   RCHAS040
 Type options, press Enter.
   1=Add   3=Copy DST repository object   4=Remove   5=Display detail
   6=Print detail   8=Display token attributes
 Opt     Global Name


 (No catalog entries match selection criteria)
```

5. Verify that the product is installed on the managed system:

   DSPSFWRSC

```
                          Display Software Resources
                                                                System:   RC
Resource
   ID     Option  Feature  Description
5763XF1   6        2924    Client Access/400 - GraphicOps for OS/2
5763XL1   *BASE    5050    Client Access/400 for DOS
5763XL1   *BASE    2924    Client Access/400 for DOS
5763XL1   1        5050    Client Access/400 - DOS SBCS
5763XL1   1        2924    Client Access/400 - DOS SBCS
5763XL1   2        5050    Client Access/400 - DOS DBCS
5763XL1   2        2924    Client Access/400 - DOS DBCS
5763XZ1   *BASE    5050    LAN Server/400 (LS400)
5763XZ1   *BASE    2924    LAN Server/400 (LS400)
9AOCC01   *BASE    5001    OCC/400 HANDS-ON LAB PRODUCT
AJDDC01   *BASE    5050    AS/400 Licensed Internal Code - AJDDC01 9400D
AJDDH01   *BASE    5050    AS/400 Licensed Internal Code - AJDDH01 9400D
AJDDP01   *BASE    5050    AS/400 Licensed Internal Code - AJDDP01 9400D
AJDG001   *BASE    5050    AS/400 Licensed Internal Code - AJDG001 9400D
```

EXAMPLE 7

Sending and Installing Product 9AOCC02 on Your Managed Systems

In this example, we sent and installed product 9AOCC02 in a single step.

1. At the central site system, enter the Send Product (SNDPRD) command specifying Install *YES and Keep catalog entry *NO.

```
                              Send Product (SNDPRD)

Type choices, press Enter.

Product ID . . . . . . . . . . . > 9AOCC02       Character value
Release level  . . . . . . . . .   *ONLY         VxRxMx, *ONLY.
Product option . . . . . . . . .   *BASE         1-99, *BASE
Product load type  . . . . . . .   *ALL          *ALL, *CODE, *LNG
Load ID  . . . . . . . . . . . .   *ALL          2900-2999, *ALL, *CODE
Managed systems node list:
  Node list  . . . . . . . . . . > PRODUCTION    Name, *NONE
    Library  . . . . . . . . . . >   GG244372    Name, *LIBL, *CURLIB
Managed system node names:
  Network identifier . . . . . .   *NONE         Name, *NONE, *NETATR
  Control point  . . . . . . . .                 Name
              + for more values
Install  . . . . . . . . . . . > *YES    *NO, *YES
Keep catalog entry . . . . . . .   *NO     *NO, *YES
Package product  . . . . . . . .   *NOREPLACE    *NOREPLACE, *REPLACE
```

*Figure 57. Send Product with Install *YES*

2. Track the progress of the distribution with the WRKSBMCRQ command.
3. Verify that the product is installed on the remote system (DSPSFWRSC).

```
                          Display Software Resources
                                                                System:   RCHASM03
Resource
   ID     Option  Feature  Description
5763XL1   1        2924    Client Access/400 - DOS SBCS
5763XL1   2        5050    Client Access/400 - DOS DBCS
5763XL1   2        2924    Client Access/400 - DOS DBCS
5763XZ1   *BASE    5050    LAN Server/400 (LS400)
5763XZ1   *BASE    2924    LAN Server/400 (LS400)
9AOCC01   *BASE    5001    OCC/400 HANDS-ON LAB PRODUCT
9AOCC02   *BASE    5001    OCC/400 HANDS-ON LAB PRODUCT
AJDDC01   *BASE    5050    AS/400 Licensed Internal Code - AJDDC01 9400D
AJDDH01   *BASE    5050    AS/400 Licensed Internal Code - AJDDH01 9400D
AJDDP01   *BASE    5050    AS/400 Licensed Internal Code - AJDDP01 9400D
```

Retrieve Product (RTVPRD)

The Retrieve Product fast path command allows you to retrieve a product from a single managed system. Before you can retrieve a product it must be stored in the distribution repository. You must run the Package Product for Distribution (PKGPRDDST) command at the managed system before retrieving the product.

Tip

If you do not use the Package Product for Distribution (PKGPRDDST) command and attempt to retrieve the product, the change request fails with the error message SMU16BE Product 9AOCC02 not found.

EXAMPLE 8

Retrieving Product 9AOCC02 from a Single Managed Systems

In this example, we retrieved the product 9AOCC02 from the managed system RCHASM03 to the central site system. Use the following steps:

1. Package the product for distribution using the PKGPRDDST command.

   You must run the PKGPRDDST (Package Product for Distribution) command under a user profile that is authorized to it.

   Use the RUNSMGCMD and specify a user ID and password that is authorized to the PKGPRDDST command at the managed system:

   ```
   RUNSMGCMD CMD(PKGPRDDST PRDID(9AOCC02))CPNAME((*NETATR RCHASM03)) +
    USRPRF(ADAN) PASSWORD() ENCODE(*NO)
    Change request OCC400 000020 submitted.
   ```

2. Track the execution of the change request with the WRKSBMCRQ command.

```
                        Work with Submitted CRQ Activities
                                                                  System:   RCHASM02
Change request  . . . . . :   OCC400
  Number  . . . . . . . . :     000020
Text  . . . . . . . . . . :



Type options, press Enter.
  3=Hold   5=Display details   6=Release   8=Work with nodes for activity
  10=Display messages          13=End

                                                                        Highest
     Activity                                                             End
Opt  Name        Type        Node                Status                 Code
     QACT000010  *CMD        ITSCNET.RCHASM03    Ended                   00
```

3. After the PKGPRDDST command has successfully run on the managed system, you should see a new entry in the distribution catalog. Enter the Work with Distribution Catalog Entries (WRKDSTCLGE) command at the managed system.

```
                         Work with DST Catalog Entries
                                                                  System:   RCHASM03
Type options, press Enter.
  1=Add   3=Copy DST repository object   4=Remove   5=Display detail
  6=Print detail   8=Display token attributes
Opt     Global Name

   I3IBM1 AS400 9A0CC02 V1R0M0 BASE ALL ALL REF 001 V3R1M0
```

4. Run the Retrieve Product fast path command.

```
                            Retrieve Product (RTVPRD)

Type choices, press Enter.

Product ID . . . . . . . . . . . > 9A0CC02    Character value
Release level  . . . . . . . . .   *ONLY         VxRxMx, *ONLY.
Product option . . . . . . . . .   *BASE         1-99, *BASE
Product load type  . . . . . . .   *ALL          *ALL, *CODE, *LNG
Load ID  . . . . . . . . . . . .   *ALL          2900-2999, *ALL, *CODE
Managed system node names:
  Network identifier . . . . . .   *NETATR       Name, *NETATR
  Control point  . . . . . . . . > RCHASM03      Name
```

Figure 58. Retrieve Product (RTVPRD) Command

5. Verify that the product has been retrieved and successfully stored in the distribution repository. Use the Work with DST Catalog Entries command at the central site system:

   WRKDSTCLGE

   You should see an entry in the distribution catalog for the retrieved product.

```
                         Work with DST Catalog Entries
                                                                System:   RCHASM02
Type options, press Enter.
  1=Add   3=Copy DST repository object   4=Remove   5=Display detail
  6=Print detail   8=Display token attributes
Opt     Global Name

   I3IBM1 AS400 9A0CC02 V1R0M0 BASE ALL ALL REF 001 V3R1M0
```

PTF Fast Path Commands

You can use the PTF fast path commands to manage the distribution of fixes in your network. Prior to System Manager/400 V3R1, a service provider could distribute fixes to the service requesters using the Send PTF (SNDPTF) command, but the PTF had to be loaded and applied by executing the appropriate command *at the managed system*. An operator at a service requester can also use the Send PTF Order (SNDPTFORD) command (which is part of OS/400) to request and receive a PTF.

With Operations Control Center/400, the SNDPTF command has been enhanced and additional fast path commands are now available:

- "Send Program Temporary Fix (SNDPTF)"
- "Retrieve Program Temporary Fix (RTVPTF)" on page 120
- "Apply Remote PTF (APYRMTPTF)" on page 120
- "Remove Remote PTF (RMVRMTPTF)" on page 122
- "Delete Remote PTF (DLTRMTPTF)" on page 123

Tip

In order to have the apply, remove, delete, or retrieve functions of the preceding commands processed on the service requester, the service requester must have Managed System Services/400 installed. The function of sending and receiving PTFs does not require MSS/400.

Send Program Temporary Fix (SNDPTF)

The service provider broadcasts the PTF to the service requesters by using the Send PTF (SNDPTF) command.

The Send Program Temporary Fix (SNDPTF) command allows you to send a PTF or a list of PTFs to a specific service requester, or to a list of service requesters, and to apply PTFs on a specific remote system or on a list of systems. The associated cover letters are also distributed if they are available. The PTF to be distributed could have been created in any of the following ways:

- The PTF save file is created using the Copy PTF to Save File (CPYPTFSAVF) command.
- The PTF is received by way of *IBMSRV or a service provider.
- The PTF is created using the Create Program Temporary Fix (CRTPTF) command.

Before you can distribute a product's PTF to the service requesters, the product must be enrolled in the list of supported products at the service provider. Use the Work with Supported Products (WRKSPTPRD) command to specify the products, options, and language features to process by way of service requests and PTF orders.

A PTF is available for distribution if a SAVE file containing the PTF is present in library QGPL and the PTF is released. To release PTFs and make them available for distribution:

- Change the service provider attributes using the CHGSRVPVDA command and specify Hold PTF received (HLDPTF) *NO *before* you copy or receive the PTFs to be distributed.

  - or -
- Release the held PTFs using the Work with Program Temporary Fixes (WRKPTF) command and option 6, Release or the Release Program Temporary Fix (RLSPTF) command.

There are some differences in how the SNDPTF command works depending on whether Managed System Services/400 is installed on the service requester or not. If the service requester is *not* a managed system (Managed System Services/400 is not installed), the following restrictions apply:

- You cannot load and apply PTFs using the SNDPTF command (and therefore, you cannot schedule these actions).
- You cannot specify that an IPL of the service requester system should occur.

The SNDPTF command is an exception to the general rules of fast path commands:

- While the other fast path commands create a change request description with only one change request activity, the SNDPTF command adds one PTF change request activity per PTF to be distributed.
- While most fast path commands provide only a subset of the capabilities of the corresponding change request activity type, the SNDPTF command offers more functions (see also "Add PTF Activity to a Change Request Description" on page 163):
  - You can send multiple PTFs (up to 50 PTFs) in a single SNDPTF fast path command
  - You can specify Check Service Requesters to determine:
    - If the PTF that is sent is already on the service requester (SAVF, LOADED, or applied). This includes requisites if SNDRQT(*YES) is specified.
    - If the product or option is installed and supported (if not supported or not installed or the PTF has a SAVF that is loaded or applied, then the PTF is not sent).
  - You can specify that an IPL of the service requester system should occur after all of the PTFs are successfully applied on the service requester and you can schedule the date and time when the IPL can occur on the service requester. This option is particularly useful if you are sending *delayed* PTFs.

In summary, a single SNDPTF command is more powerful than the corresponding change request activity type PTF.

Figure 59 on page 118 shows the parameters for the Send Program Temporary Fix (SNDPTF) command.

```
                        Send Program Temporary Fix (SNDPTF)

Type choices, press Enter.

PTF description:                  _
  PTF identifier . . . . . . .    _______        Character value, *ALL
  Product  . . . . . . . . . .    *ONLY__        F4 for list
  Release level  . . . . . . .    ______         VxRxMx
               + for more values  _
Destination service requester:    _
  Network identifier . . . . . . > *NONE___      *ALL, *SELECT, *NONE...
  Control point  . . . . . . . .  ________       Name
               + for more values  _
Maximum distribution . . . . . .  *NOMAX         1-5000, *SRVRQS, *SRVPVDA...
Send requisites  . . . . . . . .  *YES           *YES, *NO
Check service requesters . . . .  *YES           *YES, *NO
PTF parts  . . . . . . . . . . .  *ALL           *ALL, *PTF, *CVRLTR
Extent of change . . . . . . . .  *NONE          *NONE, *TEMP, *PERM
Node list name . . . . . . . . .  *NONE          Name, *NONE
  Library  . . . . . . . . . . .                  Name, *LIBL, *CURLIB
                                                                      More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 59 (Part 1 of 2). Send Program Temporary Fix (SNDPTF)

```
                        Send Program Temporary Fix (SNDPTF)

Type choices, press Enter.

Remote apply time:
  Time zone  . . . . . . . . . .  *LCLSYS       *LCLSYS, *MGDSYS
  Start after:
  Time . . . . . . . . . . . . .  *CURRENT      Time, *CURRENT
  Date . . . . . . . . . . . . .  *CURRENT      Date, *CURRENT, *NEXT
IPL remote system  . . . . . . .  *NO           *NO, *YES
Remote IPL time:
  Time zone  . . . . . . . . . .  *LCLSYS       *LCLSYS, *MGDSYS
  Start after:
  Time . . . . . . . . . . . . .  *CURRENT      Time, *CURRENT
  Date . . . . . . . . . . . . .  *CURRENT      Date, *CURRENT, *NEXT


                                                                      Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 59 (Part 2 of 2). Send Program Temporary Fix (SNDPTF)

PTF Identifier (PTFID) Command: You can specify up to 50 PTFs here. If the same PTF identifier may occur for different products or different releases of a product, you must also specify the product identifier or the release level of the product.

Destination Service Requester (DESTSRVRQS) Command: You can specify up to 50 service requesters here. The default (*SELECT) allows you to select the node names from a list of service requesters. You must specify *NONE if you want to use a node list. If you type each name manually, you also must specify the remote network identifier or *NETATR for each service requester.

Send Requisites (SNDRQT) Command: If you leave the default (*YES), the system also sends all of the necessary requisite PTFs.

Tip

If SNDRQT(*NO) and APY(*TEMP)/(*PERM) are specified, then the PTFs are applied in the order listed on the command. Otherwise, if SNDRQT(*YES), the PTFs are applied in order of prerequisites first.

Check Service Requesters (CHECK) Command: If you leave the default (*YES), the system does not send the specified PTF if it has been already loaded or applied at the service requester, or if that product option is not installed.

Extent of Change (APY) Command: If you use the default, APY(*NONE), the SNDPTF command only *sends* the PTF to the service requester and the PTF remains in a save file only until it is loaded and applied. By specifying APY(*TEMP) or APY(*PERM), you can send and apply the PTF temporally or permanently in a single operation.

PTFs that are not marked as delayed are applied immediately. PTFs marked as delayed are scheduled to be applied at the next IPL. You can specify the parameter IPL(*YES) to perform an IPL after all of the PTFs are successfully applied. PTFs marked as delayed can only be applied permanently if they have been previously applied temporarily.

Node List Name (NODL) Command: Instead of specifying the name of each service requester, you can also specify the name of a node list. In this case, the parameter for destination service requesters DESTSRVRQS must be *NONE.

Tip

If you specify a node list name (as opposed to destination service requesters), CHECK(*NO) *must* be specified and, therefore, the service requester is not checked to determine the status of the PTFs or products.

Remote Apply Time (RMTAPYTIME) Command: If you choose to apply the PTFs after sending (parameter extent of change), you can also specify the time and date when the apply should occur. That is, the apply occurs *after* the time and date specified in this parameter. This may be useful, for example, if you want to send the PTF during the daytime, but you want to apply them during the night when the products are not used.

IPL Remote System (IPL) Command: Specifies if an IPL of the service requester should occur.

Remote IPL Time (RMTIPLTIME) Command: Specifies the date and time when the IPL can occur on the service requester. The IPL starts after the date and time specified.

Retrieve Program Temporary Fix (RTVPTF)

You can use the Retrieve Program Temporary Fix (RTVPTF) command to retrieve a PTF from one or multiple managed systems.

For example, in an environment such as the one shown in Figure 2 on page 41, the PTFs are developed and created using the Create Program Temporary Fix (CRTPTF) command on the application development system RCHASM01, retrieved at the central site system RCHASM02 using the RTVPTF command, and distributed to and installed on the productions systems (RCHAS040, RCHASM03, and so on) using the SNDPTF command.

The parameters for the Retrieve Program Temporary Fix (RTVPTF) command in Figure 60 are a subset of those described after Figure 59 on page 118.

```
                    Retrieve Program Temporary Fix (RTVPTF)

Type choices, press Enter.

PTF description:                 _
  PTF identifier . . . . . . . .   _______       Character value, *ALL
  Product  . . . . . . . . . . .   *ONLY__       F4 for list
  Release level  . . . . . . . .   ______        VxRxMx
              + for more values _
Destination service requester:   _
  Network identifier . . . . . .   *SELECT_      Name, *SELECT, *NETATR
  Control point  . . . . . . . .   ________      Name
PTF parts  . . . . . . . . . . .   *ALL___       *ALL, *PTF, *CVRLTR
Cover letter language  . . . . .   *SRVPVDA      F4 for list
              + for more values _




                                                                      Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 60. Retrieve Program Temporary Fix (RTVPTF)

Apply Remote PTF (APYRMTPTF)

If you send PTFs to a service requester but you do not want to apply them at that time, or if the PTFs at the service requester have been loaded from tape, or if you want to apply permanently a PTF that was previously applied temporarily, you can use the Apply Remote PTF (APYRMTPTF) fast path command. The APYRMTPTF command is similar to the Apply PTF (APYPTF) command for the local system.

The PTF being applied by the APYRMTPTF command must already exist on the remote system.

Tip

PTFs are applied in the order listed on the command and prerequisite PTFs must already be applied.

Figure 61 on page 121 shows the parameters for the APYRMTPTF command.

```
                         Apply Remote PTF (APYRMTPTF)

Type choices, press Enter.

PTF description:                  _
  PTF identifier . . . . . . . .   _______        Character value, *ALL
  Product  . . . . . . . . . . .   *ONLY__        F4 for list
  Release level  . . . . . . . .   ______         VxRxMx
               + for more values _
Destination service requester:    _
  Network identifier . . . . . . > *NONE___       *ALL, *SELECT, *NONE...
  Control point  . . . . . . . .   ________       Name
               + for more values _
Extent of change . . . . . . . .   *TEMP          *TEMP, *PERM

                                                                   More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 61 (Part 1 of 3). Apply Remote PTF (APYRMTPTF)

```
                         Apply Remote PTF (APYRMTPTF)

Type choices, press Enter.

PTF description:                  _
  PTF identifier . . . . . . . .   _______        Character value, *ALL
  Product  . . . . . . . . . . .   *ONLY__        F4 for list
  Release level  . . . . . . . .   ______         VxRxMx
               + for more values _
Destination service requester:    _
  Network identifier . . . . . . > *NONE___       Name, *ALL, *SELECT, *NONE...
  Control point  . . . . . . . .   ________       Name
               + for more values _
Extent of change . . . . . . . .   *PERM          *TEMP, *PERM
Node list name . . . . . . . . .   *NONE_____     Name, *NONE
  Library  . . . . . . . . . . .     __________   Name, *LIBL, *CURLIB

                                                                   More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 61 (Part 2 of 3). Apply Remote PTF (APYRMTPTF)

```
                          Apply Remote PTF (APYRMTPTF)

Type choices, press Enter.


                            Additional Parameters

Remote apply time:
  Time zone  . . . . . . . . . .   *LCLSYS       *LCLSYS, *MGDSYS
  Start after:
  Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
  Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
IPL remote system  . . . . . . .   *NO           *NO, *YES
Remote IPL time:
  Time zone  . . . . . . . . . .   *LCLSYS       *LCLSYS, *MGDSYS
  Start after:
  Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
  Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT


                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 61 (Part 3 of 3). Apply Remote PTF (APYRMTPTF)

Remove Remote PTF (RMVRMTPTF)

One of the biggest advantages of the PTF process is the capability to *back out* changes that have been applied to a program product by a PTF. You can accomplish this by removing a PTF that has been temporally applied.

The Remove Remote Program Temporary Fix (RMVRMTPTF) command allows a service provider to remotely remove PTFs from a service requester system. However, if the PTF has been *applied permanently*, you cannot remove it.

When using the RMVRMTPTF command, you can request an IPL of the service requester system. The remove PTF and IPL are scheduled to occur at a later date and time. The RMVRMTPTF command is similar to the Remove PTF (RMVPTF) command for the local system.

Tip

PTFs are removed in the order listed on the command. All of the dependent PTFs must have already been removed.

Figure 62 on page 123 shows the parameters for the RMVRMTPTF command. For a description of these parameters, refer to page 118.

```
                         Remove Remote PTF (RMVRMTPTF)

Type choices, press Enter.

PTF description:
  PTF identifier . . . . . . . .   _______       Character value, *ALL
  Product  . . . . . . . . . . .   *ONLY        F4 for list
  Release level  . . . . . . . .   ______        VxRxMx
               + for more values
Destination service requester:
  Network identifier . . . . . .   *SELECT       Name, *ALL, *SELECT, *NONE...
  Control point  . . . . . . . .   ______        Name
               + for more values
Node list name . . . . . . . . .   *NONE         Name, *NONE
  Library  . . . . . . . . . . .   ______        Name, *LIBL, *CURLIB


                                                                      More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 62 (Part 1 of 2). Remove Remote PTF (RMVRMTPTF)

```
                         Remove Remote PTF (RMVRMTPTF)

Type choices, press Enter.


                           Additional Parameters

Remote remove time:
  Time zone  . . . . . . . . . .   *LCLSYS       *LCLSYS, *MGDSYS
  Start after:
  Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
  Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
IPL remote system  . . . . . . .   *NO           *NO, *YES
Remote IPL time:
  Time zone  . . . . . . . . . .   *LCLSYS       *LCLSYS, *MGDSYS
  Start after:
  Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
  Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT


                                                                     Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 62 (Part 2 of 2). Remove Remote PTF (RMVRMTPTF)

Note: Do not confuse the Remove Remote PTF (RMVRMTPTF) command with the Delete Remote PTF (DLTRMTPTF) command.

Delete Remote PTF (DLTRMTPTF)

The Delete Remote Program Temporary Fix (DLTRMTPTF) command allows a service provider to remotely delete PTFs from a service requester system. The delete function of this command is supported *only* when the service requester has System Manager/400 installed.

The DLTRMTPTF command only deletes the PTF save file and on order status of the PTF on the remote system. That is, you can no longer distribute the PTF to other systems or apply it to this system, unless you applied it before deleting it.

If you applied the PTF before deleting it, the DLTPTF does not back out the changes. Contrast this to the process of *removing* a PTF described in “Remove Remote PTF (RMVRMTPTF)” on page 122.

```
                          Delete Remote PTF (DLTRMTPTF)

 Type choices, press Enter.

 PTF description:
   PTF identifier . . . . . . . .                Character value, *ALL
   Product  . . . . . . . . . .   *ONLY          F4 for list
   Release level  . . . . . . . .                VxRxMx
                + for more values
 Destination service requester:
   Network identifier . . . . . .   *SELECT      Name, *ALL, *SELECT, *NONE...
   Control point  . . . . . . . .                Name
                + for more values
 Node list name . . . . . . . . .   *NONE        Name, *NONE
   Library  . . . . . . . . . . .                Name, *LIBL, *CURLIB

                                                                        Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 63. Delete Remote PTF (DLTRMTPTF)

EXAMPLE 9

Sending PTFs to Remote Systems

In this example,we show you how to send and apply PTF 9A01001 to product 9AOCC01. Use the following steps:

1. Enter the command:

   ```
   SNDPTF PTFID((9A01001 9AOCC01)) DESTSRVRQS(*ALL) APY(*TEMP)
   ```

   Note that the message `Contacting NetId.CPName to determine required PTFs` is shown while the system is checking if the product option or the PTFs are installed on the service requester. The verification is done on each service requester that you specify in the Destination Service Requesters (DESTSRVRQS) list.

2. Track the status of the distribution using the WRKSBMCRQ command.

3. Verify that the PTF has been sent to and temporarily applied on the remote system. Sign on to the remote system and enter the command:

   ```
   DSPPTF LICPGM(9AOCC01)
   ```

   Note: This step is for demonstration purposes only. In a real life environment, you would track the progress and success of the SNDPTF command with WRKSBMCRQ; you do not need to sign on to the remote systems to verify the PTF status.

   A display similar to the one in Figure 64 on page 125 is shown.

```
                                Work with PTF
                                                                System:   RCHASM03
Product ID  . . . . . . :   9AOCC01
Release . . . . . . . . :   V1R0M0

Type options, press Enter.  To work with assigned PTF IDs, press F18.
  1=Create   3=Hold      4=Delete   5=Display details   6=Release
  9=Work with problems   11=Load/Apply ...

Opt  PTF      Status                                PTF save file

     9A01001  Temporarily applied                   Yes (held)
```

Figure 64. WRKPTF Command

EXAMPLE 10

Removing PTFs on Remote Systems

In this example, we show you how to remove the PTF 9A01001 for product 9AOCC01 that you sent and applied in the previous example. Use the following steps:

1. Enter the command:

   `RMVRMTPTF PTFID((9A01001 *ONLY V1R0M0)) DESTSRVRQS(*ALL)`

2. Track the status of the distribution using the WRKSBMCRQ command.
3. Verify that the PTF has been removed on the remote system. Sign on to the remote system and enter the command:

   `DSPPTF LICPGM(9AOCC01)`

   Note: This step is for demonstration purposes only. In a real life environment, you would track the progress and success of the SNDPTF command with WRKSBMCRQ; you do not need to sign on to the remote systems to verify the PTF status.

   A display similar to the one in Figure 65 is shown.

```
                                Work with PTF
                                                                System:   RCHASM03
Product ID  . . . . . . :   9AOCC01
Release . . . . . . . . :   V1R0M0

Type options, press Enter.  To work with assigned PTF IDs, press F18.
  1=Create   3=Hold      4=Delete   5=Display details   6=Release
  9=Work with problems   11=Load/Apply ...

Opt  PTF      Status                                PTF save file

     9A01001  Not applied                           Yes (held)
```

Figure 65. WRKPTF Command

Note: By *removing* the PTF, you backed out the change that was implemented by that PTF. This means that the PTF is still in a save file at the managed system and can be applied again, or sent to other systems unless you also *delete* the PTF.

Chapter 4. Using CRQD for Complex Remote Operation Scenarios

In Chapter 3, “Using Fast Path Commands for Distribution Activities” on page 79, we described each function for remote operation and distribution provided by System Manager/400 and Managed System Services/400. This chapter explains how you can combine more than one of those functions by creating a new object type, a change request description (CRQD).

“Change Request Descriptions and Activities” describes the object type *CRQD, its underlying concepts, and the commands to create and work with a CRQD. Then, in “Capabilities of CRQs Not Available with Fast Path Commands” on page 133, we explain the capabilities of the change request description that allow you to handle more complex situations than you can with the fast path commands.

“Using Change Request Descriptions” on page 142 shows a complete example with the prompt displays for most of the commands that you need to work with change request descriptions. Finally in “More Sample Scenarios for CRQs with Multiple Activities” on page 167, we provide more examples that take advantage of those capabilities.

Change Request Descriptions and Activities

To operate any computer system, you constantly must apply changes to its data, programs, or configurations. Reasons for those changes might be:

- Daily business needs, for example, storing new sales prices.
- Problem resolution, as a result of any hardware or software failure.
- Configuration changes, such as defining new communication lines or other new hardware.

In a network, often the same (or very similar) changes need to be applied to many systems. The goal of a centrally-controlled operation is to make changes to all of the systems efficiently: documenting, automating, and tracking these changes.

Applying the same change to many systems individually is time consuming, at risk for error, and very difficult to track.

With System Manager/400, you can save time and reduce the chance for error. Also, you can know precisely which systems have the required changes and why these changes have not been made yet to those systems that do have the pending changes.

To accomplish the goals (documenting, automating, and tracking of changes) System Manager/400 introduced three new concepts with V3R1:

- Change request description (CRQD)
- Change Request Activity (CRQA)
- Submitted Change Request (SBMCRQ)

Change request description is a new AS/400 object type (*CRQD). It is used to store the description of a change to be made throughout your computer network. In other words, it is a plan that describes which tasks need to be performed on

which systems. You save your change request descriptions for future use. This is very similar to a *transmission plan* for NetView DM for MVS.

Like all other AS/400 objects, a CRQD resides in a library, has a user profile assigned as its owner, and contains descriptive text. If the change is related to any problem stored within the AS/400 problem log, you may also specify a problem identifier (PRBID) to provide a link between the description of a problem (as documented in the system's problem log) and its solution (documented in the CRQD).

Most importantly, every CRQD contains one or more Change Request Activities (CRQA). Each CRQA describes one action that is performed as an entity by the central site system, the managed systems, or both. Each activity can perform just one of the actions described in "Types of Change Request Activities" on page 131. The concept of a CRQA is similar to a *phase* of a NetView DM transmission plan that performs one function.

Besides describing *which* action needs to be performed, each activity (unlike the fast path commands) also has a facility to control *when* the activity is performed. When an activity is performed is defined by using one or more of these methods:

Conditions
A certain activity is only started when another activity (of the same CRQD) has ended with a certain end code.

Start Time
The activity must not start *before* a given date and time and must not start *after* another user-specified point of time. That is, a start window time is specified. Note that this is the time at which the activity starts processing at the central site.

Remote Start Time
When running programs or remote commands, or installing products or PTFs after the activity request is sent to the managed system, the actual execution of the request is delayed until the time specified by the remote start time parameter. This function is also available for the Run SMG Command (RUNSMGCMD), the Send Program Temporary Fix (SNDPTF), the Remove Remote PTF (RMVRMTPTF), and Apply Remote PTF (APYRMTPTF) fast path commands).

Each activity is related to one or more *nodes* that are managed systems. The names are individually specified for each node, or a node list is used to store those names. Relating an activity to a managed system does not necessarily mean that the activity *runs* only at the managed system. The activity is always started by the central site system. In some cases, both the central site system and the managed systems are involved, for example, sending or retrieving an object.

Although each activity within a CRQD must have a unique name (you may define a name yourself or let the system generate one for you), a CRQA is not an AS/400 object type. Rather than *creating* a CRQA, you must first create a CRQD. Then *add* one or more change request activities to it. An activity is only a part of the CRQD. It has at least one, but no more than 200 occurrences. A CRQA is compared to an entry in a table or a record in a file.

Each change request activity refers to one or more nodes. While the maximum number of nodes in the entire change request is 30,000, you can either specify up to 50 individual node names or one node list with up 500 entries with each activity. Figure 66 on page 129 shows the nested structure of a CRQD.

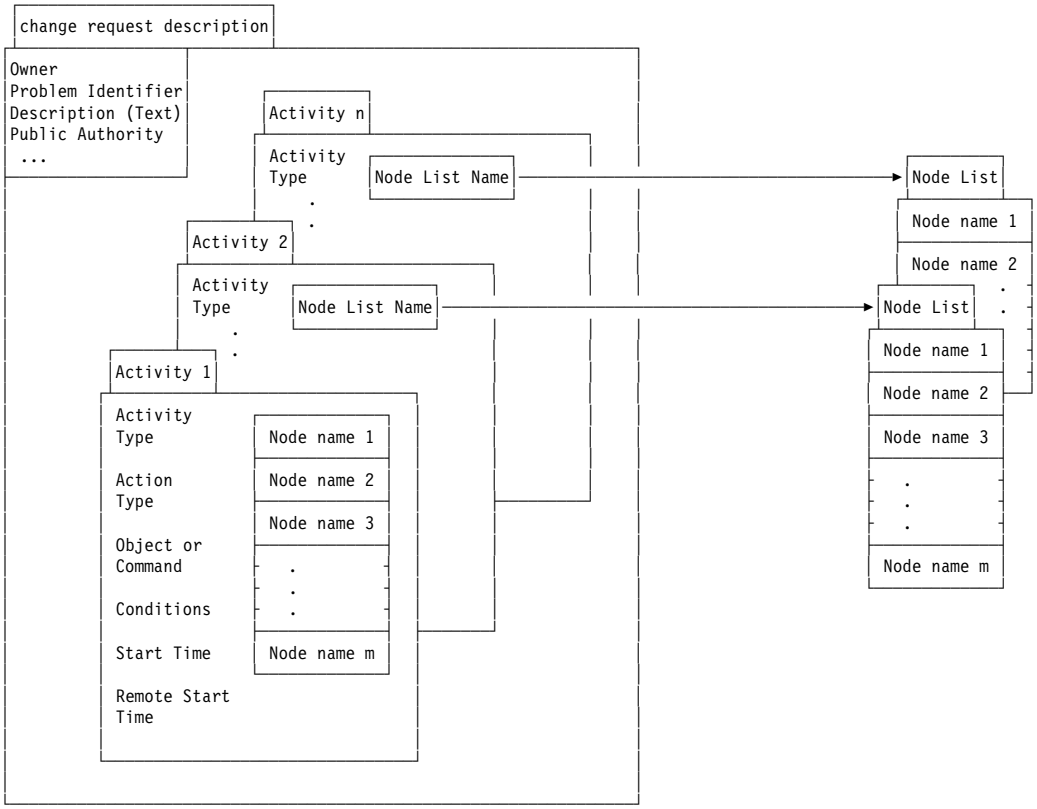


Figure 66. Structure of Change Request Descriptions

You can use System Manager/400 to plan daily business tasks or activities and put the plan into the system. The plan enables you to identify the operations that are to be performed, the systems on which they are to be performed, and when they are to be performed. Once the plan, which is called a change request description in the context of Operations Control Center/400, has been made, you can let the system run it for you.

A change request description consists of a series of change request Activities that describe changes across the network. Each change request activity can check the end codes of up to five preceding change request activities or groups of activities (if generic activities names are used) and can make itself start only when all conditions are met. At this time, you can also specify a condition mode that indicates whether you want to check the end code of all nodes or only at the same node before proceeding to the next change request activity.

Tip

The point to make clear is that five conditions can be specified. Through generic condition activity names, this means one condition can actually refer to multiple activities, for example, ACT99 is conditioned on the successful completion of ACT* (any activity starting with ACT).

This brings up another new term, a *submitted change request* which is neither an object type nor a part of a permanent object. It is an instance of a CRQD managed by System Manager/400 and Managed System Services/400. A CRQD and a submitted change request can be compared to the difference between a *Job Description (JOBD)* and an AS/400 *Job*. The JOBD is used to store

parameters necessary to control the behavior of an AS/400 job. Once the job has been submitted, it receives a copy of those parameters; after that, the job is a ″living″ structure in the system, and there is no longer any connection to the JOBD.

The CRQD is used to store the tasks and activities to be performed on managed systems. When the submitted change request becomes active, it initiates those tasks and activities at the specified times.

To observe the execution of a submitted change request, use Work with Submitted Change Requests (see “Track the Progress of a Submitted Change Request” on page 160). When you do so, you see a structure similar to the one described in Figure 66 on page 129. The submitted change request contains one or more activities. Each activity points to one or more nodes.

The submitted change request, the activities, and their nodes each have a *status*. The status describes the current state of execution (see “Various States of a Change Request Activity” on page 421). To be more precise, only the nodes have a status on their own; the status of an activity reflects the most important state of its nodes, and the status of a submitted change request represents the most important state of each of its activities.

The structure of a submitted change request provides a hierarchy, as depicted in Figure 67, that allows you to track the progress of a change request. The hierarchy starts at a high-level point of view and gives more granular detail.[4]

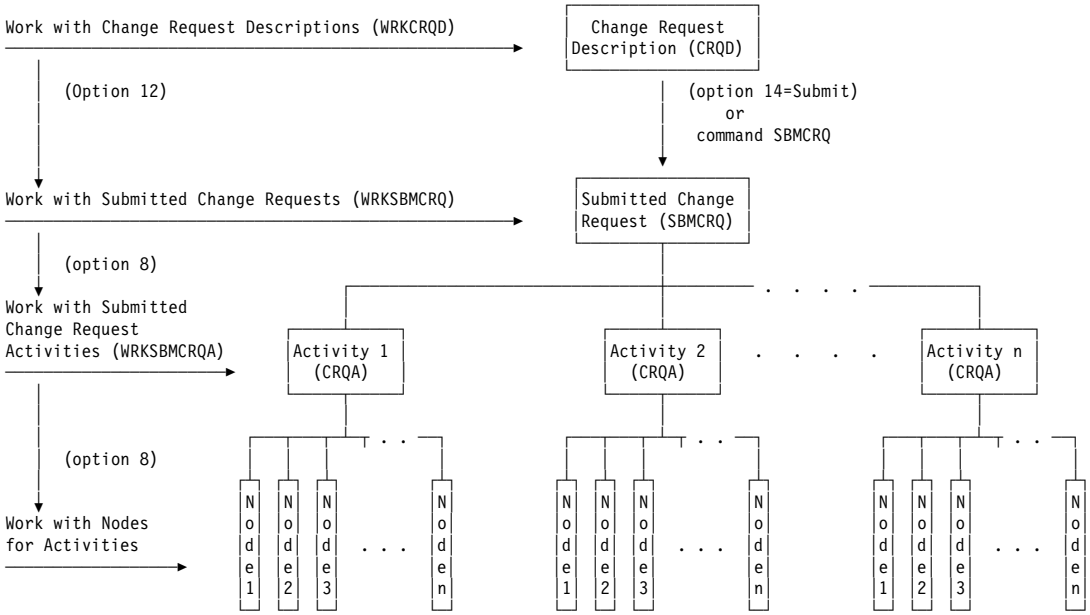


Figure 67. Structure of Change Request Descriptions

After you create a change request description and add activities to it (not shown in Figure 67), you can submit it. When you submit the CRQD using the Submit

[4] There are non-exception cases in which more detail may be given: If the Start Time on Managed System parameter is specified in the activity, when it is received and scheduled by the managed system, it sends an intermediate response to the central site. This response contains a message (SMU16BC - Activity will be performed on NETID.CPNAME) that is displayed with option 10 of WRKSBMCRQ command. A managed system attribute is used (CHGMGDSYSA command) to control whether or not intermediate responses are sent in these cases.

Change Request (SBMCRQ) command or option 14 of the Work with CRQ Descriptions (WRKCRQD) display, you are actually telling System Manager/400 and Managed System Services/400 to start its execution. After submission, you can use the Work with Submitted Change Requests (WRKSBMCRQ) command (see Figure 93 on page 161) to look at the status of the entire change request. If the status indicates a normal end, you do not need to investigate any further. If the status indicates an abnormal end, look for possible problems with that activity by using option 8, Work with Activities. If you find that one activity ran successfully for some nodes but not for others, you can now use the Work with Nodes for Activity display to see how that particular activity was performed at each individual node.

Similar to a job, a submitted change request is also known by a name that consists of two parts:

Change Request Name It has up to 10 characters. It defaults to the same name as the change request description (CRQD), but you can specify any valid name.

Sequence Number It ranges from 1 to 999999. The sequence number allows you to uniquely define the change request, even when you submit the same CRQD several times. Each time, you create a new submitted change request with the same name but with different sequence numbers. By default, the Submit Change Request (SBMCRQ) command generates a sequence number. The initial sequence number is 000010. Subsequent sequence numbers are generated in multiples of 10. If the sequence number generated is already in use, the next increment of 10 is used.

Types of Change Request Activities

Different types of activities can be combined in one change request description. There are five different types[5] of change request activities:

Command CRQ Activities Run any batch type command on a managed system or the local system. (The local system is the central site system where the activity was submitted).

Object CRQ Activities Send, retrieve, delete, run, send and run objects, or send any apply PTFs.

Product CRQ Activities Send, retrieve, install, send and install, delete, or remove products.

PTF CRQ Activities Send, retrieve, apply, remove, delete, or send and install PTFs.

Resource CRQ Activities IPL a managed system.

The send and run, send and apply, and send and install Activities each combine two functions into one activity.

Each activity can perform one action on one or more systems. Most activity types allow more than one action type.

[5] Actually there is a sixth activity type: *CHGMGT, which we do not consider in this book. It is a generic activity type, which you can create on your own by using the Add Activity (QNSADDCM) API.

Each of the fast path commands described in Chapter 3, “Using Fast Path Commands for Distribution Activities” on page 79 creates a temporary change request description with just one activity. Each fast path command relates to one action type for one type of activity. (One exception is the PTF commands. They can generate more than one activity, but all with the same action type. For example, to send two PTFs, there is an activity of action type *SND for each PTF.)

If you create your own change request descriptions, you must add the activities to it. There is one Add Change Request Activity command for each activity type:

ADDCMDCRQA Add Command Change Request Activity
ADDOBJCRQA Add Object Change Request Activity
ADDPRDCRQA Add Product Change Request Activity
ADDPTFCRQA Add PTF Change Request Activity
ADDRSCCRQA Add Resource Change Request Activity

There are also five commands to change existing activities:

CHGCMDCRQA Change Command Change Request Activity
CHGOBJCRQA Change Object Change Request Activity
CHGPRDCRQA Change Product Change Request Activity
CHGPTFCRQA Change PTF Change Request Activity
CHGRSCCRQA Change Resource Change Request Activity

The Remove CRQD Activity (RMVCRQDA) command is used to remove an activity of any type.

Each of the ADDxxxCRQA commands allows you to add one activity to the CRQD. You chose which one of the possible actions for that activity it should perform. In Chapter 3, “Using Fast Path Commands for Distribution Activities” on page 79, we describe the capabilities of each action type by discussing the corresponding fast path commands. Table 8 shows the relationship between each action and activity type to the corresponding fast path and Add xxx CRQ activity command.

Activity Type	Add a CRQA using	Action	Used by Fast Path
Object	ADDOBJCRQA	*SND	SNDSMGOBJ
		*SNDRUN	SNDSMGOBJ
		*RTV	RTVSMGOBJ
		*DLT	DLTSMGOBJ
Command	ADDCMDCRQA	-	RUNSMGCMD
PTF	ADDPTFCRQA	*SND	SNDPTF
		*SNDAPY	SNDPTF
		*RTV	RTVPTF
		*APY	APYRMTPTF
		*RMV	RMVRMTPTF
		*DLT	DLTRMTPTF
Product	ADDPRDCRQA	*SND	SNDPRD
		*SNDINS	SNDPRD

Activity Type	Add a CRQA using	Action	Used by Fast Path
		*RTV	RTVPRD
		*INS	INSRMTPRD
Resource	ADDRSCCRQA	*RESTART	-

Table 8. Relationship between Activity/Actions Types and Fast Path Commands

The rest of this chapter emphasizes the advantages of CRQDs. For a detailed description of a particular action, refer to Chapter 3, “Using Fast Path Commands for Distribution Activities” on page 79 or Appendix A. ″Programming and Command Reference″ in *System Manager/400 Use*, SC41-3321.

Capabilities of CRQs Not Available with Fast Path Commands

As opposed to fast path commands, a *change request description* allows you to:

- Combine more than one activity into one change request description.
- Define conditions to start a change request activity.
- Start a CRQ activity at a predefined time.
- Submit a CRQ multiple times.
- Use global names for AS/400 objects.

We describe each of those capabilities in the following subsections.

Combine More than One Activity into One Change Request Description

After you create a change request description (CRQD) in a library, you can add up to 200 activities to that description. Those activities can either have:

- The same action type.

  For example, you might want to send and apply many PTFs.
- Different action types.

  The different action types include sending a database file, running a program, and retrieving the updated file.

This allows you to *bundle* all of the activities that are needed to solve a certain problem, or to perform a centrally controlled function. One good example of combined activities is running end-of-day procedures at all of the systems.

To add a new activity to an existing change request description, you use option 1, Add, in the Work with CRQ Description Activities display (Figure 76 on page 147), or run any of the Add xxx Change Request Activity (ADDxxxCRQA) commands. xxx stands for one of the activity types: CMD, OBJ, PTF, PRD, or RSC.

All our examples in this chapter describe CRQDs with more than one activity.

Conditions for Starting a Change Request Activity

Activities within a CRQD can all run independently from each other in any order. You can specify up to five conditions for each activity to control when (or whether) it is started.

Each condition consists of:

Conditioning Activity Identifies one (or more, if you use a generic name) other activity of the same CRQD that must run before this one can start.

Condition code Allows you to specify that the conditioning activity ended with a certain end code. For example, you might want to start this activity only when another one was successfully ended (*SUCCESS - the default). Another use of the condition code allows you to run cleanup after a failure (*FAIL).

Condition mode Allows you to select whether the conditioning activity must have ended at all nodes (*ALLNODES - the default), or whether this activity can start only on those nodes where the conditioning activity ended (*SAMENODE).

Tip

*SAMENODE means *those nodes that are common to the activities associated by the condition*. For example, assume that a CRQD has the following activities and nodes defined:

- Activity 1 for nodes A, B and C.
- Activity 2 for nodes B, C and D, conditioned (using *SAMENODE) to successful completion of Activity 1.

When this CRQD is submitted, it works as follows:

- Activity 1 is sent to nodes A, B and C.
- Activity 2 is sent to node D without waiting for completion of Activity 1 because this node is unique to Activity 2.
- Activity 2 is sent to node B as soon as a ″successful completion″ report for Activity 1 is received from that same node. Activity 2 is sent to node C as soon as the ″successful completion″ is received from node C. It does not matter how or when Activity 1 is completed at node A.

If the condition mode used in this example is *ALLNODES instead of *SAMENODE, Activity 2 is not sent to any node until the ″successful completion″ reports that Activity 1 is received from nodes A, B, and C (all of them).

You can also define more elaborate conditions by comparing with more specific end codes, or by using other relational operators, such as greater than (*GT), less than or equal (*LE), and so forth.

All Add xxx CRQ Activity (ADDxxxCRQA) commands and all Change xxx CRQ Activity (CHGxxxCRQA) commands provide the Activity Conditions (COND) parameter, as shown in Figure 68 on page 135.

Note: If you use command prompting (F4), you do not see the condition node parameter unless you press the command key F10, Additional parameters.

```
                        Add PTF CRQ Activity (ADDPTFCRQA)

Type choices, press Enter.

 Text 'description' . . . . . .   *GEN_____________________________________
______

                            Additional Parameters
 Activity conditions:                _
   Activity . . . . . . . . . . .  *PRV______    Name, generic*, *NONE, *PRV
   Relational operator  . . . . .  *EQ           *EQ, *GT, *LT, *LE, *NE, *GE
   End code . . . . . . . . . . .  *SUCCESS      00-99, *SUCCESS, *FAIL...
   Condition mode . . . . . . . .  *ALLNODES     *ALLNODES, *SAMENODE
                 + for more values _

                                                                      More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 68. Activity Conditions (COND)

As you can see in Figure 68, the default for the Activity Condition parameters is *PRV *EQ *SUCCESS *ALLNODES. If you do not change those default values, all Activities are conditioned on the success of the previous activity at all nodes. Previous means the preceding activity in alphabetical order of its name. Therefore, pay special attention to your naming convention if you plan to define your own Activities names. (By default, the parameter ACTIVITY(*GEN) of each ADDxxxCRQA command can generate a name for you in alphabetical order.) If there is no ″previous″ activity, the condition is ignored.

See “A More Complex Conditioning Structure” on page 174 for an example of using several conditions within a change request description.

Scheduling CRQ Activities

There are three different ways to control the start of an activity by the time of day or the date by using:

- A start time for submitting the entire CRQD and scheduling it for repeated submission on a regular basis (daily or monthly, for example).
- A start time at the central site system for a single activity.
- A start time at the managed system for the remote part of a single activity.

Depending on your needs, you may use one of those functions or a combination of them. The following paragraphs describe each of these timer functions.

Start Time for Submitting the CRQD

Using the OS/400 job scheduling function, which is a part of Operational Assistant, specify a date and time when the change request description should be submitted. You can request that the CRQD be submitted on a regular basis (for example, daily or weekly).

To schedule the submission of a CRQD, you can:

- Use option 13=Schedule CRQ submission on the Work with CRQ Descriptions display (Figure 74 on page 145).
- Use command key F6, Add, on the Work with Job Schedule Entries display (WRKJOBSCDE) to specify SBMCRQ for the Command to Run parameter.

- Enter the Add Job Schedule Entry (ADDJOBSCDE) command on any command line and press F4.

Start Time at the Central Site System

You can specify a start time and, optionally, a date for each single activity. This function allows you to start some activities later than others. This is also used in combination with the capabilities described in “Conditions for Starting a Change Request Activity” on page 134. For example, Activity B must start after Activity A has ended, and not earlier than 10 PM.

Another advantage of this capability is that you can specify a *latest* time when this activity can start. For example, assume you want to apply a PTF during the night, but for some reason (communications problems, or a power failure during the night), the activity does not arrive at the managed system until the next morning. In order to avoid applying the PTF at a time when users are working again, specify a value for the Start Before parameter.

All Add xxx CRQ Activity (ADDxxxCRQA) commands and all Change xxx CRQ Activity (CHGxxxCRQA) commands provide the Activity Start Time (STRTIME) parameter, as shown in Figure 69. If you use command prompting (F4), you do not see this parameter unless you press command key F10 =Additional parameters and use the roll key (page forward) to see the last display.

```
                        Add Product CRQ Activity (ADDPRDCRQA)

 Type choices, press Enter.

  Activity start time:
    Start after:
    Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
    Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
    Start before:
    Time . . . . . . . . . . . . .   *ANY____      Time, *ANY, *CURRENT
    Date . . . . . . . . . . . . .   *ANY____      Date, *ANY, *CURRENT, *NEXT
  Hold Activity  . . . . . . . . .   *NO_          *NO, *YES

                                                                        More...
  F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
  F24=More keys
```

Figure 69. Activity Start Time (STRTIME)

Note: The actual time when the activity starts at the managed system may be different from the time specified with the parameter STRTIME. Reasons for that include:

- The activity has to wait in the SVDS distribution queue before it is transmitted.
- Managed System Services/400 at the managed system was not started.
- The managed system is in a different time zone or the QTIME system value was not set correctly at one of the systems.

Start Time at the Managed System

Some action types allow you to specify a time when the activity should be executed at the managed system. This is not related to the time when the activity and its related objects are transmitted to the managed systems, but only to those parts of the actions requiring execution *at the managed system*. For example, if you send and run (action type = *SNDRUN) a program, it is *sent*

immediately (depending on the value of STRTIME). However, the execution of the program is delayed depending on the RMTSTRTIME parameter.

If you have systems installed in different time zones, you can select that either the time zone the central site system, or the time zone of the managed system is used. The system value QUTCOFFSET (Coordinated universal time offset) should be set correctly at all systems. QUTCOFFSET is only used when central site time zone is specified, for example, time zone = *LCLSYS.[6]

All Add xxx CRQ Activity (ADDxxxCRQA) commands and all Change xxx CRQ Activity (CHGxxxCRQA) commands provide the Start Time on Managed System (RMTSTRTIME) parameter, as shown in Figure 70 on page 138.

Note: If you use command prompting (F4), you do not see this parameter unless you have entered an action type allowing for this parameter and use the roll key (page forward) to see the next display. On the Add Resource CRQ Activity (ADDRSCCRQA) command, you need to press F10 to see this parameter.

Actions that allow you to specify a remote start time:

- All Command Activities
- All Resource Activities
- Object Activities:

  ***RUN** Run an object
  ***SNDRUN** Send and run an object

- PTF Activities:

  ***APY** Apply a PTF
  ***SNDAPY** Send and apply a PTF
  ***RMV** Remove a PTF

- Product Activities:

  ***INS** Install a product
  ***SNDINS** Send and install a product

---

[6] The way this works internally is:

- If RMTSTRTIME(*LCLSYS) is used, the start time specified is converted to Coordinated Universal Time (UTC) using the QUTCOFFSET value of the central system and this is what flows to the managed system. When the managed system receives the activity, it converts the start time from UTC to ″local managed system time″ using its own QUTCOFFSET (which can be different from the one at the central site).
- If RMTSTRTIME(*MGDSYS) is used, no conversion occurs, the start time that flows to the managed system is already considered as ″local managed system time″.

In both cases, actual execution of the activity occurs when the ″local managed system time″ for the activity matches the QTIME of the managed system (which can be different to the one at the central site).

Note: The request that flows to a managed system always contains an encoded field to indicate whether the start time is UTC or not.

```
                        Add Object CRQ Activity (ADDOBJCRQA)

Type choices, press Enter.

 Start time on managed system:
   Time zone  . . . . . . . . . .   *LCLSYS       *LCLSYS, *MGDSYS
   Start after:
   Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
   Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
 Text 'description' . . . . . . .   *GEN_____________________________________
_____

                                                                        More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 70. Start Time on Managed System (RMTSTRTIME)

Submitting a CRQ Multiple Times

Because a change request description can be stored on an AS/400 system, you can submit it as many times as you need to perform the task described in the CRQD. You can submit it:

- *Automatically* on a *regular basis* by the system job scheduler as described in "Start Time for Submitting the CRQD" on page 135.
- *Automatically* by any *user-written program*.
- *Manually* whenever you want to run an unscheduled task or if you want to change the CRQD before submitting it again. For example, if the change request failed for some nodes, correct the problem and submit the CRQD again. This time, specify only the names of the failed nodes.

Using Global Names for AS/400 Objects

Whenever you submit an object activity, Managed System Services/400 needs to identify the object when it executes the request. In order to support objects from systems other than an AS/400 system, a platform-independent naming scheme is used: *global names*. Global names also allow you to define names that are unique in the network or even across different networks.

When you create your own change request descriptions with object activities, you have the choice of either using standard AS/400 object names or global names. Using global names offers so many advantages that we decided to dedicate the entire Chapter 5, "Using the Distribution Repository and Global Naming" on page 211 to that topic.

Some of those advantages are:

- Using different names for the object or the library at the central site system and the managed system.
- Retrieving objects from more than one managed system.
- Distributing document library objects (DLO).
- Using the distribution repository as a staging area.
- Distributing non-AS/400 objects.

IPL the Managed System

You cannot IPL the managed system with a fast path command.[7] To perform an IPL on a managed system from the central site system, you must add a resource activity to a change request description.

While you can also IPL the managed system by submitting a command change request with a Power Down System (PWRDWNSYS) command, there are some differences when performing a resource activity:

- The resource activity always uses the RESTART(*YES) parameter.
- With resource activity, message (MSS0205) is sent automatically to the system operator and all of the users prior to the IPL. One message is always sent 10 minutes before the IPL takes place. Another message is sent 30 minutes before the IPL, if time allows (based on the RMTSTRTIME parameter).
- A command activity completes successfully when the PWRDWNSYS is successfully executed. This means that the system just starts the power down process. The system does not run again until a later time.
- A resource activity has ended successfully when the system is running again (and Managed System Services/400 has been successfully started). This offers several advantages:
  - If you look at the submitted activities (WRKSBMCRQA), you can verify that the managed system is running again.
  - The same change request may contain activities that must not run before the system has been successfully restarted. Using a command activity with PWRDWNSYS starts those activities earlier than you want it to.
  - A resource activity can also restart a non-AS/400 resource, such as a PS/2 running NetView DM/2.

You may add a resource activity to a change request description by using the ADDRSCCRQA command. “Add Resource Activity to a Change Request Description” describes the most important parameters of that command. For more information, see Chapter 2, “How Received Operations Are Processed” in *System Manager/400 Use*, SC41-3321 and Appendix A. “Programming and Command Reference” in *Managed System Services/400 Use*, SC41-3323.

Add Resource Activity to a Change Request Description

To add a resource activity to an existing change request description, enter command ADDRSCCRQA at any command line and press F4. Figure 71 on page 140 shows the command parameters.

[7] The SNDPTF, APYRMTPTF, and RMVRMTPTF fast path commands provide the capability of IPLing the system but there is no fast path command to *only* IPL the managed system.

```
                    Add Resource CRQ Activity (ADDRSCCRQA)

Type choices, press Enter.

 Change request description . . . > SNDLICPGM     Name
   Library  . . . . . . . . . . . >   BLANKERTZ   Name, *LIBL, *CURLIB
 Activity . . . . . . . . . . . . > *GEN          Name, *GEN, *LAST
 Action . . . . . . . . . . . . .                 *RESTART
 Resource . . . . . . . . . . . .   *SYS
 Managed systems node list:
   Node list  . . . . . . . . . .   *NONE         Name, *NONE
     Library  . . . . . . . . . .                 Name, *LIBL, *CURLIB
 Managed system node names:
   Network identifier . . . . . .   *NONE         Name, *NONE, *NETATR
   Control point  . . . . . . . .                 Name
               + for more values
 How to end . . . . . . . . . . .   *CNTRLD       *CNTRLD, *IMMED
 Delay time, if *CNTRLD . . . . .   3600          Seconds
 Text 'description' . . . . . . .   *GEN

                                                                More ...
 F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
 F13=How to use this display        F24=More keys
```

Figure 71 (Part 1 of 3). Add Resource CRQ Activity (ADDRSCCRQA)

```
                    Add Resource CRQ Activity (ADDRSCCRQA)

Type choices, press Enter.


                           Additional Parameters

 Activity conditions:                _
   Activity . . . . . . . . . . .   __________     Name, generic*, *NONE, *PRV
   Relational operator  . . . . .   *EQ            *EQ, *GT, *LT, *LE, *NE, *GE
   End code . . . . . . . . . . .   *SUCCESS       00-99, *SUCCESS, *FAIL...
   Condition mode . . . . . . . .   *ALLNODES      *ALLNODES, *SAMENODE
               + for more values _
 Activity start time:
   Start after:
   Time . . . . . . . . . . . . .   *CURRENT       Time, *CURRENT
   Date . . . . . . . . . . . . .   *CURRENT       Date, *CURRENT, *NEXT
   Start before:
   Time . . . . . . . . . . . . .   *ANY____        Time, *ANY, *CURRENT
   Date . . . . . . . . . . . . .   *ANY____        Date, *ANY, *CURRENT, *NEXT
                                                                    More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 71 (Part 2 of 3). Add Resource CRQ Activity (ADDRSCCRQA)

```
                    Add Resource CRQ Activity (ADDRSCCRQA)

Type choices, press Enter.

 Start time on managed system:
   Time zone  . . . . . . . . . .   *LCLSYS       *LCLSYS, *MGDSYS
   Start after:
   Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
   Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
 Hold Activity  . . . . . . . . .   *NO           *NO, *YES


                                                                  Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 71 (Part 3 of 3). Add Resource CRQ Activity (ADDRSCCRQA)

We already have described most of the parameters earlier in this chapter, since they also apply to other activity types. The parameters that are unique to the ADDRSCCRQA (Add Resource CRQ Activity) command are:

- Resource (RSC)
- How to end (OPTION)
- Delay time (DELAY)

Resource (RSC): Specifies the resource to be restarted. For an AS/400 system as a managed system, this is always the entire system. You can only specify the IPL source.

An AS/400 system always has two versions of licensed internal code (LIC) on its IPL disk:

- The *A side* contains only permanently applied microcode PTFs.
- The *B side* contains permanently and temporary applied microcode PTFs.

The IPL source of an AS/400 system is normally the B side. You must use the A side if you want to apply microcode PTFs permanently that previously were applied as temporary. You must also use the A side if a defect microcode PTF is applied that is preventing the system from starting properly.

The Resource (RSC) parameter lets you control which side to use for an IPL by using one of these options:

***SYS** The system panel determines the IPL source.

***SYSA** The IPL source is the A side.

***SYSB** The IPL source is the B side.

How to End (OPTION): Specifies whether the system allows the active subsystems to end processing in a controlled manner, or whether the system ends all jobs immediately. The possible options are:

***CNTRLD** The jobs end in a controlled manner.

***IMMED** All jobs end immediately.

Delay Time (DELAY): Specifies the number of seconds the system waits for the jobs to be ended if OPTION(*CNTRLD) is specified. The default is 3,600 seconds (that is, one hour).

Tip

- Before the IPL is actually performed, message MSS0205 is sent to all workstations and to the system operator (QSYSOPR) message queue at the managed system. Authorized users at the managed system can still cancel the scheduled IPL at this time by using the Work with Received CRQ Activities (WRKRCVCRQA) command and selecting option 4, End, for the resource activity. Also, and probably more important, you can select the end option at the central site system (from Work with CRQ Activities panel).
- The message MSS0205 is sent at least 10 minutes before the IPL actually takes place, even if you specified OPTION(*IMMED). If the resource activity uses the Start Time on Managed System (RMTSTRTIME) parameter, message MSS0205 is also sent after the arrival of the CRQA at the managed system, but not earlier than 30 minutes before the scheduled IPL.
- If you use OPTION(*CNTRLD), the time interval specified with the DELAY parameter (the default is 3600 seconds = 1 hour) the IPL, starts 10 minutes after the remote start time (RMTSTRTIME).
- The QCQEPSCD job running under the QSVMSS user profile is started at the managed system to schedule the IPL. If an authorized user (that is, a user that has *JOBCTL special authority) ends that job, the IPL is not performed.

Using Change Request Descriptions

While Chapter 3, “Using Fast Path Commands for Distribution Activities” on page 79 describes the capabilities of each action type for change requests, and “Capabilities of CRQs Not Available with Fast Path Commands” on page 133 explains the advantages of change request descriptions (CRQD), this section shows you how to create, submit, track, and print a CRQD.

In the next sections, we discuss an example scenario followed by a description of each command and each display you can use to work with the CRQD to implement that scenario.

EXAMPLE 11

Auditing User Profile Authorities

In a large network, it is essential for the responsible administrators to control which users have authorities that allow them to perform crucial changes to the system. While this is very important in a single-system environment, it is even more critical if you have several systems in different locations.

To audit the user profiles of an AS/400 system, the responsible person should get a list of those user profiles having important special authorities, such as all object (*ALLOBJ) or security administration (*SECADM), on a regular basis.

You can use the Display User Profile (DSPUSRPRF) command with the OUTPUT(*OUTFILE) parameter to create a database file containing information about each user profile on your system. A query created by QUERY/400 can be used to produce the list of highly-authorized users.

If you have to manage more than one system, combine the lists of each system into a single weekly or a monthly report. Instead of performing the necessary steps at each system every week, you can create a change request description only once and have those tasks automatically performed by Managed System Services/400 periodically on each system.

The following sections describe in detail how to perform the tasks required to implement this example:

1. "Display User Profiles into an Outfile at the Central Site System"
2. "Create a Query Definition"
3. "Create a Change Request Description (CRQD)" on page 145, containing these activities:
   a. "Send the Query Definition to All Systems" on page 148
   b. "Display All User Profiles into an Outfile at All Systems" on page 150
   c. "Run the Query at All Systems" on page 152
4. "Print the CRQD for Documentation" on page 156
5. "Submit the Change Request" on page 157
6. "Track the Progress of a Submitted Change Request" on page 160
7. "Print the Combined Spool File of All Systems" on page 163

Display User Profiles into an Outfile at the Central Site System

Because you need a query definition for the next step, a database file must be created first. You can create the task manually. The same task is also executed automatically at all managed systems as one activity ("Display All User Profiles into an Outfile at All Systems" on page 150) of the CRQD.

By using the Display User Profile (DSPUSRPRF) command, you can create a physical file containing one record for each user profile on your AS/400 central site system:

```
DSPUSRPRF *ALL OUTPUT(*OUTFILE) OUTFILE(QTEMP/DSPUSRPRF)
```

We used the name DSPUSRPRF for the new file in library QTEMP. The file is only used in the next step, "Create a Query Definition." Therefore, it is created in the temporary library, QTEMP.

Create a Query Definition

In order to produce the required report, create a query definition (an AS/400 object type *QRYDFN) using the QUERY/400 program product. The idea is to create the *QRYDFN object once at the central site system and send it to the managed systems for execution using a change request description. We used QUERY/400 for this example because it was the easiest way to achieve the required result. You can also use the SQL/400 query manager, or write your own program using any high-level language such as RPG/400, COBOL/400, C/400, or others.

To create a new query definition, enter command WRKQRY on any command line and you see the Work with Queries display shown in Figure 72 on page 144.

```
                              Work with Queries

Type choices, press Enter.

   Option  . . . . . .   1              1=Create, 2=Change, 3=Copy, 4=Delete
                                        5=Display, 6=Print definition
                                        8=Run in batch, 9=Run
   Query . . . . . . .   ANLUSPRF       Name, F4 for list
     Library . . . . .     GG244372__   Name, *LIBL, F4 for list

 F3=Exit       F4=Prompt       F5=Refresh       F12=Cancel
                                                 (C) COPYRIGHT IBM CORP. 1988
```

Figure 72. Work with Queries (WRKQRY)

Select option 1, Create. Enter ANLUSRPRF (Analyze User Profiles) and the name of the library (we chose GG244372 for all of the examples in this book). Because it is beyond the scope of this book, we do not show all of the displays for creating the query definition. For more information on working with queries, see *Query/400 User's Guide*, SC41-9614. One pertinent part, however, is selecting the proper records from file DSPUSRPRF. Figure 73 shows the Select Records display, where you specify the selection criteria for those records to be included with the report.

```
                              Select Records

Type comparisons and press Enter.  Specify OR to start each new group.
   Tests:  EQ, NE, LE, GE, LT, GT, RANGE, LIST, LIKE, IS, ISNOT...

 AND/OR  Field            Test   Value (Field, Number, 'Characters', or ...)
         UPSPAU________   LIKE_  '*ALLOBJ%'_____________________
  OR__   UPSPAU________   LIKE_  '%*SECADM%'____________________
  OR__   UPSPAU________   LIKE_  '%*SERVICE%'___________________
  ____   ______________   _____  ______________________________
  ____   ______________   _____  ______________________________
  ____   ______________   _____  ______________________________
                                                                 Bottom

 Field          Text                                            Len  Dec
 UPPSOT         Previous sign-on time                             6
 UPNVSA         Sign-on attempts not valid                       11    0
 UPLDVS         Limit device sessions                             7
 UPSPAU         Special authorities                             150
 UPMXST         Max storage                                      15    0
                                                                More...
 F3=Exit         F5=Report         F9=Insert         F11=Display names only
 F12=Cancel      F13=Layout        F20=Reorganize    F24=More keys
```

Figure 73. Work with Queries (WRKQRY)

The UPSPAU field contains the special authorities of the user profiles. This is a large field containing one or more keywords for special authorities. Therefore you must use the LIKE operator and a compare pattern with a percent sign (%) as a wild card.

After you have specified all of the other information for creating a query (Select and sequence fields, Select sort fields, and so on), save the query definition object with the name ANLUSRPRF in library GG244372. That object is used by the CRQD created in the following steps.

Create a Change Request Description (CRQD)

If you run the query you created in the previous step on your AS/400 system, you receive a printed report with a list of all of the user profiles having a high authority on that system. However, the goal of this example is to create a combined report covering all of the systems in the network, or the group of systems for which you are responsible. In the following sections, you see how you can use System Manager/400 to create a CRQD and let Managed System Services/400 automate that task at all of the managed systems periodically, for example, once a month.

Work with CRQ Descriptions (WRKCRQD): A good starting point for using change request descriptions is the Work with CRQ Descriptions (WRKCRQD) command. If you enter the command WRKCRQD at a command line without specifying any parameters, you see a display (Figure 74) with all of the objects of type *CRQD residing in those libraries that are in the library list of your job.

However, WRKCRQD shows only those change request descriptions to which you have authority. If a user is not authorized to a CRQD, it is not shown even if the library where it resides is in the library list. When CRQDs are created (CRTCRQD command), the default value for public authority is *EXCLUDE.

```
                          Work with CRQ Descriptions
                                                                System:   RCHASM02
Type your options and press Enter.
   1=Create   2=Change   3=Copy   4=Delete   6=Print   8=Work with Activities
   12=Work with submitted CRQs    13=Schedule CRQ submission   14=Submit ...

        Change
        Request
 Opt  Description  Library     Text
 1_   ANLUSRPRF_   GG244372__
 __   APYPTFS      GG244372    Apply PTFs f.5763SS1, -RG1, -WP1, 1234INT, 1
 __   CRTHDWINV    GG244372    Create a central Hardware Inventory
 __   DAILYWORK    GG244372    Run & Retrieve Daily Reports, Start Backup
 __   DSTINSPRD    GG244372
 __   INSCUMTAP1   GG244372    07/10: Send & Install PTF Package for all P
 __   INSPTFPKG    GG244372    Send & Install PTF Package for *EXIST *ALL
 __   INSPTFPKG1   GG244372    Prepare PTF Pkg for all products for RCHAS0

                                                                        More...
 Parameters or command
 ===> ____________________________________________________________________________
 F3=Exit      F4=Prompt   F6=Print list   F11=Display user and problem ID
 F12=Cancel   F17=Position to   F23=More options   F24=More keys
 (C) COPYRIGHT IBM CORP. 1990, 1994.
```

Figure 74. Work with CRQ Descriptions (WRKCRQD)

The display in Figure 74 not only *shows* all of the CRQDs in your libraries, it is also a starting point for all of the tasks you need to perform with change requests. To proceed with our example, you can use option 1, Create, as shown in Figure 74 to create a new CRQD. Press Enter and see the prompt display for the Create change request description (CRTCRQD) command.

Most commands for Operations Control Center/400 use *selective prompting*, that is, you only see the most important parameters on the first display. In order to see the additional parameters as shown in Figure 75 on page 146, press command key F10.

Instead of using option 1 of the WRKCRQD command, you can also enter the CRTCRQD command directly on a command line, or write a CL program to call

that command. We used option 1 for our example because it is the easiest method for an interactive user.

If the CRQD already exists, use option 2 or the Change Request Description (CHGCRQD) command. It has the same parameters as the CRTCRQD command shown in Figure 75.

Create a Change Request Description (CRTCRQD)

```
                          Create CRQ Description (CRTCRQD)

 Type choices, press Enter.

  Change request description . . . > ANLUSRPRF_    Name
    Library  . . . . . . . . . . .     *CURLIB___  Name, *CURLIB
  User profile . . . . . . . . . .   *SBM__        *SBM, *OWNER
  Problem identifier . . . . . . .   __________    Character value, *NONE
  Text 'description' . . . . . . . > Retrieve High Authority Users from All
Systems

                              Additional Parameters

  Authority  . . . . . . . . . . .   *EXCLUDE      Name, *EXCLUDE, *LIBCRTAUT...


                                                                        Bottom
  F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
  F24=More keys
```

Figure 75. Create CRQ Description (CRTCRQD)

Only a few parameters are necessary to create a CRQD. Although it is not mandatory, we highly recommend that you add descriptive text for documentation purposes, as we did in Figure 75. No other parameters are needed for this example. See *AS/400 CL Reference* for information on additional parameters of this command.

After you press Enter, the CRQD is created in your current library. The Work with CRQ Description Activities display is shown automatically. For an existing CRQD, you can reach that display by using option 8, Work with Activities. There is no special command to Work with CRQ Description activities; the display shown in Figure 76 on page 147 is only reached through the WRKCRQD display.

Work with CRQ Description Activities: This display allows you to manipulate all of the activities of a single change request description. When you see that display for the first time after creating the CRQD, it contains an empty list such as the one shown in Figure 76 on page 147. Therefore, the only thing you can do at this time is to add a CRQD activity by entering option 1.

```
                        Work with CRQ Description Activities
                                                                System:   RCHASM02
 Change request description . . . . . . . . :   ANLUSRPRF
   Library  . . . . . . . . . . . . . . . . :     GG244372
 Text . . . . . . . . . . . . . . . . . . . :   Retrieve High Authority Users
from All Systems


Type your options and press Enter.
   1=Add   2=Change   3=Copy   4=Remove   5=Display details   8=Display nodes

 Opt  Activity    Type        Text
 1    *GEN____   ________

   (No activities to display)



                                                                          Bottom
 Parameters or command
 ===> ______________________________________________________________________________
 F3=Exit   F4=Prompt      F5=Refresh   F6=Print list     F9=Retrieve
 F11=Display conditions   F12=Cancel   F17=Position to   F24=More keys
```

Figure 76. Work with CRQ Description Activities

When you add a new activity, you can either leave the default *GEN in the Activity column or enter any valid AS/400 name. The keyword *GEN requests that System Manager/400 generates a name for you, starting with QACT000010 for the first activity, and use the first multiple of 10 for each subsequent activity that is not already being used by previously added activities.

See “Naming the Change Request Activities” on page 172 to determine whether *GEN or your own naming convention is best for you.

For each activity you add, you *must specify a type*. If you do not know the correct keyword, you can leave the Type field on the Work with CRQ Description Activities display (Figure 76) blank and press Enter. You see the Display Activity Type display shown in Figure 77.

```
                              Display Activity Type
                                                                System:   RCHASM02
Type option, press Enter.
   1=Select

         Activity
 Opt     Type           Description
 _       *CMD           Run a command
 1       *OBJ           Object distribution
 _       *PTF           PTF distribution
 _       *PRD           Product distribution
 _       *RSC           Resource activation

                                                                          Bottom
 F3=Exit   F12=Cancel
```

Figure 77. Display Activity Type

The first action in this example is to send the query definition, an AS/400 *object*, to the managed systems. Therefore, you need to add an object activity by specifying option 1 o the second line of the list in Figure 77.

Send the Query Definition to All Systems: If you enter option 1 (ADD) together with type *OBJ at the Work with CRQ Description Activities display (Figure 76), you see the prompt display for the Add Object CRQ Activity (ADDOBJCRQA) command as shown in Figure 78 on page 148. This is exactly the same as if you had entered the ADDOBJCRQA command o a command line and pressed the F4 key. When you enter ADDOBJCRQA from the command line, you must type the name of the CRQD.

```
                    Add Object CRQ Activity (ADDOBJCRQA)

Type choices, press Enter.

Change request description . . . > ANLUSRPRF_    Name
  Library  . . . . . . . . . . . >   GG244372_   Name, *LIBL, *CURLIB
Activity . . . . . . . . . . . . > *GEN______    Name, *GEN, *LAST
Action . . . . . . . . . . . . .   *snd___       *SND, *RTV, *DLT, *RUN...
Object . . . . . . . . . . . . .   anlusrprf_    Name, *GLOBAL
  Library  . . . . . . . . . . .    __________   Name, *LIBL, *CURLIB
Object type  . . . . . . . . . .   *qrydfn___    F4 for list


                                                                   Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 78 (Part 1 of 3). Add Object CRQ Activity (ADDOBJCRQA)

```
                    Add Object CRQ Activity (ADDOBJCRQA)

Type choices, press Enter.

 Change request description . . . > ANLUSRPRF_    Name
   Library  . . . . . . . . . . . >   GG244372_   Name, *LIBL, *CURLIB
 Activity . . . . . . . . . . . . > *GEN______    Name, *GEN, *LAST
 Action . . . . . . . . . . . . . > *SND___       *SND, *RTV, *DLT, *RUN...
 Object . . . . . . . . . . . . . > ANLUSRPRF_    Name, *GLOBAL
   Library  . . . . . . . . . . . >   *CURLIB___  Name, *LIBL, *CURLIB
 Object type  . . . . . . . . . . > *QRYDFN___    F4 for list
 Managed systems node list:
   Node list  . . . . . . . . . .   ITSC______    Name, *NONE
     Library  . . . . . . . . . .    __________   Name, *LIBL, *CURLIB
 Managed system node names:       _
   Network identifier . . . . . .   *NONE_____    Name, *NONE, *NETATR
   Control point  . . . . . . . .   __________    Name
                + for more values _
 Target release . . . . . . . . .   *CURRENT__    *PRV, V2R3M0, V3R0M5...
 Replace object . . . . . . . . . > *YES          *NO, *YES
                                                                   More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 78 (Part 2 of 3). Add Object CRQ Activity (ADDOBJCRQA)

```
                    Add Object CRQ Activity (ADDOBJCRQA)

Type choices, press Enter.

  Text 'description' . . . . . .   *GEN_____________________________________
 ______

                            Additional Parameters
  Activity conditions:                _
    Activity . . . . . . . . . . .   *PRV______     Name, generic*, *NONE, *PRV
    Relational operator  . . . . .   *EQ           *EQ, *GT, *LT, *LE, *NE, *GE
    End code . . . . . . . . . . .   *SUCCESS      00-99, *SUCCESS, *FAIL...
    Condition mode . . . . . . . .   *ALLNODES     *ALLNODES, *SAMENODE
                  + for more values _

  Activity start time:
    Start after:
    Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
    Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
    Start before:
    Time . . . . . . . . . . . . .   *ANY____      Time, *ANY, *CURRENT
    Date . . . . . . . . . . . . .   *ANY____      Date, *ANY, *CURRENT, *NEXT
  Hold Activity  . . . . . . . . .   *NO_          *NO, *YES

                                                                      Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 78 (Part 3 of 3). Add Object CRQ Activity (ADDOBJCRQA)

Some parameters for this command are only valid for certain actions or object types. That is why you only see the first four parameters on the first display. Other parameters appear after you supply the action type (*SND) and the object name and press Enter.

The Additional Parameters part of the ADDOBJCRQA display (Figure 78 on page 148) does not appear unless you press F10. In this example, you do not need any of those additional parameters. Defaults for these parameters fit our requirements exactly:

Text description TEXT(*GEN) instructs System Manager/400 to generate a meaningful description for the activity, in this case, it is Send *QRYDFN GG244372/ANLUSRPRF.

Conditions COND(*PRV *EQ *SUCCESS *ALLNODES) is ignored because this is the first activity in alphabetical sequence. See “Conditions for Starting a Change Request Activity” on page 134 for more information on this parameter.

Activity Start Time STRTIME(*CURRENT *CURRENT *ANY *ANY) actually means there is no restriction on the time the activity is started. See “Scheduling CRQ Activities” on page 135 for more information on this parameter.

Hold Activity HOLD(*NO) does not require an operator to manually release the activity.

This activity sends the query definition object ANLUSRPRF in library GG244372 to all of those systems specified in node list ITSC. The object is restored to the same library on all of the systems. If an object with the same name already exists at a managed system, it is replaced. For a detailed discussion of object activities, see “Object Fast Path Commands” on page 94.

Note: If you entered the parameters, as shown in Figure 78 on page 148, it does not mean that you send an object to the managed systems *now*. The action is merely executed after the entire change request was submitted and all of the conditions for this action are met.

After you press Enter, you see the Work with CRQ Description Activities display again (Figure 79).

```
                      Work with CRQ Description Activities
                                                              System:   RCHASM02
 Change request description . . . . . . . . :   ANLUSRPRF
   Library  . . . . . . . . . . . . . . . . :     BLANKERTZ
 Text . . . . . . . . . . . . . . . . . . . :   Retrieve High Authority Users
from All Systems


Type your options and press Enter.
   1=Add   2=Change   3=Copy   4=Remove   5=Display details   8=Display nodes

 Opt  Activity    Type        Text
  1    *GEN______  *CMD______
  _   QACT000010  *OBJ        Send  *QRYDFN GG244372/ANLUSRPRF




Bottom
 Parameters or command
 ===> ____________________________________________________________________________
 F3=Exit   F4=Prompt      F5=Refresh   F6=Print list     F9=Retrieve
 F11=Display conditions   F12=Cancel   F17=Position to   F24=More keys
 Activity QACT000010 added.
```

Figure 79. Work with CRQ Description Activities

Make sure to check the message appearing on the bottom line of your display to see whether the activity has been added, an error occurred, or a warning was sent. If a warning was sent, position the cursor on that message, press the Help key or F1, and then press F10 to see additional messages in your joblog. For example, if you did not specify the name of the object correctly, the activity is added with a warning. That is, an error might occur later when you submit the change request.

If the activity was successfully added but you do not see it in the list of activities above the command line, press command key F5 to refresh the display.

Now you can add the next activity by entering option 1 again. You need to add a command activity and, therefore, you can specify *CMD in the Type column.

Display All User Profiles into an Outfile at All Systems: In order to produce a report for all of the user profiles, you first need to run a Display User Profile (DSPUSRPRF) command *at the managed systems*. Therefore, you must add a command CRQ activity to the CRQD by either selecting option 1 and typing `*CMD` (as shown in Figure 79), or by entering `ADDCMDCRQA` on any command line. The prompt display in Figure 80 on page 151 shows the required parameters for the Add Command CRQ Activity (ADDCMDCRQA) command.

```
                    Add Command CRQ Activity (ADDCMDCRQA)

Type choices, press Enter.

 Change request description . . . > ANLUSRPRF_    Name
   Library  . . . . . . . . . . . >   GG244372__    Name, *LIBL, *CURLIB
 Activity . . . . . . . . . . . . > *GEN______    Name, *GEN, *LAST
 Command to run . . . . . . . . . > DSPUSRPRF USRPRF(*ALL) TYPE(*BASIC) OUTPUT(*
OUTFILE) OUTFILE(GG244372/DSPUSRPRF)____________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
________________________________________________________________________________
_____________________________________________________________________________ ...
 Managed systems node list:
   Node list  . . . . . . . . . . > ITSC______    Name, *NONE
     Library  . . . . . . . . . .     *LIBL_____  Name, *LIBL, *CURLIB

                                                                        More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 80. Display All User Profiles into an Outfile (ADDCMDCRQA) (Part 1 of 3)

The Display User Profile (DSPUSRPRF) command has basically the same parameters as the “Display User Profiles into an Outfile at the Central Site System” on page 143. Note, however, that we did not create the output file (DSPUSRPRF) in library QTEMP. We used the temporary library QTEMP as a work library because the file was only needed for the query in the next step (“Run the Query at All Systems” on page 152) and should be deleted after that. The reason not to use library QTEMP for this step is that there is no guarantee that both activities are run in the same job. There may be more than one server jobs (QCQSVSRV) at the managed system. Therefore an object created in library QTEMP by one activity may or may not be accessible by another activity.

When you page forward using the RollUp key, you see the parameters shown in Figure 81.

```
                    Add Command CRQ Activity (ADDCMDCRQA)

Type choices, press Enter.

Managed system node names:
  Network identifier . . . . . . > *NONE___      Name, *LOCAL, *NONE, *NETATR
  Control point  . . . . . . . .   ________      Name
              + for more values
Start time on managed system:
  Time zone  . . . . . . . . . .   *LCLSYS       *LCLSYS, *MGDSYS
  Start after:
  Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
  Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
  Start before:
  Time . . . . . . . . . . . . .   *ANY____      Time, *ANY, *CURRENT
  Date . . . . . . . . . . . . .   *ANY____      Date, *ANY, *CURRENT, *NEXT
Return spooled file  . . . . . .   *YES_         *YES, *NO, *FAIL
User profile . . . . . . . . . .   *NONE_____    Name, *NONE
Password . . . . . . . . . . . .   *NONE_____    Name, *USRPRF, *NONE
Encode command . . . . . . . . .   *NO_          *YES, *NO
                                                                      More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 81. Display All User Profiles into an Outfile (ADDCMDCRQA) (Part 2 of 3)

Tip

You cannot add a command CRQA if the command does not exist at the central site system.

The default for parameter CPNAME (managed system node names) for the ADDCMDCRQA command is *LOCAL, that is the central site system. If you enter the name of a node list (Figure 80 on page 151) as in this example, you must type *NONE for the parameter CPNAME. This is different from all of the other ADDxxxCRQA commands.

You may use the defaults for the other parameters of this display. However, this implies the following assumption:

- If you do not specify the name of a user profile, this activity runs under the default user profile specified with the Change Managed System Attributes (CHGMGDSYSA) command at the managed system. The original value for that is QSVMSS. You should make sure that the default user profile has sufficient authority to the requested command (DSPUSRPRF in this case).

Press command key F10 to see the Additional Parameters display as shown in Figure 82.

```
                      Add Command CRQ Activity (ADDCMDCRQA)

Type choices, press Enter.

 Text 'description' . . . . . .   Write User Profiles into Outfile DSPUSRPRF__
_____

                           Additional Parameters

 Activity conditions:
   Activity . . . . . . . . . . . > *NONE_____     Name, generic*, *NONE, *PRV
   Relational operator  . . . . .   *EQ           *EQ, *GT, *LT, *LE, *NE, *GE
   End code . . . . . . . . . . .   *SUCCESS      00-99, *SUCCESS, *FAIL...
   Condition mode . . . . . . . .   *SAMENODE     *ALLNODES, *SAMENODE
                + for more values +
                                                                       More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 82. Display All User Profiles into an Outfile (ADDCMDCRQA) (Part 3 of 3)

This activity, Display User Profile (DSPUSRPRF), is not dependent on the previous one (see “Send the Query Definition to All Systems” on page 148). That is, the Display User Profile activity can start running even if the *QRYDFN object is not yet restored on the managed system. Therefore, we coded COND(*NONE). This is not absolutely necessary for this example, but it allows some overlapped work to save time.

Run the Query at All Systems: As the third activity of the change request, you need to define another command activity to execute the query. This produces a printed report. Remember, each spool file created by a command activity is sent to the central site system unless you specify *NO or *FAIL for the Return Spooled File (RTNSPLF) parameter. This is exactly the objective of this activity and the entire change request.

The command to run is:

```
RUNQRY QRY(GG244372/ANLUSRPRF) QRYFILE(GG244372/DSPUSRPRF) OUTTYPE(*PRINTER)
```

Only the first parameter (QRY) is mandatory and specifies the name and library of the *QRYDFN object to be used. It is the object that was sent to the managed system by the first activity (“Send the Query Definition to All Systems” on page 148).

The QRYFILE parameter is coded here to make sure that file DSPUSRPRF in library GG244372 is used (as opposed to library QTEMP at the time when the query definition was created).

```
                    Add Command CRQ Activity (ADDCMDCRQA)

 Type choices, press Enter.

  Change request description . . . > ANLUSRPRF_    Name
    Library  . . . . . . . . . . . >   GG244372__  Name, *LIBL, *CURLIB
  Activity . . . . . . . . . . . . > *GEN______    Name, *GEN, *LAST
  Command to run . . . . . . . . . > RUNQRY QRY(GG244372/ANLUSRPRF) QRYFILE(GG244
372/DSPUSRPRF)_OUTTYPE(*PRINTER)_____________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________ ...
  Managed systems node list:
    Node list  . . . . . . . . . .   ITSC______    Name, *NONE
      Library  . . . . . . . . . .     *LIBL_____  Name, *LIBL, *CURLIB

                                                                      More...
  F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
  F13=How to use this display        F24=More keys
```

Figure 83 (Part 1 of 3). Run a Query to Print Selected Profiles (ADDCMDCRQA)

```
                    Add Command CRQ Activity (ADDCMDCRQA)

 Type choices, press Enter.

 Managed system node names:
   Network identifier . . . . . . > *NONE___      Name, *LOCAL, *NONE, *NETATR
   Control point  . . . . . . . .   ________      Name
              + for more values
 Start time on managed system:
   Time zone  . . . . . . . . . .   *LCLSYS       *LCLSYS, *MGDSYS
   Start after:
   Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
   Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
   Start before:
   Time . . . . . . . . . . . . .   *ANY____       Time, *ANY, *CURRENT
   Date . . . . . . . . . . . . .   *ANY____       Date, *ANY, *CURRENT, *NEXT
 Return spooled file  . . . . . .   *YES_          *YES, *NO, *FAIL
 User profile . . . . . . . . . .   *NONE          Name, *NONE
 Password . . . . . . . . . . . .   *NONE          Name, *USRPRF, *NONE
 Encode command . . . . . . . . .   *NO            *YES, *NO
                                                                    More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 83 (Part 2 of 3). Run a Query to Print Selected Profiles (ADDCMDCRQA)

```
                      Add Command CRQ Activity (ADDCMDCRQA)

Type choices, press Enter.

 Text 'description' . . . . . .   Run a Query to Print Selected Profiles______
______

                           Additional Parameters

 Activity conditions:                 _
   Activity . . . . . . . . . . .   *PRV_______    Name, generic*, *NONE, *PRV
   Relational operator  . . . . .   *EQ           *EQ, *GT, *LT, *LE, *NE, *GE
   End code . . . . . . . . . . .   *SUCCESS      00-99, *SUCCESS, *FAIL...
   Condition mode . . . . . . . .    *SAMENODE     *ALLNODES, *SAMENODE
                + for more values +

                                                                        More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 83 (Part 3 of 3). Run a Query to Print Selected Profiles (ADDCMDCRQA)

This activity must not start before the first two activities have *both* successfully ended at the *same managed system*. Therefore, press command key F10 to enter additional parameters. Change the Condition Mode to *SAMENODE. Enter a plus sign (+) in the *for more values* field and press Enter. As shown in Figure 84, you can now enter more conditions.

```
                    Specify More Values for Parameter COND

Type choices, press Enter.


                           Additional Parameters

 Activity conditions:                 _
   Activity . . . . . . . . . . .   *PRV_______    Name, generic*, *NONE, *PRV
   Relational operator  . . . . .   *EQ           *EQ, *GT, *LT, *LE, *NE, *GE
   End code . . . . . . . . . . .   *SUCCESS      00-99, *SUCCESS, *FAIL...
   Condition mode . . . . . . . .   *SAMENODE     *ALLNODES, *SAMENODE

   Activity . . . . . . . . . . > QACT000010     Name, generic*, *PRV
   Relational operator  . . . . .   *EQ           *EQ, *GT, *LT, *LE, *NE, *GE
   End code . . . . . . . . . . .   *SUCCESS      00-99, *SUCCESS, *FAIL...
   Condition mode . . . . . . . > *SAMENODE      *ALLNODES, *SAMENODE



                                                                        More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 84. Specify More Values for Parameter COND (ADDCMDCRQA)

You must enter the name of the first activity (QACT000010) for the second condition, because Send QRYDFN is not the *previous* Activity.

Although the three activities already fulfill the objective of this example, it is a good idea to add two additional object activities to delete the query definition object ANLUSRPRF and the physical file DSPUSRPRF in library GG244372. We do not show the prompt displays for those two ADDOBJCRQA commands here.

After you have added all of the activities to the CRQD, the Work with CRQ Description Activities display should be similar to the one in Figure 85 on page 155. If it is not, press F5 to refresh the display.

```
                    Work with CRQ Description Activities
                                                          System:   RCHASM02
 Change request description . . . . . . . . :   ANLUSRPRF
   Library  . . . . . . . . . . . . . . . . :     GG244372
 Text . . . . . . . . . . . . . . . . . . . :   Retrieve High Authority Users
from All Systems


Type your options and press Enter.
   1=Add   2=Change   3=Copy   4=Remove   5=Display details   8=Display nodes

 Opt  Activity    Type        Text
  _   *GEN_______ __________
  _   QACT000010  *OBJ        Send  *QRYDFN GG244372/ANLUSRPRF
  _   QACT000020  *CMD        Write User Profiles into Outfile DSPUSRPRF
  _   QACT000030  *CMD        Run a Query to Print Selected Profiles
  _   QACT000040  *OBJ        Delete *QRYDFN GG244372/ANLUSRPRF
  _   QACT000050  *OBJ        Delete *FILE GG244372/DSPUSRPRF
                                                                      Bottom
 Parameters or command
 ===> ____________________________________________________________________
 F3=Exit   F4=Prompt      F5=Refresh   F6=Print list     F9=Retrieve
 F11=Display conditions   F12=Cancel   F17=Position to   F24=More keys
```

Figure 85. Work with CRQ Description Activities

Use option 5 (Display details) to verify whether you entered the correct parameters for each activity. Use option 2 (Change) to change an activity if necessary.

If you press Enter (or F3 or F12) now, you return to the Work with CRQ Descriptions display where you started with Figure 74 on page 145. Again, press F5 to see the updated list such as in Figure 86.

```
                          Work with CRQ Descriptions
                                                          System:   RCHASM02
Type your options and press Enter.
   1=Create   2=Change   3=Copy   4=Delete   6=Print   8=Work with Activities
   12=Work with submitted CRQs    13=Schedule CRQ submission   14=Submit ...

       Change
       Request
 Opt  Description  Library     Text
 __   ___________  _________
 6_   ANLUSRPRF    GG244372    Retrieve High Authority Users from All Systems
 __   APYPTFS      GG244372    Apply PTFs f.5763SS1, -RG1, -WP1, 1234INT, 1
 __   CRTHDWINV    GG244372    Create a central Hardware Inventory
 __   DAILYWORK    GG244372    Run & Retrieve Daily Reports, Start Backup
 __   DSTINSPRD    GG244372
 __   INSCUMTAP1   GG244372    07/10: Send & Install PTF Package for all P
 __   INSPTFPKG    GG244372    Send & Install PTF Package for *EXIST *ALL
 __   INSPTFPKG1   GG244372    Prepare PTF Pkg for all products for RCHAS0

                                                                      More...
 Parameters or command
 ===> ____________________________________________________________________
 F3=Exit      F4=Prompt   F6=Print list   F11=Display user and problem ID
 F12=Cancel   F17=Position to   F23=More options   F24=More keys
 (C) COPYRIGHT IBM CORP. 1990, 1994.
```

Figure 86. Work with CRQ Descriptions (WRKCRQD)

Print the CRQD for Documentation

After you have created a CRQD, it is a good idea to print its contents for documentation and to be able to verify its correctness. You may print the definition of a CRQD by selecting option 6 at the Work with CRQ Descriptions display (Figure 86 on page 155).

The printout for this example is shown in Figure 87. While reading this example, you might want to compare the contents of the printout to the command parameters discussed on the previous pages.

```
                                        Change Request Description                                                  Page     1
5763SM1 V3R1M0  940909                                                    GG244372/ANLUSRPRF    RCHASM02  07/26/94  14:28:15
 Change request description . . . . . . . . . :   ANLUSRPRF
   Library  . . . . . . . . . . . . . . . . . :     GG244372
 User profile . . . . . . . . . . . . . . . . :   *SBM
 Problem ID . . . . . . . . . . . . . . . . . :   *NONE
   Origin . . . . . . . . . . . . . . . . . . :
 Text . . . . . . . . . . . . . . . . . . . . :   Retrieve High Authority Users from All Systems
                                                     ------- Activity -------
 Activity name . . . . . . . . . . . . . . . :   QACT000010
 Activity type  . . . . . . . . . . . . . . . :   *OBJ
 Node list  . . . . . . . . . . . . . . . . . :   ITSC
   Library  . . . . . . . . . . . . . . . . . :     *LIBL
 Scheduled start:
   Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . . :   Send Query Definition to All Systems
 Action . . . . . . . . . . . . . . . . . . . :   Send object
 Object . . . . . . . . . . . . . . . . . . . :   ANLUSRPRF
   Library  . . . . . . . . . . . . . . . . . :     GG244372
 Object type  . . . . . . . . . . . . . . . . :   *QRYDFN
 Target release . . . . . . . . . . . . . . . :   *PRV
 Data object class  . . . . . . . . . . . . . :   AS/400 object
 Replace  . . . . . . . . . . . . . . . . . . :   *ALLOWED
                                                 Specific activity data                                              Page     2
5763SM1 V3R1M0  940909                                                                  RCHASM02  07/26/94  14:28:18
                                                     ------- Activity -------
 Activity name . . . . . . . . . . . . . . . :   QACT000020
 Activity type  . . . . . . . . . . . . . . . :   *CMD
 Node list  . . . . . . . . . . . . . . . . . :   ITSC
   Library  . . . . . . . . . . . . . . . . . :     *LIBL
 Scheduled start:
   Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . . :   Display All User Profiles into an Outfile
 Action . . . . . . . . . . . . . . . . . . . :   Run command
 Command:
   DSPUSRPRF USRPRF(*ALL) TYPE(*BASIC) OUTPUT(*OUTFILE) OUTFILE(GG244372/DSPUSRPRF)
 Managed system start time:
 Time zone  . . . . . . . . . . . . . . . . . :   *LCLSYS
   Start after date and time  . . . . . . . . :     *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :     *ANY        *ANY
 Return spooled files . . . . . . . . . . . . :   *FAIL
 User profile . . . . . . . . . . . . . . . . :   *NONE
 Password specified . . . . . . . . . . . . . :   *NO
```

Figure 87 (Part 1 of 2). Printout for Change Request ANLUSRPRF

```
                                        Specific activity data                                                    Page     3
5763SM1 V3R1M0  940909                                                                                RCHASM02  07/26/94  14:28:20
                                                 ------- Activity -------
 Activity name . . . . . . . . . . . . . . :   QACT000030
 Activity type  . . . . . . . . . . . . . . :   *CMD
 Node list  . . . . . . . . . . . . . . . . :   ITSC
   Library  . . . . . . . . . . . . . . . . :     *LIBL
 Scheduled start:
   Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . . :   Run a Query to Print Selected Profiles
 --------------------Conditions----------------------
                                        Condition
 Activity       Relation     Code           Mode
 *PRV             *EQ        *SUCCESS       *SAMENODE
 QACT000010       *EQ        *SUCCESS       *SAMENODE
 Action . . . . . . . . . . . . . . . . . . :   Run command
 Command:
   RUNQRY QRY(GG244372/ANLUSRPRF) QRYFILE((GG244372/DSPUSRPRF)) OUTTYPE(*PRINTER)
 Managed system start time:
 Time zone  . . . . . . . . . . . . . . . . :   *LCLSYS
   Start after date and time  . . . . . . . . :     *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :     *ANY        *ANY
 Return spooled files . . . . . . . . . . . :   *YES
 User profile . . . . . . . . . . . . . . . :   *NONE
 Password specified . . . . . . . . . . . . :   *NO
                                        Specific activity data                                                    Page     4
5763SM1 V3R1M0  940909                                                                                RCHASM02  07/26/94  14:28:20
                                                 ------- Activity -------
 Activity name . . . . . . . . . . . . . . :   QACT000040
 Activity type  . . . . . . . . . . . . . . :   *OBJ
 Node list  . . . . . . . . . . . . . . . . :   MGD_SYS
   Library  . . . . . . . . . . . . . . . . :     *LIBL
 Scheduled start:
   Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . . :   *YES
 Text . . . . . . . . . . . . . . . . . . . . :   Delete QRYDFN after Usage only at Managed Systems
 --------------------Conditions----------------------
                                        Condition
 Activity       Relation     Code           Mode
 *PRV             *EQ        *SUCCESS       *SAMENODE
 Action . . . . . . . . . . . . . . . . . . :   Delete object
 Object . . . . . . . . . . . . . . . . . . :   ANLUSRPRF
   Library  . . . . . . . . . . . . . . . . :     GG244372
 Object type  . . . . . . . . . . . . . . . :   *QRYDFN
 Target release . . . . . . . . . . . . . . :
 Data object class  . . . . . . . . . . . . :   '00000000'X
                                   * * * * *  E N D   O F   L I S T I N G   * * * * *
```

Figure 87 (Part 2 of 2). Printout for Change Request ANLUSRPRF

Submit the Change Request

After the CRQD has been created, you can submit the change request. That is, instruct System Manager/400 to start the execution of each change request activity whenever the conditions are met and the start time (if specified) is reached.

```
                          Work with CRQ Descriptions
                                                                 System:   RCHASMO2
Type your options and press Enter.
   1=Create   2=Change   3=Copy   4=Delete   6=Print   8=Work with Activities
   12=Work with submitted CRQs    13=Schedule CRQ submission   14=Submit ...

        Change
        Request
 Opt  Description  Library     Text

 __   __________   __________
 14   ANLUSRPRF    GG244372    Retrieve High Authority Users from All Systems
 __   APYPTFS      GG244372    Apply PTFs f.5763SS1, -RG1, -WP1, 1234INT, 1
 __   CRTHDWINV    GG244372    Create a central Hardware Inventory
```

Figure 88. Submit a CRQD Using Option 14 in WRKCRQD

There are two ways to submit a CRQD:

- One time, by selecting option 14, Submit..., on the Work with CRQ Descriptions display.
- Periodically, by using option 13, Schedule CRQ submission.

Option 14 calls the Submitting a Change Request (SBMCRQ) command and Option 13 calls the Add Job Schedule Entry (ADDJOBSCDE) command with an imbedded SBMCRQ command. The ADDJOBSCDE command is part of the Operational Assistant function supplied with OS/400.

If you select option 14 for a CRQD and press F4, you see the prompt display for the Submit Change Request (SBMCRQ) command as shown in Figure 89.

Submitting a Change Request (SBMCRQ): Note that the names of the Change Request Description (CRQD) parameter and the (submitted) Change Request (CRQ) parameter on the following display are two different things. Although the first part of the submitted CRQ name defaults to the same name of the CRQD object (*CRQD), you may enter your own name for it. The second part of the submitted CRQ name is always a six-digit number, by default generated (*GEN) as 000010 or in multiples of 10, if other submitted CRQs exist with the same first name.

```
                          Submit Change Request (SBMCRQ)

Type choices, press Enter.

 Change request description . . . > ANLUSRPRF_     Name
   Library  . . . . . . . . . . .     GG244372__   Name, *LIBL, *CURLIB
 Change request:
   Name . . . . . . . . . . . . .   *CRQD_____     Name, *CRQD
   Sequence number  . . . . . . .   *GEN_______     1-999999, *GEN


                                                                        Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 89. Submit Change Request (SBMCRQ)

After you submit the request, your display is released immediately *before* the change request is actually executed. The reason is that System Manager/400 and Managed System Services/400 perform the request asynchronously as a batch job in the background. You do not receive any information about the

Activity's progress *automatically*. The Work with Submitted CRQ (WRKSBMCRQ) and Work with Submitted CRQ Activities (WRKSBMCRQA), described in "Track the Progress of a Submitted Change Request" on page 160, provide you with much more information about the status of the change request at each node.

Schedule CRQ Submission (ADDJOBSCDE): The intent of this example is to run the change request not only once, but to schedule it to be executed periodically (for example, the first Monday of each month). To accomplish this, select option 13 on the Work with CRQ Descriptions display. The prompt for the Add Job Schedule Entry (ADDJOBSCDE) command is shown in Figure 90.

```
                        Add Job Schedule Entry (ADDJOBSCDE)

Type choices, press Enter.

  Job name . . . . . . . . . . . .   __________     Name, *JOBD
  Command to run . . . . . . . . . > SBMCRQ CRQD(GG244372/ANLUSRPRF)
  Frequency  . . . . . . . . . . .   ________       *ONCE, *WEEKLY, *MONTHLY
  Schedule date, or  . . . . . . .   *CURRENT_      Date, *CURRENT, *MONTHSTR...
  Schedule day . . . . . . . . . .   *NONE          *NONE, *ALL, *MON, *TUE...
                + for more values    _____
  Schedule time  . . . . . . . . .   *CURRENT       Time, *CURRENT


                                                                          Bottom
  F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
  F13=How to use this display        F24=More keys
```

Figure 90. Add Job Schedule Entry (ADDJOBSCDE)

You must specify a name for the job scheduling entry. This name can be arbitrary, but it is a good idea to use the same name as the CRQD (ANLUSRPRF in this example). The Add Job Schedule Entry (ADDJOBSCDE) command offers many possibilities to schedule a job for repeated submission. For more information on those possibilities, see *Work Management Guide*, SC41-8078. In this example, we define the change request to be submitted on the first Monday of every month at 5 AM. (Figure 91).

```
                        Add Job Schedule Entry (ADDJOBSCDE)

Type choices, press Enter.

  Job name . . . . . . . . . . . . > ANLUSRPRF_     Name, *JOBD
  Command to run . . . . . . . . . > SBMCRQ CRQD(GG244372/ANLUSRPRF)
  Frequency  . . . . . . . . . . . > *MONTHLY       *ONCE, *WEEKLY, *MONTHLY
  Schedule date, or  . . . . . . .   *CURRENT_      Date, *CURRENT, *MONTHSTR...
  Schedule day . . . . . . . . . . > *MON_          *NONE, *ALL, *MON, *TUE...
                + for more values    _____
  Schedule time  . . . . . . . . . > 050000___      Time, *CURRENT
  Relative day of month  . . . . .   1____          *LAST, 1, 2, 3, 4, 5
                + for more values    _____


                                                                          Bottom
  F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
  F13=How to use this display        F24=More keys
```

Figure 91. Add Job Schedule Entry (ADDJOBSCDE) First Sunday Each Month

The job defined in Figure 91 only submits the change request; it does not execute it. The actual execution is controlled by System Manager/400.

Track the Progress of a Submitted Change Request

You certainly want to make sure sometime after you submit a change request, whether it:

- Completed correctly.
- Is still running.
- Encountered problems of what type and at which system.

You may also want to display or print any spool files being received as the result of your change request.

Again, you may use the Work with CRQ Descriptions (WRKCRQD) display as a starting point for tracking, that is, to work with *submitted* CRQDs:

```
                          Work with CRQ Descriptions
                                                                System:   RCHASMO2
Type your options and press Enter.
   1=Create   2=Change   3=Copy   4=Delete   6=Print   8=Work with Activities
   12=Work with submitted CRQs    13=Schedule CRQ submission   14=Submit ...

        Change
        Request
 Opt  Description  Library     Text

 __   __________   __________
 12   ANLUSRPRF    GG244372    Retrieve High Authority Users from All Systems
 __   APYPTFS      GG244372    Apply PTFs f.5763SS1, -RG1, -WP1, 1234INT, 1
 __   CRTHDWINV    GG244372    Create a central Hardware Inventory
```

Figure 92. Use Option 12 of WRKCRQD to Work with Submitted CRQDs

Selecting option 12 brings you to the Work with Submitted Change Requests (WRKSBMCRQ) display (shown in Figure 93 on page 161) only for those submitted CRQs that are an instance of the particular CRQD, ANLUSRPRF in this example. You can also enter the Work with Submitted Change Requests (WRKSBMCRQ) directly from any command line. This allows you to specify several selection criteria, such as:

CRQ The Change request allows to specify the generic name and sequence number of the submitted change request or requests.

STATUS The status allows you to select only those change requests having a certain status.

HIGHENDCDE The highest end code selects those CRQs that end with a certain highest end code.

LASTENDCDE The last end code selects those CRQs that end with a certain last end code.

CRQD The change request description selects the instances of one or more CRQDs (matching a beginning string).

SBM The submitter selects the CRQs submitted by a certain user profile.

PERIOD The period selects only those CRQs that are supposed to start during a certain time interval.

PRBID The problem identifier selects the CRQs for a CRQD related to a problem ID.

PRBORG The problem origin specifies the originating system of the problem ID.

The Work with Submitted Change Requests (WRKSBMCRQ) command is basically the highest entry point of a hierarchy of levels of detail. Use it to track

the progress of a submitted change request (compare also Figure 67 on page 130). You can start at one of the following points:

1. All submitted change requests:

   `WRKSBMCRQ`

2. A group of submitted CRQs, for example:

   `WRKSBMCRQ STATUS(*ENDED)`

3. All submitted CRQs for one CRQD. Use Option 12 of WRKCRQD or:

   `WRKSBMCRQ CRQD(library/crqdname)`

4. One submitted CRQ:

   `WRKSBMCRQ CRQ(ANLUSRPRF 000010)`

5. All activities of *one* submitted CRQ. Use Option 8 of WRKSBMCRQ or:

   `WRKSBMCRQA CRQ(ANLUSRPRF 000010)`

6. All nodes of *one* submitted CRQ activity. Use Option 8 of WRKSBMCRQA.

In this example, we start at level 3 using the options in each list display (as opposed to typing the commands and parameters). The following paragraphs show a ″normal″ situation, that is, the activities run without any errors. See Chapter 10, “Problem Determination” on page 421 for a detailed hypothetical example showing how to do problem determination using this and other facilities.

```
                        Work with Submitted Change Requests
                                                                System:   RCHASM03
Type your options and press Enter.
   3=Hold   4=Delete   5=Display details   6=Release   8=Work with Activities
   10=Display messages   13=End ...

                                                  Highest  Last
      Change                                        End    End
 Opt  Request     Number  Status                   Code    Code
 __   ANLUSRPRF   000010  Ended                      00      00
 _8   ANLUSRPRF   000020  Active

                                                                          Bottom
 Parameters or command
 ===> ____________________________________________________________________________
 F3=Exit      F4=Prompt         F5=Refresh   F6=Print list   F11=Display user
 F12=Cancel   F17=Position to   F23=More options   F24=More keys
```

Figure 93. Work with Submitted Change Requests (WRKSBMCRQ)

The Work with Submitted Change Requests display in Figure 93 shows that we have submitted the change request description ANLUSRPRF twice. You can see that the first instance, sequence number 000010, ended successfully because the highest end code (for all of the nodes of all of the activities) is 00.

The status ″Active″ for the second instance tells us only that the change request was successfully submitted and that not all of the activities have ended yet. That is, while one activity might have been ended (with or without success), others are still running or have not even started yet. To learn more about the state of each activity, you can use the Work with Submitted CRQ Activities display by either selecting option 8, as we did in Figure 93, or by entering the WRKSBMCRQA command. The latter case requires that you know the name and number of the submitted change request.

```
                        Work with Submitted CRQ Activities
                                                                  System:   RCHASM02
 Change request  . . . . . :   ANLUSRPRF
   Number  . . . . . . . . :     000020
 Text  . . . . . . . . . . :   Retrieve High Authority Users from All Systems



Type your options and press Enter.
   3=Hold   5=Display details   6=Release   8=Work with nodes for Activity
   10=Display messages          13=End

                                                                        Highest
     Activity                                                             End
 Opt Name        Type        Node                Status                  Code
 __  QACT000010  *OBJ        ITSCNET.RCHASM03    Ended                    00
 __  QACT000020  *CMD        ITSCNET.RCHASM03    Ended                    00
 _8  QACT000030  *CMD        ITSCNET.RCHASM...   Running
                                                                          More...
 Parameters or command
 ===> ____________________________________________________________________________
 F3=Exit   F4=Prompt      F5=Refresh   F6=Print list     F9=Retrieve
 F11=Display conditions   F12=Cancel   F17=Position to   F24=More keys
```

Figure 94. Work with Submitted CRQ Activities (WRKSBMCRQA)

Figure 94 shows a situation where the activities QACT000010 and QACT000020 have ended successfully and QACT000030 is still running. The status running means that the request has been sent to all nodes. The activity may have different states for each node. At this point, you may select option 8, Work with nodes for Activity (Figure 95) to learn about the state of each node.

```
                          Work with Nodes for Activity
                                                                  System:   RCHASM02
 Change request  . . . . . :   ANLUSRPRF
   Number  . . . . . . . . :     000020
 Activity name . . . . . . :   QACT000030


Type your options and press Enter.
   3=Hold   6=Release   8=Display conditions for node   10=Display messages
   13=End

     Control   Network                            End
 Opt point     ID        Status                   Code
 __  RCHASM01  ITSCNET   Running
 __  RCHASM02  ITSCNET   Running
 __  RCHAS040  ITSCNET   Ended                     00


                                                                          Bottom
 Parameters or command
 ===> ____________________________________________________________________________
 F3=Exit           F4=Prompt    F5=Refresh   F6=Print list   F9=Retrieve
 F11=Display job   F12=Cancel   F16=Repeat position to       F17=Position to
```

Figure 95. Work with Nodes for Activity (Option 8 of WRKSBMCRQA)

If a node stays in the running status for a long time, it may mean that the request is not yet transmitted to that node. See “Status = Running” on page 427 for how to do problem determination in such a case.

For this example, we assume all of the nodes reach ″Ended″ status after awhile. (Press function key F5 to see an updated list if the state of a node changed.)

Print the Combined Spool File of All Systems

If you press Enter again, you return to the Work with Submitted CRQ Activities display shown in Figure 94 on page 162. Selecting option 5, Display details, allows you to see more details for each activity. Now you can use command key F11 to display type specific data, and then F11 again to display spooled files.

PTF and Product Activities

The previous example did not use any PTF or product activities. The following sections show the prompt displays for the Add PTF CRQ Activity (ADDPTFCRQA) and the Add Product CRQ Activity (ADDPRDCRQA) commands, and explain the usage of the Package a Product for Distribution (PKGPRDDST) command.

Add PTF Activity to a Change Request Description

Each PTF activity within a user-created CRQD is able to perform an action for one PTF only. This is different from the PTF fast path commands (for example, the Send Program Temporary FIX (SNDPTF) command, that allows you to specify up to 50 PTFs in one command).

Another difference is that a PTF activity cannot check for requisite PTFs.

```
                        Add PTF CRQ Activity (ADDPTFCRQA)

 Type choices, press Enter.

 Change request description . . . > SNDPTF____     Name
   Library  . . . . . . . . . . . >   GG244372_    Name, *LIBL, *CURLIB
 Activity . . . . . . . . . . . . > *GEN______     Name, *GEN, *LAST
 Action . . . . . . . . . . . . .   _______        *SND, *RTV, *DLT, *APY...
 PTF identifier:
   PTF  . . . . . . . . . . . . .   _______        Character value, *ALL
   Product  . . . . . . . . . . .   *ONLY__        F4 for list
   Release level  . . . . . . . .   _______        VxRxMx
 Managed systems node list:
   Node list  . . . . . . . . . .   *NONE_____     Name, *NONE
     Library  . . . . . . . . . .     __________   Name, *LIBL, *CURLIB
 Managed system node names:       _
   Network identifier . . . . . .   *netatr___     Name, *NONE, *NETATR
   Control point  . . . . . . . .   RCHAS040__     Name
               + for more values _
 PTF parts  . . . . . . . . . . .   *PTF___        *PTF, *CVRLTR
                                                                   More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 96 (Part 1 of 3). Add PTF CRQ Activity (ADDPTFCRQA)

```
                        Add PTF CRQ Activity (ADDPTFCRQA)

Type choices, press Enter.

 Cover letter language  . . . . .   *SRVRQS       2900-2999, *SRVRQS
 Extent of change . . . . . . . .   *TEMP         *TEMP, *PERM
 Start time on managed system:
   Time zone  . . . . . . . . . .   *LCLSYS       *LCLSYS, *MGDSYS
   Start after:
   Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
   Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
 Text 'description' . . . . . . .   *GEN___________________________________
_____

                                                                     More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 96 (Part 2 of 3). Add PTF CRQ Activity (ADDPTFCRQA)

```
                        Add PTF CRQ Activity (ADDPTFCRQA)

Type choices, press Enter.

                            Additional Parameters

 Activity conditions:             _
   Activity . . . . . . . . . .   __________     Name, generic*, *NONE, *PRV
   Relational operator  . . . . .   *EQ          *EQ, *GT, *LT, *LE, *NE, *GE
   End code . . . . . . . . . . .   *SUCCESS     00-99, *SUCCESS, *FAIL...
   Condition mode . . . . . . . .   *ALLNODES    *ALLNODES, *SAMENODE
               + for more values _
 Activity start time:
   Start after:
   Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
   Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
   Start before:
   Time . . . . . . . . . . . . .   *ANY____      Time, *ANY, *CURRENT
   Date . . . . . . . . . . . . .   *ANY____      Date, *ANY, *CURRENT, *NEXT
 Hold Activity  . . . . . . . . .   *NO_          *NO, *YES

                                                                    Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 96 (Part 3 of 3). Add PTF CRQ Activity (ADDPTFCRQA)

The only parameters unique to the Add PTF CRQ Activity (ADDPTFCRQA) command are:

- PTF identifier (PTFID) specifies the name of the PTF to be sent, retrieved, deleted, applied, or removed.
- PTF parts (PTFPART) specifies whether the PTFs or cover letters should be sent, retrieved, or deleted.
- Cover letter language (CVRLTRLNG) specifies the language of the cover letter to be sent with the PTF.
- Extent of change (APY) specifies the extent of change, that is, whether the PTF is to be applied permanently or temporarily.

See “PTF Fast Path Commands” on page 116 for a more complete discussion of these parameters.

Package a Product for Distribution (PKGPRDDST)

Before you can send a licensed program to a managed system, it must be stored in the distribution repository of the central site system.

The Package Product for Distribution (PKGPRDDST) command saves a copy of the objects that make up a product in a save file so the product can be distributed electronically. A distribution catalog entry is created for the product, and the packaged product is loaded into the distribution repository.

The Package Product for Distribution command is not the same as the Package Product Option (PKGPRDOPT) command. You can only package a product for distribution if it already exists on your system as an installed licensed program. It must be either an IBM-licensed or your own (or another vendor's) application that was packaged using the PKGPRDOPT command.

```
                        Package Product for DST (PKGPRDDST)

 Type choices, press Enter.

  Product ID . . . . . . . . . . . > 5763PC1       Character value
  Release level  . . . . . . . . .   *ONLY_        VxRxMx, *ONLY.
  Product option . . . . . . . . .   *BASE         01-99, *BASE
  Product load type  . . . . . . .   *ALL_         *ALL, *CODE, *LNG
  Load ID  . . . . . . . . . . . .   *ALL_         Character value, *CODE, *ALL
  Save file  . . . . . . . . . . .   *NONE_____    Name, *NONE
    Library  . . . . . . . . . . .    __________   Name, *LIBL, *CURLIB
  Authorization list . . . . . . .   QCQRPSAUTL    Character value, QCQRPSAUTL
  Replace  . . . . . . . . . . . .   *NO_          *NO, *YES

                                                                        Bottom
  F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
  F24=More keys
```

Figure 97. Package Product for Distribution (PKGPRDDST)

Add Product Activity to a Change Request Description

The Add Product Change Request Activity (ADDPRDCRQA) command adds an activity to a change request description that performs a product distribution function.

```
                    Add Product CRQ Activity (ADDPRDCRQA)

Type choices, press Enter.

Change request description . . . > SNDLICPGM_    Name
  Library  . . . . . . . . . . . >   GG244372_   Name, *LIBL, *CURLIB
Activity . . . . . . . . . . . . > *GEN______    Name, *GEN, *LAST
Action . . . . . . . . . . . . .   *SNDINS_      *SND, *RTV, *DLTCLGE, *INS....
Product ID . . . . . . . . . . .   _______        Character value
Release level  . . . . . . . . .   *ONLY___       VxRxMx, *ONLY.
Product option . . . . . . . . .   *BASE_         1-99, *BASE
Product load type  . . . . . . .   *ALL_          *ALL, *CODE, *LNG
Load ID  . . . . . . . . . . . .   *ALL_          2900-2999, *ALL, *CODE
Managed systems node list:
  Node list  . . . . . . . . . .   *NONE_____     Name, *NONE
    Library  . . . . . . . . . .     __________   Name, *LIBL, *CURLIB
Managed system node names:       _
  Network identifier . . . . . .   *NONE___       Name, *NONE, *NETATR
  Control point  . . . . . . . .   ________       Name
              + for more values _
                                                                   More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 98 (Part 1 of 3). Add Product CRQ Activity (ADDPRDCRQA)

```
                    Add Product CRQ Activity (ADDPRDCRQA)

Type choices, press Enter.

 Keep catalog entry . . . . . . .   *NO_          *YES, *NO
 Start time on managed system:
   Time zone  . . . . . . . . . .   *LCLSYS       *LCLSYS, *MGDSYS
   Start after:
   Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
   Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
 Text 'description' . . . . . . .   *GEN___________________________________
_____
                                                                   More...
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 98 (Part 2 of 3). Add Product CRQ Activity (ADDPRDCRQA)

```
                    Add Product CRQ Activity (ADDPRDCRQA)

Type choices, press Enter.

                           Additional Parameters

Activity conditions:                _
  Activity . . . . . . . . . . .   __________     Name, generic*, *NONE, *PRV
  Relational operator  . . . . .   *EQ           *EQ, *GT, *LT, *LE, *NE, *GE
  End code . . . . . . . . . . .   *SUCCESS      00-99, *SUCCESS, *FAIL...
  Condition mode . . . . . . . .   *ALLNODES     *ALLNODES, *SAMENODE
               + for more values _
Activity start time:
  Start after:
  Time . . . . . . . . . . . . .   *CURRENT      Time, *CURRENT
  Date . . . . . . . . . . . . .   *CURRENT      Date, *CURRENT, *NEXT
  Start before:
  Time . . . . . . . . . . . . .   *ANY____      Time, *ANY, *CURRENT
  Date . . . . . . . . . . . . .   *ANY____      Date, *ANY, *CURRENT, *NEXT
Hold Activity  . . . . . . . . .   *NO_          *NO, *YES
                                                                     Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 98 (Part 3 of 3). Add Product CRQ Activity (ADDPRDCRQA)

More Sample Scenarios for CRQs with Multiple Activities

This section describes some scenarios using change request descriptions.

Distribution of Multiple Objects

The *SNDSMGOBJ* fast path and the object Change Request Activity only allow sending or retrieving one object at a time. There are three methods to send more than one object using one change request description:

- Using one activity per object to be sent:

  This works fine for a small number of objects, but there is no way to specify generic names.

- Sending an entire library:

  This is the best method, if you really want to send *all* of the objects residing in one library. If you distribute an entire library, specify OBJTYPE(*LIB) with the ADDOBJCRQA or SNDSMGOBJ command.

- Using a save file to transport the objects:

  This is the most flexible method. It requires six activities that are combined within one change request:

  1. Create an empty save file at the central site system.
  2. Save the objects to be sent to the save file.
  3. Send the save file to the managed systems.
  4. Restore the objects at the managed systems.
  5. Delete the save file at the central site system.
  6. Delete the save file at the managed systems.

We now demonstrate using a save file to transport the objects.

EXAMPLE 12

Using a Save File to Send Multiple Objects

Figure 99 shows a change request description that distributes all of the objects with a generic name, that is, all objects of type *PGM with a name starting with the letters ″INS″. We chose the name of each activity in the CRQD so that the digit following the first letter corresponds to one of the six activities previously described. See “Naming the Change Request Activities” on page 172 for more information about the naming conventions used in this example. The numbers within black squares (such as **1**) are not part of the CRQD, but refer to the descriptions given in “Special Considerations for This Example” on page 171.

You can print the contents of any change request description for documentation purposes by using the Work with CRQ Descriptions (WRKCRQD) command and specifying option 6 (Print) to the left of the CRQD you want to print. The printout is similar to the example in Figure 99.

```
                                        Change Request Description                                          Page     1
5763SM1 V3R1M0  940909                                                  GG244372/SNDMLTOBJ  RCHASM02  11/28/94  16:30:06
 Change request description . . . . . . . . . :   SNDMLTOBJ
   Library  . . . . . . . . . . . . . . . . . :     GG244372
 User profile . . . . . . . . . . . . . . . . :   *SBM
 Problem ID . . . . . . . . . . . . . . . . . :   *NONE
   Origin . . . . . . . . . . . . . . . . . . :
 Text . . . . . . . . . . . . . . . . . . . . :   Send GG244372/INS* *ALL to node list ITSC
                                                     ------- Activity -------
 Activity name . . . . . . . . . . . . . . . :   A1CRTSAVF
 Activity type  . . . . . . . . . . . . . . . :   *CMD
 Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
 Scheduled start:
   Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . . :   Create an empty save file at the central system
 Action . . . . . . . . . . . . . . . . . . . :   Run command
 Command:
   CRTSAVF FILE(GG244372/SNDMLTOBJ) AUT(*ALL)
 Managed system start time:
 Time zone  . . . . . . . . . . . . . . . . . :   *LCLSYS
   Start after date and time  . . . . . . . . :     *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :     *ANY        *ANY
 Return spooled files . . . . . . . . . . . . :   *YES
 User profile . . . . . . . . . . . . . . . . :   ITSCID11
 Password specified . . . . . . . . . . . . . :   *YES
```

Figure 99 (Part 1 of 4). Printout of the CRQD Send Multiple Objects SNDMLTOBJ

```
                                        Specific activity data                                          Page     2
5763SM1 V3R1M0  940909                                                                  RCHASM02  11/28/94  16:30:15
                                               ------- Activity -------
 Activity name . . . . . . . . . . . . . . :   A2SAVOBJ
 Activity type  . . . . . . . . . . . . . . :   *CMD
 Node . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
 Scheduled start:
   Start after date and time  . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . :   Save the objects to be sent into the save file
 ---------------------Conditions----------------------
                                        Condition
 Activity       Relation     Code        Mode
 *PRV             *EQ        *ANY        *SAMENODE  1
5763SM1 V3R1M0  940909                                                                  RCHASM02  11/28/94  16:30:16
 Action . . . . . . . . . . . . . . . . . . :   Run command
 Command:
   SAVOBJ OBJ(INS*) LIB(GG244372) DEV(*SAVF) OBJTYPE(*PGM) SAVF(GG244372/SNDMLTOBJ)
 Managed system start time:
 Time zone  . . . . . . . . . . . . . . . . :   *LCLSYS
   Start after date and time  . . . . . . . :     *CURRENT    *CURRENT
   Start before date and time . . . . . . . :     *ANY        *ANY
 Return spooled files . . . . . . . . . . . :   *YES
 User profile . . . . . . . . . . . . . . . :   ITSCID11
 Password specified . . . . . . . . . . . . :   *YES
                                        Specific activity data                                          Page     3
                                               ------- Activity -------
 Activity name . . . . . . . . . . . . . . :   A3SNDSVF
 Activity type  . . . . . . . . . . . . . . :   *OBJ
 Node list  . . . . . . . . . . . . . . . . :   ITSC  2
   Library  . . . . . . . . . . . . . . . . :     GG244372
 Scheduled start:
   Start after date and time  . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . :   Send the save file to the managed systems
 ---------------------Conditions----------------------
                                        Condition
 Activity       Relation     Code        Mode
 *PRV             *EQ        *SUCCESS    *ALLNODES  3
 Action . . . . . . . . . . . . . . . . . . :   Send object
 Object . . . . . . . . . . . . . . . . . . :   SNDMLTOBJ
   Library  . . . . . . . . . . . . . . . . :     GG244372
 Member . . . . . . . . . . . . . . . . . . :   *ALL
 Object type  . . . . . . . . . . . . . . . :   *FILE
 Target release . . . . . . . . . . . . . . :   *CURRENT
 Data object class  . . . . . . . . . . . . :   '00000000'X
 Replace  . . . . . . . . . . . . . . . . . :   *ALLOWED
                                        Specific activity data                                          Page     4
5763SM1 V3R1M0  940909                                                                  RCHASM02  11/28/94  16:30:16
                                               ------- Activity -------
 Activity name . . . . . . . . . . . . . . :   A4RSTOBJ
 Activity type  . . . . . . . . . . . . . . :   *CMD
 Node list  . . . . . . . . . . . . . . . . :   ITSC
   Library  . . . . . . . . . . . . . . . . :     GG244372
 Scheduled start:
   Start after date and time  . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . :   Restore the objects at the managed systems
 ---------------------Conditions----------------------
                                        Condition
 Activity       Relation     Code        Mode
 A3SNDSVF         *EQ        *SUCCESS    *SAMENODE
 Action . . . . . . . . . . . . . . . . . . :   Run command
 Command:
   RSTOBJ OBJ(INS*) SAVLIB(GG244372) DEV(*SAVF) OBJTYPE(*PGM) SAVF(GG244372/SNDMLTOBJ) MBROPT(*ALL) ALWOBJDIF(*ALL)
 Managed system start time:
 Time zone  . . . . . . . . . . . . . . . . :   *LCLSYS
   Start after date and time  . . . . . . . :     *CURRENT    *CURRENT
   Start before date and time . . . . . . . :     *ANY        *ANY
 Return spooled files . . . . . . . . . . . :   *YES
 User profile . . . . . . . . . . . . . . . :   ITSCID11
 Password specified . . . . . . . . . . . . :   *YES
```

Figure 99 (Part 2 of 4). Printout of the CRQD Send Multiple Objects SNDMLTOBJ

```
                                          Specific activity data                                          Page     5
5763SM1 V3R1M0  940909                                                                  RCHASM02  11/28/94  16:30:17
                                                 ------- Activity -------
 Activity name . . . . . . . . . . . . . . :   A5DLTSAVF
 Activity type  . . . . . . . . . . . . . . . :   *OBJ
 Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
 Scheduled start:
   Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . . :   Delete the save file at the central system
 ---------------------Conditions----------------------
                                          Condition
 Activity       Relation     Code          Mode
 A3SNDSVF         *EQ        *SUCCESS      *ALLNODES
 Action . . . . . . . . . . . . . . . . . . :   Delete object
 Object . . . . . . . . . . . . . . . . . . :   SNDMLTOBJ
   Library  . . . . . . . . . . . . . . . . :     GG244372
 Member . . . . . . . . . . . . . . . . . . :   *ALL
 Object type  . . . . . . . . . . . . . . . :   *FILE
 Target release . . . . . . . . . . . . . . :
 Data object class  . . . . . . . . . . . . :   '00000000'X
                                          Specific activity data                                          Page     6
5763SM1 V3R1M0  940909                                                                  RCHASM02  11/28/94  16:30:17
                                                 ------- Activity -------
 Activity name . . . . . . . . . . . . . . :   A6DLTRMTSF
 Activity type  . . . . . . . . . . . . . . . :   *OBJ
 Node list  . . . . . . . . . . . . . . . . :   ITSC
   Library  . . . . . . . . . . . . . . . . :     GG244372
 Scheduled start:
   Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . . :   Delete the save file at the managed systems
 ---------------------Conditions----------------------
                                          Condition
 Activity       Relation     Code          Mode
 A4RSTOBJ         *EQ        *ANY          *SAMENODE
 Action . . . . . . . . . . . . . . . . . . :   Delete object
 Object . . . . . . . . . . . . . . . . . . :   SNDMLTOBJ
   Library  . . . . . . . . . . . . . . . . :     GG244372
 Member . . . . . . . . . . . . . . . . . . :   *ALL
 Object type  . . . . . . . . . . . . . . . :   *FILE
 Target release . . . . . . . . . . . . . . :
 Data object class  . . . . . . . . . . . . :   '00000000'X
                                          Specific activity data                                          Page     7
5763SM1 V3R1M0  940909                                                                  RCHASM02  11/28/94  16:30:17
                                                 ------- Activity -------
 Activity name . . . . . . . . . . . . . . :   X_ALL_OK  4
 Activity type  . . . . . . . . . . . . . . . :   *CMD
 Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
 Scheduled start:
   Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . . :   Send Completion Message, if Succesfully
 ---------------------Conditions----------------------
                                          Condition
 Activity       Relation     Code          Mode
 A4RSTOBJ         *EQ        *ANY          *ALLNODES
 Action . . . . . . . . . . . . . . . . . . :   Run command
 Command:
   SNDMSG MSG('CRQ SNDMLTOBJ "Send GG244372/INS* *ALL to node list ITSC         " completed successfully at all nodes') TOUSR(...CI
   D11)
 Managed system start time:
 Time zone  . . . . . . . . . . . . . . . . :   *LCLSYS
   Start after date and time  . . . . . . . :     *CURRENT    *CURRENT
   Start before date and time . . . . . . . :     *ANY        *ANY
 Return spooled files . . . . . . . . . . . :   *YES
 User profile . . . . . . . . . . . . . . . :   ITSCID11
 Password specified . . . . . . . . . . . . :   *YES
```

Figure 99 (Part 3 of 4). Printout of the CRQD Send Multiple Objects SNDMLTOBJ

```
                                        Specific activity data                                          Page     8
5763SM1 V3R1M0  940909                                                                  RCHASM02  11/28/94  16:30:18
                                                 ------- Activity -------
 Activity name . . . . . . . . . . . . . . . :   Y_SNDFAIL  5
 Activity type  . . . . . . . . . . . . . . . :   *CMD
 Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
 Scheduled start:
   Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . . :   Send error message, if send failed
 --------------------Conditions---------------------
                                          Condition
 Activity       Relation     Code         Mode
 A3SNDSVF         *EQ        *FAIL  6     *ALLNODES
 Action . . . . . . . . . . . . . . . . . . :   Run command
 Command:
   SNDMSG MSG('Send for SNDMLTOBJ "Send GG244372/INS* *ALL to node list ITSC " failed at least at one node')  TOUSR(ITSCID11)
 Managed system start time:
 Time zone  . . . . . . . . . . . . . . . . :   *LCLSYS
   Start after date and time  . . . . . . . . :     *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :     *ANY        *ANY
 Return spooled files . . . . . . . . . . . :   *YES
 User profile . . . . . . . . . . . . . . . :   ITSCID11
 Password specified . . . . . . . . . . . . :   *YES
                                        Specific activity data                                          Page     9
5763SM1 V3R1M0  940909                                                                  RCHASM02  11/28/94  16:30:18
                                                 ------- Activity -------
 Activity name . . . . . . . . . . . . . . . :   Z_RSTFAIL  7
 Activity type  . . . . . . . . . . . . . . . :   *CMD
 Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
 Scheduled start:
   Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . . :   Send error message, if restore failed
 --------------------Conditions---------------------
                                          Condition
 Activity       Relation     Code         Mode
 A4RSTOBJ         *EQ        *FAIL  8     *ALLNODES
 Action . . . . . . . . . . . . . . . . . . :   Run command
 Command:
   SNDMSG MSG('Restore for SNDMLTOBJ "Send GG244372/INS* *ALL to node list ITSC        " failed at least at one node')  TOUSR(...CI
   D11)
 Managed system start time:
 Time zone  . . . . . . . . . . . . . . . . :   *LCLSYS
   Start after date and time  . . . . . . . . :     *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :     *ANY        *ANY
 Return spooled files . . . . . . . . . . . :   *YES
 User profile . . . . . . . . . . . . . . . :   ITSCID11
 Password specified . . . . . . . . . . . . :   *YES
                                   * * * * *  E N D   O F   L I S T I N G   * * * * *
```

Figure 99 (Part 4 of 4). Printout of the CRQD Send Multiple Objects SNDMLTOBJ

Special Considerations for This Example

The example shown in Figure 99 on page 168 shows some techniques for efficient use of System Manager/400 functions:

- Naming the change request activities.
- Using a work library.
- Running activities on different nodes.
- Conditioning a complex structure.
- Sending completion or error messages.
- Creating the CRQD with a user-written program.

In the following sections, we describe these techniques in more detail.

Naming the Change Request Activities: For this example, we did not use the capability of System Manager/400 to generate names for the activities. We chose to provide meaningful names, that is, names showing what each activity does.

If the activity names are generated automatically and you work with submitted CRQ activities as shown in Figure 94 on page 162, you have to use option 5, Display details, to find out what QACT000030 actually does. One solution is to give each activity a full mnemonic name, so the Work with Submitted CRQ Activities display is similar to the display shown in Figure 100.

```
                                                                  Highest
     Activity                                                       End
Opt  Name        Type        Node               Status             Code
__   CRTSAVF     *CMD        ITSCNET.RCHASM02   Ended               00
__   DLTSAVF     *CMD        ITSCNET.RCHASM02   Ended               00
__   DLTRMTSF    *OBJ        ITSCNET.RCHASM...  Ended               00
                                                                    More...
```

Figure 100. Full Mnemonic Names for CRQ Activities

As you can see in Figure 100, the activities are shown in alphabetical sequence. According to our example here, this is not a logical sequence; that is, the Send and Restore must be finished before the DLTSAVF is started. The *PRV condition (**3** in Figure 99 on page 168) is not possible either. You have to code the name of the preceding activity (CRTSAVF) explicitly.

Therefore, we used a ″partial mnemonic″ naming convention, where the first two characters provide the alphabetical sequence, followed by a short mnemonic name.

```
                                                                  Highest
     Activity                                                       End
Opt  Name        Type        Node               Status             Code
__   A1CRTSAVF   *CMD        ITSCNET.RCHASM02   Ended               00
__   A2SAVOBJ    *CMD        ITSCNET.RCHASM02   Ended               00
__   A3SNDSVF    *OBJ        ITSCNET.RCHASM...  Ended               00
                                                                    More...
```

Figure 101. Partial Mnemonic Names for CRQ Activities

Sending Completion or Error Messages: The distribution functions of Operations Control Center/400 are designed to work unattended and to log the successful and unsuccessful execution of all activities. In order not to flood the operator of the central site system with too many mostly redundant messages, System Manager/400 does not send any completion or error messages.

You must use the Work with Submitted Change Requests Activities command (*WRKSBMCRQA*) to see the status of a change request and its activities. (See “Work with Submitted CRQ Activities (WRKSBMCRQA)” on page 422 for a description of that command.)

If you prefer to receive a message after successful or unsuccessful completion of a submitted change request, you can use additional activities for that. The last three activities of this example (**4** in Figure 99 on page 168) are used to send a message to the user who submitted the request. They indicate either a successful completion of all of the activities at all of the nodes, or the failure of the Send (**5**) or Restore (**7**) activity for at least one managed system.

There is some inconvenience with this method. If you look at the Work with Submitted Change Requests display (Figure 39 on page 101), you normally see at a glance that all of the activities at all of the nodes have completed successfully. This is no longer true if you add an activity, such as Y_SNDFAIL and Z_RSTFAIL, having a condition code *FAIL (**6** and **8**). In this case, the highest end code is *always* 99 and the last end code is *always* 00 because either of the following two cases is true:

- All of the activities complete successfully, which means the conditions for Y_SNDFAIL and Z_RSTFAIL are *not* met and therefore, their end code is 99, or the *highest* end code. The end code of the *last* activity actually being performed (X_ALL_OK) is 00.
- At least one activity fails, which means the conditions for X_ALL_OK are *not* met and therefore, its end code is 99, or the *highest* end code, in this case. The end code of the *last* activity (either Y_SNDFAIL or Z_RSTFAIL depending on which activity failed) is 00.

Therefore, in both cases, the Work with Submitted CRQ display is identical:

```
                                                Highest  Last
      Change                                      End    End
 Opt  Request     Number  Status                 Code    Code
 __   SNDMLTOBJ   000040  Ended                   99      00
```

You *must* use option 8, Work with Activities (or look at the messages sent by Y_SNDFAIL or Z_RSTFAIL), to find out about the success of the entire change request.

TIP

This situation always occurs if you add one or more activities conditioned on the unsuccessful completion of another one (for example, if you want to back out some processing that was performed before the failure occurred). Therefore, sending a message or an alert may be a good idea to notify the operator about failures of this kind of change request.

Using a Work Library: This example requires an object, the save file SNDMLTOBJ, to be created for usage only while the change request is active. With most applications for an AS/400 system, you use the temporary library QTEMP to store such objects. In this case, however, you must not use QTEMP for two reasons:

1. You cannot distribute objects out of and into library QTEMP. (You receive the error message SMU1844 when you try to use QTEMP with an object activity.)
2. Even if you do not send or retrieve the object, you should not place objects into library QTEMP to be used by subsequent activities. Some activities may or may not be executed by different server jobs, which each have their own QTEMP library.

Activities to be Run on Different Sets of Nodes: The set of nodes may be different for each activity. That is, for this example:

- The activities A1CRTSAVF, A2SAVOBJ, A5DLTSAVF, X_ALL_OK, Y_SNDFAIL, and Z_RSTFAIL are all executed at the central site system.

- The activity A3SNDSVF sends the save file from the central site system to all of the systems specified in node list ITSC (**2**).
- The activities A6RSTOBJ and A6DLTRMTSF are executed only at the managed systems in the same node list.

A More Complex Conditioning Structure: The typical way (and also the default) to condition the execution of change request activities is to execute all of the activities sequentially; that is, the second activity (in alphabetical sequence) starts only when the first one successfully completes at all of the nodes.

This example uses a more sophisticated structure of conditioning. Figure 102 shows an overview of that structure.

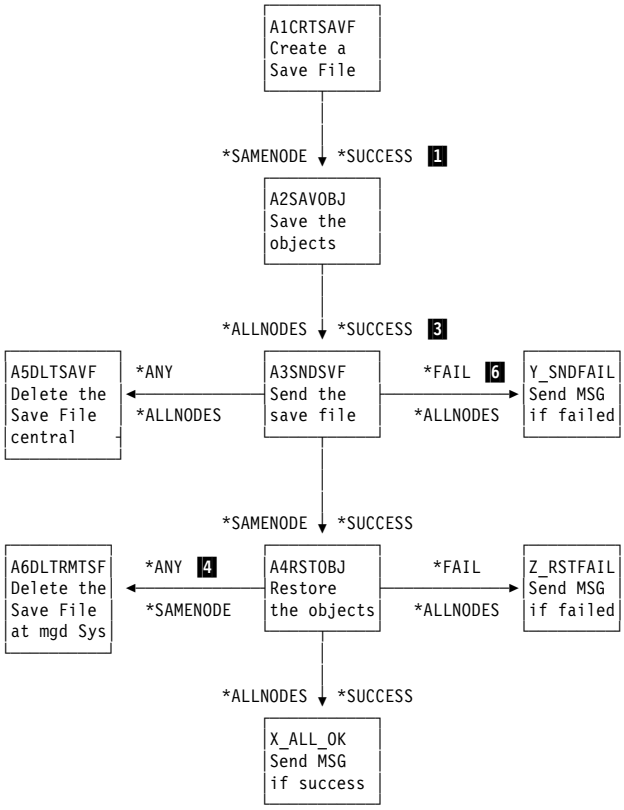


Figure 102. Activity Conditions for Sending Multiple Objects

The numbers in black squares (**1**) in the following description refer to Figure 102 as well as to Figure 99 on page 168.

- **1** : The activity A2SAVOBJ does not start before A1CRTSAVF has completed successfully. For this activity, it does not really matter if we specify *SAMENODE or *ALLNODES because both activities run at the same node (the central site system).
- **3** : This activity (A3SNDSVF) must not start until the save object (A2SAVOBJ) has completed *successfully*. Here, it *must* be *ALLNODES, because the two activities (A2SAVOBJ and A3SNDSVF) operate on different sets of nodes.
- **4** : The activity A6DLTRMTSF deletes the save file at the managed system after the restore object (A4RSTOBJ) *on the same system* has completed. However, we specified *ANY as Condition Mode, so we do not care whether

it completed successfully or whether it failed because we want to clean up the system in all cases.

- **6**: This activity (Y_SNDFAIL) starts only after the send activity (A3SNDSVF) has completed for all of the nodes and failed for at least one node. It sends an error message to the submitter of the CRQD.

Creating and Submitting the CRQD with a User-Written Program: The change request description shown in Figure 99 on page 168 is only used to send a certain set of objects (all programs in library GG244372 with names starting with the letters INS) to the systems specified in the node list ITSC. In order to use the same approach to send other objects from other libraries, you must either change the CRQD or (as we did for this example) create a program that accepts parameters to build and automatically submit the change request. Calling such a program is similar to using a fast path command. However, this program submits more than one activity and they are of different types.

Figure 103 on page 177 shows the CL program SNDMLTOBJ. When you call program SNDMLTOBJ, you need to specify these parameters:

OBJ The name of the object or objects to be sent. You may specify a single or a generic name (INS*).

OBJLIB The library where those objects reside.

OBJTYP The type of the objects.

NODL The name of the node list containing the destination nodes.

USRPRF The user profile to be used for saving the objects at the central site system and restoring them at the managed systems. This example assumes the profile exists at each system.

PASSWORD The password for the user profile. This example assumes the password is identical on all systems.

SNDMSG An indicator describing whether a completion message should be sent (″1″) or not (″0″).

Using these parameters, the program:

- Creates the CRQD SNDMLTOBJ in library GG244372.
- Adds the CRQ activities described in Figure 99 on page 168.
- Submits that change request.
- If the user called the program from an interactive job, it shows the Work with Submitted Change Request (WRKSBMCRQ) display for this CRQD.

You may easily extend this example to:

- Add more variables to support other parameters of the Save Object (SAVOBJ) command, the most common of which are:
  - Target release (TGTRLS)
  - Update history (UPDHST)
  - Save while active (SAVACT)
  - File member (FILEMBR)
- Add parameters for the Restore Object (RSTOBJ) command, such as the following:
  - Allow object differences (ALWOBJDIF)
  - Restore to library (RSTLIB)
  - Auxiliary storage pool ID (RSTASP)

– Output (OUTPUT)

For example, if you specify OUTPUT(*PRINT), a spool file is sent to the central site system reporting information about possible problems with each object that was restored or failed to restore.

You may even extend this example to achieve functions similar to those provided by the SNDSMTOBJ command of the System Management Tools (SMT) PRPQ.

You might want to change some values that are hard coded in the example, such as the following:

- The node list must be always in library GG244372.
- The CRQD is always created in library GG244372.
- The CRQD name is always SNDMLTOBJ.
- The user profile and password for the command activities must be identical at the central site and all of the managed systems.

CL Program SNDMLTOBJ to Create and Submit CRQD to Distribute Multiple Objects

```
  PGM (&obj &objlib &objtyp &nodl &usrprf SMGUIxx &sndmsg)

/* Program SNDMLTOBJ  Send Multiple Objects to all Systems in a Node List     */
/*         ---------  ==================================================     */
/*                                                                            */
/* Input:                                                                     */
/*    CALL Parameters:                                                        */
/*         &obj         (generic) Name of the object(s) to send               */
/*         &objlib      Library Name of the object(s) to send                 */
/*         &objtyp      Object Type (we allow only one)                       */
/*         &nodl        Name of the Node List (in library &lib)               */
/*         &usrprf      User profile to be used for saving and restoring      */
/*         SMGUIxx    Password for the user profile                         */
/*         &sndmsg      Return a message on completion or failure             */
/*                                                                            */
/* Output:                                                                    */
/*    Change Request Description SNDMLTOBJ in Library GG244372                */
/*       containing the CRQ Activities for:                                   */
/*         A1CRTSAVF   Create an empty save file at the central system        */
/*         A2SAVOBJ    Save the objects to be sent into the save file         */
/*         A3SNDSVF    Send the save file to the managed systems              */
/*         A4RSTOBJ    Restore the objects at the managed systems             */
/*         A5DLTSAVF   Delete the save file at the central system             */
/*         A6DLTRMTSF  Delete the save file at the managed systems            */
/*                                                                            */
/*    Finally, the Change Request SNDMLTOBJ will be submitted                 */

/*  CALL Parameters:                                                          */
DCL &obj        *CHAR 10    /* (generic) Name of the object(s) to send        */
DCL &objlib     *CHAR 10    /* Library Name of the object(s) to send          */
DCL &objtyp     *CHAR  7    /* Object Type (we allow only one)                */
DCL &nodl       *CHAR 10    /* Name of the Node List (in library &lib)        */
DCL &usrprf     *CHAR 10    /* Userprofile for command activities             */
DCL SMGUIxx   *CHAR 10    /* Password for command activities                */
DCL &sndmsg     *LGL        /* Return a message on completion or failure      */

/*  Constants used in this Program which are likely to be changed:            */
DCL SMGUIxx        *CHAR 10 GG244372   /* Working Libaray for CRQD, SAVF, ...    */
DCL &savf       *CHAR 10 SNDMLTOBJ  /* Name of the Save File to be created    */
DCL &crqd       *CHAR 10 SNDMLTOBJ  /* Name of the CRQD to be created         */

/*  Work variables:                                                           */
DCL &ctlsys     *CHAR  8    /* Name of the central system = this system       */
DCL &text       *CHAR 50    /* Descriptive text for CRQD and CRQAs            */
DCL &user       *CHAR 10    /* User ID who started this job                   */
DCL &curlib     *CHAR 10    /* The "Current Library"                          */
DCL &interactiv *CHAR 1     /* Indicator: Is this an interactiv job?          */

DCL &error      *lgl   VALUE('0')  /* Indicator: "unmonitored" error occured  */
MONMSG (CPF0000 SMU0000) EXEC(GOTO StdError) /* Standard error routine        */

/* Find out the name of this system, that is, the central system             */

  RTVNETA LCLCPNAME(&ctlsys)
  RTVJOBA CURLIB(&curlib) USER(&user) TYPE(&interactiv)
  IF (&usrprf   *EQ *CURRENT) CHGVAR &usrprf &user
  IF (SMGUIxx *NE *NONE)    CHKPWD SMGUIxx

/* The SAVOBJ command does not allow for *CURLIB => So we do it.              */

  IF (&objlib = *CURLIB) CHGVAR &objlib &curlib
```

Figure 103 (Part 1 of 3). CL Pgm SNDMLTOBJ - Create and Submit CRQD to Distribute Multiple Objects

```
/* We want to have the text of the Change Request Description (CRQD) more     */
/* descriptive. So we insert the variables.                                   */

  CHGVAR  &text ('Send'|>&objlib|<'/'||&obj|>&objtyp|>'to node list'|>&nodl)

  DLTCRQD    &lib/&crqd
    MONMSG CPF2105          /* CRQD does not exist yet => no need to delete   */
  CRTCRQD &lib/&crqd TEXT(&text)
  CLRSAVF &lib/&savf
    MONMSG CPF9810 +
      EXEC(CRTLIB  &lib)    /* Worklibrary does not exist => Create it.       */
    MONMSG CPF9812          /* SAVF does not exist => 1. CRQA will create it  */
/* 1. Create an empty save file at the central system                         */

  ADDCMDCRQA CRQD(&lib/&crqd) ACTIVITY(A1CRTSAVF)                              +
        CMD(CRTSAVF &lib/&savf AUT(*ALL))                                      +
            USRPRF(&usrprf) PASSWORD(&password)                                +
            CPNAME((*NETATR &ctlsys))                                          +
          TEXT('Create an empty save file at the central system ')             +
          COND(*NONE)

/* 2.  Save the objects to be sent into the save file                         */

  ADDCMDCRQA CRQD(&lib/&crqd) ACTIVITY(A2SAVOBJ)                               +
            CMD(SAVOBJ &obj &objlib *SAVF &OBJTYP SAVF(&lib/&SAVF))            +
            USRPRF(&usrprf) PASSWORD(&password)                                +
            CPNAME((*NETATR &ctlsys))                                          +
          TEXT('Save the objects to be sent into the save file    ')           +
          COND((*PRV *EQ *ANY *SAMENODE))

/* 3.  Send the save file to the managed systems                              */

  ADDOBJCRQA CRQD(&lib/&crqd) ACTIVITY(A3SNDSVF) ACTION(*SND)                  +
              OBJ(&lib/&savf) OBJTYPE(*FILE) REPLACE(*YES)                     +
            NODL(&lib/&nodl)                                                   +
            TEXT('Send the save file to the managed systems         ')         +
            COND((*PRV *EQ *SUCCESS *ALLNODES))
            MONMSG SMU16FD        /* Ignore message "File does not exist"    */

/* 4.  Restore the objects at the managed systems                             */

  ADDCMDCRQA CRQD(&lib/&crqd) ACTIVITY(A4RSTOBJ)                               +
            CMD(RSTOBJ &obj &objlib *SAVF &OBJTYP SAVF(&lib/&SAVF)             +
                MBROPT(*ALL) ALWOBJDIF(*ALL))                                  +
          USRPRF(&usrprf) PASSWORD(&password)                                  +
          NODL(&lib/&nodl) CPNAME(*NONE)                                       +
          TEXT('Restore the objects at the managed systems        ')           +
          COND((A3SNDSVF *EQ *SUCCESS *SAMENODE))

/* 5.  Delete the save file at the central system                             */

  ADDOBJCRQA CRQD(&lib/&crqd) ACTIVITY(A5DLTSAVF) ACTION(*DLT)                 +
              OBJ(&lib/&savf) OBJTYPE(*FILE)                                   +
          CPNAME((*NETATR &ctlsys))                                            +
          TEXT('Delete the save file at the central system')                   +
          COND((A3SNDSVF *EQ *SUCCESS *ALLNODES))

/* 6.  Delete the save file at the managed systems                            */

  ADDOBJCRQA CRQD(&lib/&crqd) ACTIVITY(A6DLTRMTSF) ACTION(*DLT)                +
              OBJ(&lib/&savf) OBJTYPE(*FILE)                                   +
          NODL(&lib/&nodl)                                                     +
          TEXT('Delete the save file at the managed systems')                  +
          COND((A4RSTOBJ *EQ *ANY *SAMENODE))
```

Figure 103 (Part 2 of 3). CL Pgm SNDMLTOBJ - Create and Submit CRQD to Distribute Multiple Objects

```
/* 7.  Send Completion Message, if Succesfull at all Nodes                   */

  IF &sndmsg DO

    ADDCMDCRQA CRQD(&lib/&crqd) ACTIVITY(X_ALL_OK)                           +
      CMD(SNDMSG TOUSR(&user)                                          +
       MSG('CRQ'|>&crqd|>'"'||&text||'" completed successfully at all nodes')) +
      USRPRF(&usrprf) PASSWORD(&password)                                    +
      CPNAME((*NETATR &ctlsys))                                              +
           TEXT('Send Completion Message, if Succesfully')                   +
             COND((A4RSTOBJ *EQ *SUCCESS *ALLNODES))

/* 8.  Send Error Message, if Send failed at some Node                       */

    ADDCMDCRQA CRQD(&lib/&crqd) ACTIVITY(Y_SNDFAIL)                          +
      CMD(SNDMSG TOUSR(&user)                                                +
        MSG('Send for'|>&crqd|>'"'||&text|>'" failed at least at one node')) +
           CPNAME((*NETATR &ctlsys))                                         +
       USRPRF(&usrprf) PASSWORD(&password)                                   +
       TEXT('Send error message, if send failed')                            +
       COND((A3SNDSVF *EQ *FAIL    *ALLNODES))

/* 9.  Send Error Message, if Restore failed at some Node                    */

    ADDCMDCRQA CRQD(&lib/&crqd) ACTIVITY(Z_RSTFAIL)                          +
      CMD(SNDMSG TOUSR(&user)                                                +
       MSG('Restore for'|>&crqd|>'"'||&text||'" failed at least at one node')) +
           CPNAME((*NETATR &ctlsys))                                         +
      USRPRF(&usrprf) PASSWORD(&password)                                    +
      TEXT('Send error message, if restore failed')                          +
      COND((A4RSTOBJ *EQ *FAIL    *ALLNODES))
  ENDDO


/* Now we submitt the CRQD we just created,                                  */
/* That is, after having described everything,we really activate that process.*/

  SBMCRQ CRQD(&lib/&crqd)

/* If this Program was called by an interactive job, we call the "Work with   */
/* Submitted Change Requests" for him, to be able to track the success of it. */

  IF (&interactiv = '1') WRKSBMCRQ  &crqd  SBM(&user)

  RETURN              /* In case of any error not specifically monitored,     */
                      /* we resend all diagnostic and escape messages to      */
StdError:             /* the calling program. See the "System Programmer's    */
  IF (*NOT &error) DO /* Interface Guide" for more Information on APIs.       */
    CHGVAR &error '1'
    CALL QMHMOVPM ('    ' '*DIAG      ' X'00000001' '*' X'00000001' X'00000000')
    CALL QMHRSNEM ('    ' X'00000000')
  ENDDO
ENDPGM
```

Figure 103 (Part 3 of 3). CL Pgm SNDMLTOBJ - Create and Submit CRQD to Distribute Multiple Objects

CMD Source: Create and Submit CRQD to Distribute Multiple Objects: To make it easier for the user to specify the required parameters for program SNDMLTOBJ and to provide default values and the possibility of parameter prompting, you can create a CL command to call program SNDMLTOBJ. Figure 104 shows the source statements to create the command SNDMLTOBJ.

```
CMD 'Send Multiple Objects'

PARM OBJ        *GENERIC MIN(1)       SPCVAL(*ALL)  PROMPT('Object Name')

PARM OBJLIB     *NAME    DFT(*CURLIB) SPCVAL(*CURLIB *LIBL) PROMPT('Library')

PARM OBJTYP     *CHAR 7 RSTD(*YES) DFT(*ALL)  VALUES( +
                   (*ALL)    (*DTAQ  ) (*JOBQ  ) (*PAGSEG) (*SCHIDX) +
                   (*ALRTBL) (*EDTD  ) (*JOBSCD) (*PDG   ) (*SPADCT) +
                   (*BNDDIR) (*EXITRG) (*JRN   ) (*PGM   ) (*SQLPKG) +
                   (*CHTFMT) (*FCT   ) (*JRNRCV) (*PNLGRP) (*SQLPKG) +
                   (*CLD   ) (*JOBD  ) (*MENU  ) (*PRDAVL) (*SRVPGM) +
                   (*CLS   ) (*JOBQ  ) (*MODULE) (*PRDDFN) (*SSND  ) +
                   (*CMD   ) (*FILE  ) (*MSGF  ) (*PRDLOD) (*SVRSTG) +
                   (*CRQD  ) (*FNTRSC) (*MSGQ  ) (*QMFORM) (*S36   ) +
                   (*CSI   ) (*FORMDF) (*NODL  ) (*QMQRY ) (*TBL   ) +
                   (*CSPMAP) (*FTR   ) (*OUTQ  ) (*QRYDFN) (*USRIDX) +
                   (*CSPTBL) (*GSS   ) (*OVL   ) (*RCT   ) (*USRQ  ) +
                   (*DTAARA) (*JOBD  ) (*PAGDFN) (*SBSD  ) (*USRSPC) +
                                                           (*WSCST ) ) +
              PROMPT('Object Type')

PARM NODL    *NAME MIN(1)  PROMPT('Send to Node List')

PARM USRPRF  *NAME SPCVAL(*NONE *CURRENT) DFT(*CURRENT) PROMPT('User Profile')

PARM PWD     *NAME DFT(*NONE) SPCVAL((*NONE)) DSPINPUT(*NO) PROMPT('Password')

PARM SNDMSG  *LGL  SPCVAL((*YES '1') (*NO '0')) DFT(*NO) +
                                                 PROMPT('Return a Message')
```

Figure 104. CMD SNDMLTOBJ - Create and Submit CRQD to Distribute Multiple Objects

Run and Retrieve Daily Reports, Start Backup and IPL

EXAMPLE 13

You can also use change request descriptions to control tasks that must be run on a regular basis on all or some of the systems in your network. An example is end-of-day processing that runs every night and contains these steps:

- Send a message to all of the active users telling them that the system will be shut down.
- Terminate the interactive subsystem to prevent users from working with those applications.
- Produce daily report and summary files. This step might be multiple jobs that run simultaneously.
- Retrieve daily summary files for each application. Files are sent to the central site system.
- Start the backup.
- Reorganize application databases (if there is at least one hour left before the start of the first shift the next morning).
- IPL the system (if there is at least 30 minutes left before the start of the first shift the next morning).
- If the IPL was not performed because it was already too late, restart the subsystem for the interactive users.

Figure 105 on page 181 shows the conditioning structure of the change request description.

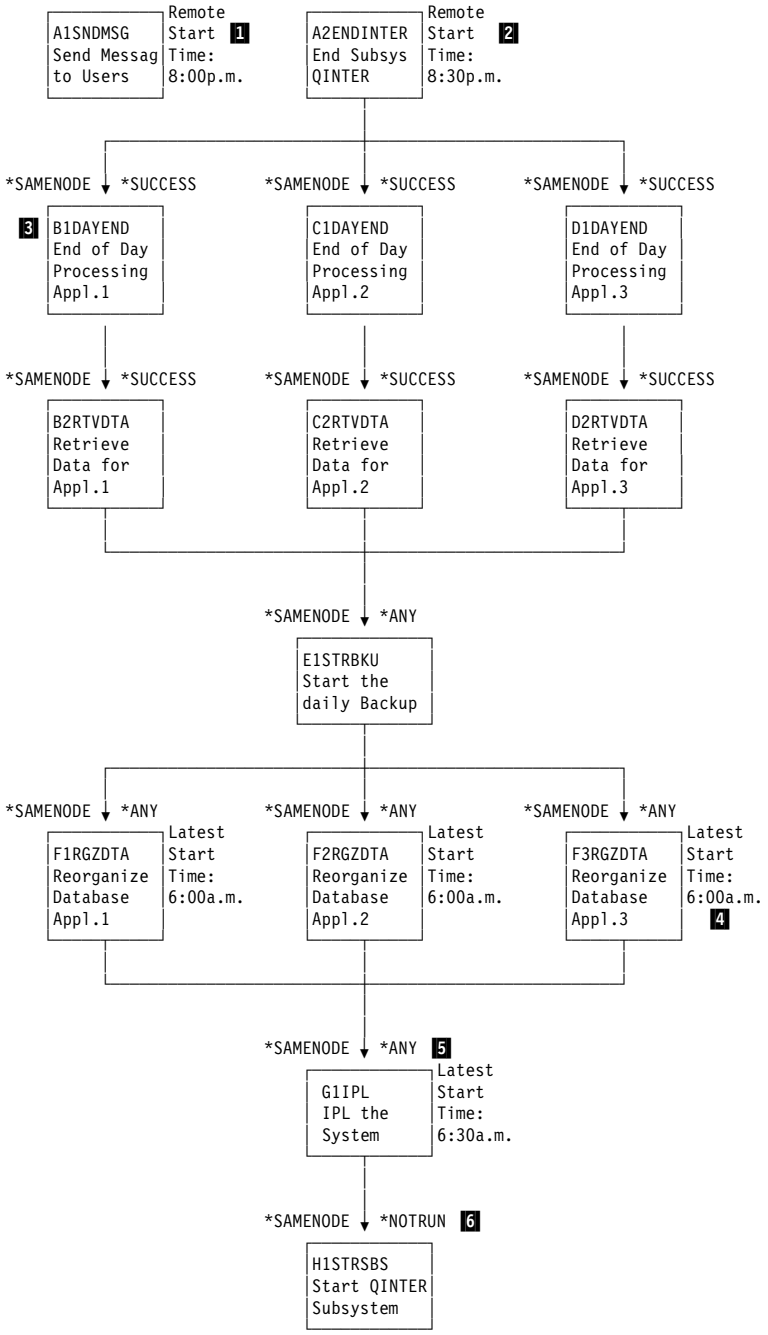


Figure 105. Activity Conditions for End of Day Activities

Note that the first two activities A1SNDMSG (1) and A2ENDINTER (2) are completely independent of each other. We used a remote start time for both, so the request can be sent much earlier. The advantage of using Remote Start Time (RMTSTRTIME) rather than the Activity Start Time (STRTIME) is that the request can be sent when an operator is still available at the central site system. The operator can check that the request was sent successfully to all of the managed systems and that an intermediate response was received.

One way to end a subsystem with the activity A2ENDINTER is to use a command activity with the ENDSBS QINTER command. The disadvantage of this approach is that although the command completes successfully, the subsystem might still remain active for some time.

Figure 106 shows the source for CL program ENDSBS that accepts the name of a subsystem as a parameter and performs a controlled termination of that subsystem. Then it tries to allocate ALCOBJ, the subsystem description. This is not possible before the subsystem has ended. Therefore, the program is put into a wait state until the termination of the subsystem is complete.

```
PGM &sbsd

/* Program ENDSBS  Terminate a Subsystem and Wait until it Completely Ended   */
/*         ------  ========================================================   */
/*                                                                            */
/* Input:                                                                     */
/*    CALL Parameters:                                                        */
/*         &sbsd        Name of the subsystem to be terminated               */

DCL &delay       *DEC (5 0) 1200        /* Delay in seconds for ENDSBS *CTRLD */
DCL &sbsd        *CHAR 10

DCL &error      *lgl   VALUE('0')  /* Indicator: "unmonitored" error occured  */
MONMSG (CPF0000 SMU0000) EXEC(GOTO StdError) /* Standard error routine       */
 7

  ENDSBS &sbsd  *CNTRLD DELAY(&delay)
  MONMSG CPF1054                        /* Subsystem currently not active     */

  CHGVAR  &delay (&delay + 600)         /* Allow for additional 600 seconds   */

  ALCOBJ  OBJ((&sbsd *SBSD *EXCL)) WAIT(&DELAY)
  DLCOBJ  OBJ((&sbsd *SBSD *EXCL))

  RETURN                 /* In case of any error not specifically monitored,  */
                         /* we resend all diagnostic and escape messages to   */
StdError:                /* the calling program. See the "System Programmer's */
  IF (*NOT &error) DO    /* Interface Guide" for more Information on APIs.    */
    CHGVAR &error '1'
    CALL QMHMOVPM ('    ' '*DIAG      ' X'00000001' '*' X'00000001' X'00000000')
    CALL QMHRSNEM ('    ' X'00000000')  8
  ENDDO

ENDPGM
```

Figure 106. CL Source - End Subsystem and Wait Until Complete Termination

Tip

Whenever you call your own programs from a change request activity, you should monitor them for all of the error messages. If an escape message is issued by any function within a CL program and there is neither a global (the first statement after the last Declare (DCL) statement) nor a specific Monitor Message (MONMSG) command, the inquiry message CPA0701 is sent to the system operator (QSYSOPR) message queue. The result is that the activity hangs until the message has been replied to. There are several solutions for this:

- Include a global MONMSG CPF0000 and resend the escape message to the caller. This situation is handled by Managed System Services/400:
  - An escape message is captured.
  - An escape message is sent to central site system.
  - The activity ends with a status of "failed" (20). This is the cleanest way to handle such a situation. In our example, we used the system API QMHRSNEM to resend the escape message (see **7** and **8** in Figure 106).
- Include a global MONMSG CPF0000 to ignore the error condition in every CL program. In most cases, this is not recommended because even if a certain function within your program fails, the activity can end successfully.
- Put the QSYSOPR message queue in default mode so the inquiry message CPA0701 is replied to with C automatically. This might seriously affect other applications and is not recommended in most cases.
- Use a job description for the default user profile that specifies Inquiry message reply: INQMSGRPY(*DFT).

The next block of activities (B1DAYEND to D2RTVDTA at **3** in Figure 105 on page 181) are examples of day-end procedures for your applications. We show how you can build several job streams, where certain activities can run independently of each other (for example, B1DAYEND, C1DAYEND, and D1DAYEND), and some other activities that must be performed sequentially. For example, B2RTVDTA must not start until B1DAYEND ends successfully.

The daily backup procedure (E1STRBKU) is not dependent on the *success* of the application, but it must not start until the others have ended, regardless of the end code (*ANY). The same is true for the next application activities (F1RGZDTA to F2RGZDTA). However, an additional condition for these activities applies. Assuming the first shift of users start at 7 AM and the duration of the reorganization of the application databases does not last longer than one hour, we do not want to start those activities after 6 AM (**4**). That is, these activities are only performed if there is enough time left.

For the activity G1IPL, perform an IPL. We also defined a time constraint, assuming it is done within 30 minutes.

Tips for the Resource Activity IPL

- This activity type *always* performs a Power Down System (PWRDWNSYS) command with RESTART(*YES). The system is not powered down, but an IPL is performed unless the key at the system panel is in manual mode. If you really want the system to be powered down, you can either use a command activity with the PWRDWNSYS command, or the Change Power On/Off Schedule (CHGPWRSCD) function of the Operational Assistant, which also allows you to specify a time to power on the system automatically every day.
- The default for the resource activity (IPL) is to perform a *controlled* (*CNTRLD) power down with a delay of 3600 seconds. That is, in most cases the system needs at least one hour to end, because not all of the subsystems can be terminated in a controlled manner. Therefore, you may either use a shorter delay (we used DELAY(600) **5**, that is 10 minutes), or specify OPTION(*IMMED).
- If you did not include the Start Subsystem (STRSBS) for QSNADS in the IPL Startup Program specified in system value QSTRUPPGM at the managed systems, the central site system has no way of knowing whether the resource activity has completed. Therefore, no activity conditioned on the IPL is started before the QSNADS subsystem at the managed system is started. See “Change the Startup Program at the Managed Systems” on page 208 for a CRQD to change the startup program at all of the managed systems.

We wrote the CL program DAYEND shown in Figure 107 on page 185 to demonstrate which commands are needed to create the CRQD for this example. Although it is not necessary to write a CL program (you could also enter each command manually), writing a CL program is a good way to document what has been done and why. A CL program also simplifies future modifications.

```
PGM

/* Program DAYEND     Create CRQD to perform day end work at all systems      */
/*         ------     ==================================================      */
/*                                                                             */
/* Input:                                                                      */
/*    None                                                                     */
/*                                                                             */
/* Output:                                                                     */
/*    - Change Request Description DAY_END in Library GG244372                 */
/*    - Job Scheduler Entry to submit the CRQD daily at 6p.m.                  */
/*                                                                             */
/* Assumptions:                                                                */
/*    - Program ENDSBS exists on all managed system in library GG244372        */
/*    - Default user profile (QSVMSS or the one defined with CHGMGDSYSA)       */
/*      at managed systems has authority to program GG244372/ENDSBS as well    */
/*      as to the application programs and database files for day end process.*/

DCL SMGUIxx       *CHAR 10 GG244372          /* Library to store CRQD            */
DCL &crqd      *CHAR 10 DAY_END           /* Name of CRQD to be created       */
DCL &nodl      *CHAR 10 PRODUCTION        /* Node List with managed systems   */
DCL &autl      *CHAR 10 OCC400            /* Authority List to secure the CRQD*/
DCL &rmtlib    *CHAR 10 GG244372          /* Library at managed systems       */

/*  Create the Change Request Description                                      */

  DLTCRQD &lib/&crqd                     /* Delete the already existing CRQD */
  MONMSG CPF0000                         /* ... but it did not exist ...     */

  CRTCRQD   &lib/&crqd USRPRF(*OWNER) +
                            TEXT('Perform Day End Processing')

  GRTOBJAUT &lib/&crqd *CRQD AUTL(&autl)

/*  Add the Activities to the CRQD                                             */

  ADDCMDCRQA &lib/&crqd A1SNDMSG  1                                           +
          CMD(SNDMSG TOUSR(*ALLACT)                                          +
                MSG('System will go down in 30 minutes. Please sign off.'))   +
          CPNAME((*NONE)) NODL(&lib/&nodl)                                   +
          TEXT('Send a Message to all active Users')                         +
          RMTSTRTIME(*LCLSYS (200000 *CURRENT)) COND(*NONE)

  ADDOBJCRQA &lib/&crqd A2ENDINTER ACTION(*RUN)  2                            +
          OBJ(&rmtlib/ENDSBS) OBJTYPE(*PGM) PARM((QINTER))                   +
          CPNAME((*NONE)) NODL(&lib/&nodl)                                   +
          TEXT('Terminate Interactive Subsystem QINTER')                     +
          RMTSTRTIME(*LCLSYS (203000 *CURRENT)) COND(*NONE)

/*  Day end processing for applications  3                                    */

  ADDOBJCRQA &lib/&crqd B1DAYEND ACTION(*RUN)                                 +
          OBJ(&rmtlib/APPL1) OBJTYPE(*PGM) CPNAME((*NONE)) NODL(&lib/&nodl)   +
          TEXT('Execute Day End Processing for Appl.1')                      +
          COND((A2ENDSBS *EQ *SUCCESS *SAMENODE))

  ADDOBJCRQA &lib/&crqd B2RTVDTA ACTION(*RTV)                                 +
          OBJ(*GLOBAL) GLBNAME(*NETID *ANY SUMMARY APPL1) REPLACE(*YES)      +
          CPNAME((*NONE)) NODL(&lib/&nodl)                                   +
          TEXT('Retrieve Day End Results for Appl.1')                        +
          COND((*PRV     *EQ *SUCCESS *SAMENODE))
    MONMSG SMU16FD  9  /* Activity QACT000010 added, but warnings exist.     */
```

Figure 107 (Part 1 of 3). CL Source - Create CRQD for Day End Processing

```
ADDOBJCRQA &lib/&crqd C1DAYEND ACTION(*RUN)                                +
        OBJ(&rmtlib/APPL2) OBJTYPE(*PGM) CPNAME((*NONE)) NODL(&lib/&nodl)    +
        TEXT('Execute Day End Processing for Appl.2')                      +
        COND((A2ENDSBS *EQ *SUCCESS *SAMENODE))

ADDOBJCRQA &lib/&crqd C2RTVDTA ACTION(*RTV)                                +
        OBJ(*GLOBAL) GLBNAME(*NETID *ANY SUMMARY APPL2) REPLACE(*YES)       +
        CPNAME((*NONE)) NODL(&lib/&nodl)                                   +
        TEXT('Retrieve Day End Results for Appl.2')                        +
        COND((*PRV *EQ *SUCCESS *SAMENODE))
  MONMSG SMU16FD  9  /* Activity QACT000010 added, but warnings exist.    */

ADDOBJCRQA &lib/&crqd D1DAYEND ACTION(*RUN)                                +
        OBJ(&rmtlib/APPL3) OBJTYPE(*PGM) CPNAME((*NONE)) NODL(&lib/&nodl)    +
        TEXT('Execute Day End Processing for Appl.3')                      +
        COND((A2ENDSBS *EQ *SUCCESS *SAMENODE))

ADDOBJCRQA &lib/&crqd D2RTVDTA ACTION(*RTV)                                +
        OBJ(*GLOBAL) GLBNAME(*NETID *ANY SUMMARY APPL3) REPLACE(*YES)       +
        CPNAME((*NONE)) NODL(&lib/&nodl)                                   +
        TEXT('Retrieve Day End Results for Appl.3')                        +
        COND((*PRV *EQ *SUCCESS *SAMENODE))
  MONMSG SMU16FD  9  /* Activity QACT000010 added, but warnings exist.    */

ADDCMDCRQA &lib/&crqd E1STRBKU                                             +
        CMD(STRBKUBRM CTLGRP(DLYBACKUP) SBMJOB(*NO))                       +
        CPNAME((*NONE)) NODL(&lib/&nodl)                                   +
        TEXT('Start Daily Backup using BRMS/400')                          +
        COND((B2RTVDTA *EQ *ANY *SAMENODE) (C2RTVDTA *EQ *ANY *SAMENODE)    +
             (D2RTVDTA *EQ *ANY *SAMENODE) )

ADDCMDCRQA &lib/&crqd F1RGZDB                                              +
        CMD(CALL &rmtlib/RGZ1) NODL(&LIB/&NODL) CPNAME(*NONE)              +
        STRTIME((*CURRENT *CURRENT) (060000 *NEXT))  4                     +
        TEXT('Reorganize Data for Appl.1')                                 +
        COND((E1STRBKU *EQ *ANY *SAMENODE))

ADDCMDCRQA &lib/&crqd F2RGZDB                                              +
        CMD(CALL &rmtlib/RGZ2) NODL(&LIB/&NODL) CPNAME(*NONE)              +
        STRTIME((*CURRENT *CURRENT) (060000 *NEXT))                        +
        TEXT('Reorganize Data for Appl.2')                                 +
        COND((E1STRBKU *EQ *ANY *SAMENODE))

ADDCMDCRQA &lib/&crqd F3RGZDB                                              +
        CMD(CALL &rmtlib/RGZ3) NODL(&LIB/&NODL) CPNAME(*NONE)              +
        STRTIME((*CURRENT *CURRENT) (060000 *NEXT))                        +
        TEXT('Reorganize Data for Appl.3')                                 +
        COND((E1STRBKU *EQ *ANY *SAMENODE))

ADDRSCCRQA &lib/&crqd G1IPL ACTION(*RESTART) OPTION(*CNTRLD) DELAY(600)  5  +
        NODL(&LIB/&NODL) CPNAME(*NONE)                                     +
        STRTIME((*CURRENT) (063000 *NEXT)) TEXT('IPL the System')          +
        COND((F* *EQ *ANY *SAMENODE))  6

ADDCMDCRQA &lib/&crqd H1STRSBS                                             +
        CMD(STRSBS QINTER) NODL(&LIB/&NODL) CPNAME(*NONE)                  +
        TEXT('Restart Subsystem QINTER')                                   +
        COND((*PRV *EQ *NOTRUN *SAMENODE))
```

Figure 107 (Part 2 of 3). CL Source - Create CRQD for Day End Processing

```
/*  Add the Entry for Submitting the CRQD to JobScheduler                    */

  RMVJOBSCDE &crqd
    MONMSG CPF0000

  ADDJOBSCDE &crqd CMD(SBMCRQ CRQD(&lib/&crqd))                              +
             FRQ(*WEEKLY) SCDDATE(*NONE)                                     +
             SCDDAY(*MON *TUE *WED *THU *FRI) SCDTIME(170000)
  MONMSG CPF0000

ENDPGM
```

Figure 107 (Part 3 of 3). CL Source - Create CRQD for Day End Processing

The Monitor Message (MONMSG) command (**9** in Figure 107 on page 185) keeps the CL program from failing by a warning from the Add Object CRQA (ADDOBJCRQA) command. This can happen, because when you add an object CRQA, the system checks whether the specified object exists. If it does not exist, the CRQA is added, but a warning is signaled as an escape message which in turn cancels the CL program, unless there is a Monitor Message (MONMSG) command for it.

The numbers in black squares in Figure 107 on page 185 refer also to Figure 105 on page 181 and the description starting on page 181.

Distribute and Load PTFs and Apply at Night

EXAMPLE 14

Assume that you have ordered some PTFs for OS/400 from IBM and loaded them on your central site system. Now you want to send them to the managed systems. The users of the managed systems should not be disturbed. Therefore, you want to apply the PTFs during the night. Because one of the PTFs has to be applied *delayed*, an IPL has to be performed after the apply. Figure 108 on page 188 contains the commands to create such a CRQD.

```
PGM

/* Program DSTPTF  Create CRQD to Distribute several OS/400 PTFs to mgd Sys   */
/*         ------  ==========================================================  */
/*                                                                             */
/* Input:                                                                      */
/*    None                                                                     */
/*                                                                             */
/* Output:                                                                     */
/*    - Change Request Description DSTPTF in Library GG244372                  */

DCL SMGUIxx       *CHAR 10 GG244372          /* Library to store CRQD            */
DCL &crqd      *CHAR 10 DSTPTF            /* Name of CRQD to be created       */
DCL &nodl      *CHAR 10 PRODUCTION        /* Node List with managed systems   */

/*  Create the Change Request Description                                      */
/*  =====================================                                      */

  DLTCRQD &lib/&crqd                      /* Delete the already existing CRQD */
  MONMSG CPF0000                          /* ... but it did not exist ...     */

  CRTCRQD   &lib/&crqd USRPRF(*OWNER) +
                            TEXT('Perform Day End Processing')


/*  Add the Activities to the CRQD                                             */
/*  ==============================                                             */

  ADDPTFCRQA &lib/&crqd ACTION(*SND) PTFID(SF19912)                           +
          CPNAME((*NONE)) NODL(&lib/&nodl)

  ADDPTFCRQA &lib/&crqd ACTION(*SND) PTFID(SF19874)                           +
          CPNAME((*NONE)) NODL(&lib/&nodl)

  ADDPTFCRQA &lib/&crqd ACTION(*SND) PTFID(SF19871)                           +
          CPNAME((*NONE)) NODL(&lib/&nodl)

  ADDPTFCRQA &lib/&crqd ACTION(*APY) PTFID(*ALL 5763SS1)                      +
          CPNAME((*NONE)) NODL(&lib/&nodl)                                    +
          RMTSTRTIME(*LCLSYS 220000)                                          +
          TEXT('Apply all OS/400 PTFs at the managed Systems')

  ADDRSCCRQA &lib/&crqd ACTION(*RESTART) OPTION(*IMMED)                       +
               NODL(&lib/&nodl) CPNAME(*NONE)
```

Figure 108. CL Source - Create CRQD to Distribute OS/400 PTFs

This example is much simpler than the previous one. We used the defaults whenever possible.

Distribute and Apply the Contents of a Cumulative PTF Tape

A cumulative PTF tape is a tape containing the program temporary fixes (PTFs) for an AS/400 system that have been accumulated from the start of the current release. PTFs requiring special handling are not included in a cumulative PTF package. Such tapes are used by IBM and other software vendors to distribute the most important PTFs for AS/400 licensed programs. If you receive such a cumulative tape, you may want to install it on all of your systems to ensure having the most recent level of software.

Distributing Cumulative Tapes Electronically

Assuming that the AS/400 systems in your network are centrally managed, there are two ways to install cumulative PTFs on all of your systems:

- Duplicate the tape and send a copy to each location.
- Load the PTFs on the central site system and distribute them by using Operations Control Center/400.

The advantage of the latter method is that one person at the central site system can start and control the process at all of the managed systems. Also there is no need to duplicate and ship any tapes. In total, the process is faster and synchronized. You can do it at the same time for all of the systems.

These are the steps necessary to distribute and install multiple PTFs for multiple licensed programs on a centrally managed system:

1. **Define the supported products on the central site system**. When you want to distribute PTFs for one or more licensed programs to other systems, you first must specify which products and which releases you want to support with your central site system. Use the following command:

   `WRKSPTPRD RLS(*ALL)`

   to display the names, descriptions, and (after pressing *F11*), the releases of those licensed programs for which you want to provide PTFs for other systems. If you want to add more products or a new release for an already supported product, press F14 (Support additional products).

   Note:

   If you do not define a certain licensed program as a supported product, save files loaded onto your system are deleted after you have applied the PTFs to the system. Therefore, you might not be able to send those PTFs to other systems. You have to specify each release of a product you want to support. For example, if you supported all of the IBM-licensed programs for Version 2 Release 3 and you upgrade your central site system to Version 3 Release 1, you should add the V3R1 version of each product to the supported products. At the same time, the V2R3 products are still supported until all of your service requesters have been upgraded to V3R1 also. Then you can delete that supported product (only for V2R3) using option 4 of Work with Supported Products display.

   See Chapter 6 of the *System Manager/400 Use*, SC41-3321 for more information on managing the PTF database, especially the section ″Cumulative PTF Package″, which outlines the process we are using in this example without going into detail about how to distribute and install the PTFs.

2. **Load the PTFs on the central system**. Depending on the needs of your central site system, you may install (that is, INSPTF or LODPTF, and then APYPTF) the PTFs on your central site system or copy (CPYPTFSAVF) them to a save file on that system.

3. **Release those PTFs you want to send**. By default, all of the PTFs you copied onto your central system are held; that is, they are not eligible to be sent to managed systems or service requesters. There are two ways to release PTFs to be sent:

- Change the default by running the Change Service Provider Attributes (CHGSRVPVDA) command with parameter HLDPTF(*NO) before you copy or load the PTFs onto your system.

  or

- Release the PTFs after copying them by using the Work with Program Temporary Fixes (WRKPTF) command and then choosing option 6 for each PTF, or by using the Release Program Temporary Fix (RLSPTF) command for each PTF.

4. **Create a Software and PTF inventory** of the managed system. You need to know which licensed programs and which PTFs are installed on the remote systems.
5. **Create a PTF package for the managed systems**. Create a database file containing the names of those PTFs available on the central site system but not yet on the managed systems.
6. **Create a save file for each licensed program containing the PTFs to be sent**. You can accomplish this by using the CPYPTF command and specifying FROMDEV(*SERVICE) and TODEV(*SAVF). While CPYPTFSAVF (as well as SNDPTFORD) creates a new save file for every PTF, CPYPTF can ″bundle″ many PTFs into one save file per licensed program. You cannot specify more than 50 PTFs. Therefore, you might need more than one save file per product. This step combines many save files, containing one PTF each, into one (or more) save files per licensed program.
7. **Send the save files** to the managed systems.
8. **Delete the save files** from the central site system.
9. **Load the PTFs** from the save files into the managed systems using command *LODPTF*.
10. **Delete the save files** from the managed systems.
11. **Apply the PTFs** to the managed systems. Some PTFs may have prerequisite PTFs for the operating system or the licensed internal code (LIC). Therefore, the LIC PTFs should be applied first, then the operating system PTFs, and then those for all of the other software products.
12. **IPL the managed systems** only if there was at least one delayed PTF.

EXAMPLE 15

Purpose of the Sample Programs and Files

While we do not go into further detail for steps 1 to 3 on page 189, the following example shows how to automate the remaining steps by using:

- CL program **SNDPTFPKG** (Figure 115 on page 198)
- CL program **INSPTFPKG** (Figure 116 on page 200)
- RPG program **CHKLICPGM** (Figure 117 on page 205)
- Physical file **PTFSTS**
- Physical file **SFWRSC**
- Logical file **ALLSFW** (Figure 110 on page 192)

The PTF Status File (PTFSTS) is created by using parameter OUTPUT(*OUTFILE) with the Display Program Temporary Fix (DSPPTF) command. That file resides on the central site system and contains one member for each managed system. It tells which PTFs are currently installed at each system. We need that information to send only those PTFs that are not yet installed. This file must be created before compiling the CL program INSPTFPKG (see Figure 117 on page 205) by entering the command:

```
DSPPTF OUTPUT(*OUTFILE) OUTFILE(GG244372/PTFSTS)
```

You do not need to supply any DDS or SQL statements to define the structure of that file. A model for that file already exists and is used by the system to create your file description. GG244372 is the name of the library we used to store the examples for this book.

Figure 109 shows only those fields needed by CL program INSPTFPKG (see Figure 116 on page 200).

Field	Description	Len	Dec
SCPPID	Licensed program	7	
SCPTFID	PTF ID	7	
SCPTFV	PTF release	6	
SCTYPE	Type (immediate or delayed)	18	

Figure 109. Physical File PTFSTS - Field Description

The concept of file SFWRSC is similar to file PTFSTS. It has one member for each managed system. It is created using the Display Software Resources (DSPSFWRSC) command and contains one record for each installed licensed program option. This file can basically form a *Software Inventory* of all managed systems. Therefore, we are able to avoid sending those PTFs for products not installed on the managed system.

We do not access file SFWRSC directly, but only by using logical file ALLSFW. File SFWRSC must be created *before* creating logical file ALLSFW by entering the command:

```
DSPSFWRSC OUTPUT(*OUTFILE) OUTFILE(GG244372/SFWRSC)
```

While physical file SFWRSC contains one member for each managed system, the (only) logical file member of ALLSFW covers all of those members. It has a keyed access path. That allows RPG program CHKLICPGM (see Figure 117 on page 205) to randomly access each record by using CP name, product ID, and release level as a key.

This file must be created *before* creating RPG program CHKLICPGM by entering the statements shown in Figure 110 on page 192 into source file QDDSSRC in library GG244372, and then entering the command:

```
CRTLF FILE(GG244372/ALLSFW) SRCFILE(GG244372/QDDSSRC)
```

or by using option 14 on the Work with Members Using PDM (WRKMBRPDM) display.

Logical File ALLSFW - Software Inventory: The RPG Program CHKLICPGM does not really read any data stored in physical file ALLSFW. It merely checks for the existence of a record using the key fields described in Figure 111 on page 192.

```
     A          T_Name++++++_Len++TDpB      Functions+++++++++++++++++++++++++++
           1         2         3         4         5         6         7         8
12345678901234567890123456789012345678901234567890123456789012345678901234567890
     A          R QARZLCGD                  PFILE(SFWRSC)
     A          K LCSYSN
     A          K LCPRDI
     A          K LCVRSL
     A          K LCRLSL
     A          K LCMODL
     A          T_Name++++++_Len++TDpB      Functions+++++++++++++++++++++++++++
```

Figure 110. DDS for Logical File ALLSFW - Software Inventory

Field	Description	Len	Dec
LCSYSN	System name	8	
LCPRDI	Product identification	7	
LCVRSL	Product version level	4	
LCRLSL	Product release level	2	
LCMODL	Release modification level	2	

Figure 111. Logical File ALLSFW - Field Description

Structure and Flow of Programs and CRQ Activities

Each of the two CL programs SNDPTFPKG and INSPTFPKG creates and submits a change request description (CRQD) using the information in the Call parameters supplied by the user. The first four activities created by program SNDPTFPKG are optional. They ensure that the contents of the PTF status file (PTFSTS) and the software inventory (SFWRSC) at the central site system reflect the most recent status of the managed system. The last (and possibly only) activity then calls program INSPTFPKG, which in turn creates a variable number of activities depending on the:

- Number of products to be serviced (just one or all of the products existing at the managed system).
- Number of PTFs available.
- Number of PTFs already installed.
- Number of PTFs per product (each package save file cannot contain more than 50 PTFs).

Figure 112 on page 195 shows the basic flow and the dependencies between those two programs and the CRQ activities created by them. Note, that both the execution of each of the two programs is performed in two completely distinct steps:

Some functions are directly executed by the programs, creating the CRQDs, or adding activities to the CRQD, for example. Program INSPTFPKG also performs additional steps, such as creating save files and PTF packages. Finally, the CRQD, which was created before, is submitted.

Then, the change requests that have been built and submitted before are executed under control of System Manager/400. The program that originally created the CRQD is no longer active at this time.

The complete sequence is:

1. The user calls program SNDPTFPKG by entering the SNDPTFPKG command and supplying parameters.

2. Program SNDPTFPKG creates the CRQD INSPTFPKG1 with up to five activities depending on parameters supplied by the user. As the last step, the program submits the CRQD.
3. System Manager/400 starts the execution of change request INSPTFPKG1 with the following activities:
   - A1DSPPTF

     Creates file PTFSTS at the managed system only if it is requested by the user with RTVPTFINV(*YES).
   - A2RTVPTFST

     Retrieves file PTFSTS from the managed to the central site system only if it is requested by the user with RTVPTFINV(*YES).
   - A3DSPSFWRS

     Creates file SFWRSC at the managed system only if it is requested by the user with RTVSFWINV(*YES).
   - A3RTVSFWRS

     Retrieves file SFWRSC from the managed to the central site system only if it is requested by the user with RTVSFWINV(*YES).
   - B5INSPTF

     Calls program INSPTFPKG.
4. Program INSPTF does the following:
   - Creates a new member (NEWPTFS) in file PTFSTS with only those PTFs that are not yet installed on the managed system.
   - Creates CRQD INSPTFPKG.
   - Reads that member NEWPTFS.
   - Creates one or more save files for each product found in NEWPTFS.
   - Copies up to 50 PTFs into that save file.
   - Adds a variable number of activities to the CRQD.
   - Submits CRQD INSPTFPKG.
5. System Manager/400 starts the execution of change request INSPTFPKG with the following activities repeated for each product and up to 50 PTFs:
   - AppppppppxxD

     Send save file number xx for product ppppppp to the managed system.
   - AppppppppxxL

     Load the PTFs from save file number xx for product ppppppp at the managed system.
   - AppppppppxxM

     Delete save file number xx for product ppppppp at the managed system.
   - AppppppppxxN

     Delete save file number xx for product ppppppp at the central site system.
6. APY999PTFS

   Apply the PTFs for the licensed internal code.

7. APYSS1PTFS

   Apply the PTFs for OS/400.

8. APYpppppp

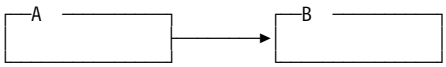
   Apply PTFs for product ppppppp; repeat for each product.

9. AIPLSYS

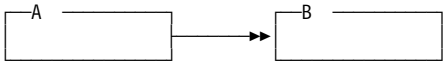
   IPL the managed system if there was at least one delayed PTF.

Adding an activity to a change request description is similar to writing and compiling a program at one point in time, and executing it at a different point in time. The sequence in which the activities are created may be different from the sequence in which they are executed. Execution sequence is dependent on the conditions specified for each activity.

The arrows between the activities depict the conditions to start each activity. For example, Activity B must not start before A has ended - regardless of whether it was successful or not - is shown by:



If Activity A has to end *successfully* before B can start, it is represented by:



```
┌CL-Pgm-SNDPTFPKG──────────────────────────────────┐
│creates and submits:                               │
│┌CRQD-INSTPTFPKG1──────────────────────────────┐   │
│└│containing these activities                  │   │
│ │┌A1DSPPTF ──────────┐                        │   │
│ │└│creates PTFSTS file│                        │   │
│ │ │on managed system  │                        │   │
│ │ └───────────────────┘                        │   │
│ │          ↓                                   │   │
│ │          ↓                                   │   │
│ │┌A2RTVPTFST ────────┐                        │   │
│ │└│retrieves PTFSTS   │                        │   │
│ │ │from managed system├──┐                     │   │
│ │ └───────────────────┘  │                     │   │
│ │                        │                     │   │
│ │                        │                     │   │
│ │┌A3DSPSFWRS ────────┐   │                     │   │
│ │└│creates SFWRSC file│   │                     │   │
│ │ │on managed system  │   │                     │   │
│ │ └───────────────────┘   │                     │   │
│ │          ↓              │                     │   │
│ │          ↓              │                     │   │
│ │┌A4RTVSFWRS ────────┐    ↓   ┌B5INSPTF──────────┐│   │
│ │└│retrieves SFWRSC   │    ↓   │calls pgm INSPTFPKG│   │
│ │ │from managed system├────┴──▶│                  │   │
│ │ └───────────────────┘        └──────────────────┘   │
│ └──────────────────────────────────────────────────┘   │
└────────────────────────────────────────────────────────┘
                                  │
                                  │
                                  ↓
┌CL-Pgm-INSPTFPKG──────────────────────────────────────────────────────────────────────────┐
│creates member NEWPTFS in file PTFSTS                                                     │
│containing PTFs to be send (CRTPTFPKG)                                                    │
│                                                                                          │
│creates one or more PTF save file                                                         │
│packages per product (max.50 PTFs/pkg)                                                    │
│                                                                                          │
│creates and submits:                                                                      │
│┌CRQD-INSTPTFPKG──────────────────────────────────────────────────────────────────────────┐
│└│containing these activities                                                             │
│ │┌Appppppp01D──────────┐    ┌Appppppp02D──────────┐    pppppp = product ID    ┌AppppppppnnD──────────┐│
│ │└│Send the SAVF number 01│  │Send the SAVF number 02│   for all inst. products  │Send the SAVF number nn│
│ │ │for product ppppppp    │  │for product ppppppp    │ . . . . . . . . . . . . . │for product ppppppp    │
│ │ │to managed system      │  │to managed system      │       00 ◄ nn ◄ 99        │to managed System      │
│ │ └───────────────────────┘  └───────────────────────┘                           └───────────────────────┘
│ │          ↓                          ↓                                                   ↓
│ │┌Appppppp01L──────────┐    ┌Appppppp02L──────────┐                           ┌AppppppppnnL──────────┐
│ │└│Load PTFs of SAVF 01   │  │Load PTFs of SAVF 02   │                           │Load PTFs of SAVF nn   │
│ │ │for product ppppppp    │  │for product ppppppp    │ . . . . . . . . . . . . . │for product ppppppp    │
│ │ │at managed system      ├──▶│at managed system      ├──▶                    ──▶│at managed system      │
│ │ └───────────────────────┘  └───────────────────────┘                           └───────────────────────┘
│ │          ↓                          ↓                                                   ↓
│ │┌Appppppp01M──────────┐    ┌Appppppp02M──────────┐                           ┌AppppppppnnM──────────┐
│ │└│Delete the SAVF nbr 01 │  │Delete the SAVF nbr 02 │                           │Delete the SAVF nbr nn │
│ │ │for product ppppppp    │  │for product ppppppp    │ . . . . . . . . . . . . . │for product ppppppp    │
│ │ │at managed system      │  │at managed system      │                           │at managed system      │
│ │ └───────────────────────┘  └───────────────────────┘                           └───────────────────────┘
│ │                                                                                          │
│ │                                                                                          │
│ │          ┌──────────────────────────────────────────────────────────────────────────────┘
│ │          ↓
│ │┌APY999PTFS ──────────┐    ┌APYSS1PTFS ──────────┐
│ │└│  Apply the LIC PTFs   │  │  Apply the OS/400 PTFs│
│ │ │  for product 5763999  ├──▶│  for product 5763SS1  │
│ │ │  at managed system    │  │  at managed system    │
│ │ └───────────────────────┘  └───────────────────────┘
│ │                                     │
│ │                                     │
│ │          ┌──────────────────────────┘
│ │          ↓
│ │┌APYpppppppp ─────────┐    ┌APYpppppppp ─────────┐                           ┌APYpppppppp ─────────┐
│ │└│  Apply the PTFs       │  │  Apply the PTFs       │                           │  Apply the PTFs       │
│ │ │  for product ppppppp  ├──▶│  for product ppppppp  │ . . . . . . . . . . . . . │  for product ppppppp  │
│ │ │  to managed system    │  │  to managed system    ├──▶                    ──▶│  to managed system    │
│ │ └───────────────────────┘  └───────────────────────┘                           └───────────────────────┘
│ │                                                                                          │
│ │          ┌──────────────────────────────────────────────────────────────────────────────┘
│ │          ↓
│ │┌AIPLSYS──────────────┐
│ │└│ IPL the managed System│
│ │ └───────────────────────┘
└└────────────────────────────────────────────────────────────────────────────────────────────┘
```

Figure 112. Flowchart for Sending a PTF Package

The program INSPTFPKG accepts five parameters to control its function. To help the user specify those parameters and to provide default values, we wrote the SNDPTFPKG command. The command definition statements are shown in Figure 113.

Prepare Remote PTF Install Command: After you create and enter the statements shown in Figure 113 in source file QCMDSRC of library GG244372, you can create the command by entering:

```
CRTCMD CMD(GG244372/SNDPTFPKG) PGM(GG244372/SNDPTFPKG) +
              SRCFILE(GG244372/QCMDSRC)
```

on any command line or select option 14 of the Work with Members Using PDM (WRKMBRPDM) display to compile the command.

```
CMD 'Send and Install PTF Package'
PARM NODE       *CNAME 8  MIN(1)  PROMPT('Send to Node') +
                           CHOICE('CP Name')
PARM LICPGM     *CHAR  7  DFT(*EXIST) RANGE('1AAAAAA' '9999999') +
                          SPCVAL((*EXIST)) PROMPT('Product Name') +
                           CHOICE('*EXIST, PTF number')
PARM RLS        *CHAR  6  RSTD(*YES) DFT(*ALL) VALUES(*ALL V3R1M0 V2R3M0) +
                             PROMPT('Release')
PARM RTVPTFINV  *LGL     DFT(*YES) SPCVAL((*YES '1') (*NO '0')) +
                             PROMPT('Retrieve PTF Inventory')
PARM RTVSFWINV  *LGL     DFT(*NO) SPCVAL((*YES '1') (*NO '0')) +
                             PROMPT('Retrieve Software Inventory')
```

Figure 113. Command Source SNDPTFPKG - Prepare Remote PTF Install

To execute this command, enter SNDPTFPKG on any command line and press F4. You see the prompt for command SNDPTFPKG, as shown in Figure 114.

```
                    Send and Install PTF Package (SNDPTFPKG)

Type choices, press Enter.

 Send to Node . . . . . . . . . .   ________      CP Name
 Product Name . . . . . . . . . .   *EXIST_       *EXIST, PTF number
 Release  . . . . . . . . . . . .   *ALL___       *ALL, V3R1M0, V2R3M0
 Retrieve PTF Inventory . . . . .   *YES          Logical value, *YES, *NO
 Retrieve Software Inventory  . .   *NO_          Logical value, *YES, *NO

                                                                     Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 114. Send and Install PTF Package (SNDPTFPKG)

With parameter PGM(GG244372/SNDPTFPKG) of the CRTCMD command, we linked the command definition to program SNDPTFPKG. Provided the CL program shown in Figure 115 on page 198 has already been successfully compiled, the program is called and the parameters entered in the prompt (Figure 114) are passed to that program as call parameters. The parameters that control the functions of program SNDPTFPKG include:

NODE Send to Node

Specifies the CP Name of the system where the PTFs are to be installed. This example assumes the network ID is the same as the one on the central site system.

LICPGM Product Name

Identifies the licensed program for which you want to send PTFs. *EXIST indicates that you want to send PTFs for all of the products that exist on the managed system. This is the default.

RLS Release

Specifies the release of the product. This parameter is ignored if you specify LICPGM(*EXIST).

RTVPTFINV Retrieve PTF Inventory

Allows you to retrieve the information about the PTFs currently installed at the managed system before the PTFs are sent. Specifying RTVPTFINV(*NO) requires that the member with the name of the managed system in file PTFSTS already contains the current information about the PTFs at that node.

RTVSFWINV Retrieve Software Inventory

Allows you to retrieve the software inventory for the managed system into a member of file SFWRSC.

```
PGM (&mgdsys &prd &vrm &rtvptfsts &rtvsfwinv)

/* Program SNDPTFPKG  Prepare to Install a PTF package on a remote System     */
/*         ---------  ==================================================     */
/*                                                                            */
/* Input:                                                                     */
/*    CALL Parameters:                                                        */
/*         &mgdsys      CP Name of the Remote Managed System                  */
/*         &licpgm      Licensed Program (Product) Name                       */
/*         &vrm         Version, Release, Modification of the Product         */
/*         &rtvptfsts   Retrieve PTF Status before sending PTF Pkg?           */
/*         &rtvsfwinv   Retrieve SFW Inventory before sending PTF Pkg?        */
/*                                                                            */
/* Output:                                                                    */
/*    Change Request Description INSPTFPKG1 in Library GG244372               */
/*       containing the CRQ Activities for:                                   */
/*         A1DSPPTF     Perform a DSPPTF to an outfile on the managed System  */
/*         A2RTVPTFST   Retrieving that outfile to store it on the centrl Sys.*/
/*         A1DSPSFWRS   Perform a DSPSFWRSC to an outfile on the managed Sys  */
/*         A2RTVSFWRS   Retrieving that outfile to store it on the centrl Sys.*/
/*         B5INSPTF     Run Program INSPTFPKG on the central (this) System    */
/*                                                                            */
/*    Finally, the Change Request INSPTFPKG1 will be submitted                */

/*  CALL Parameters:                                                          */
DCL &mgdsys     *CHAR 8     /* CP Name of the Remote Managed System         */
DCL &prd        *CHAR 7     /* Licensed Program (Product) Name              */
DCL &vrm        *CHAR 6     /* Version, Release, Modification of the Product */
DCL &rtvptfsts  *LGL        /* Retrieve PTF Status before sending PTF Pkg?   */
DCL &rtvsfwinv  *LGL        /* Retrieve SFW Inventory before sending PTF Pkg?*/

/*  Constants used in this Program which are likely to be changed:           */
DCL NETID      *CHAR 8  *NETATR    /* Network ID is the same for all systems */
DCL SMGUIxx        *CHAR 10 GG244372   /* Working library for CRQD, files etc .. */
DCL &crqd       *CHAR 10 INSPTFPKG1 /* Name of CRQD to be created in this pgm */

/*  Work variables                                                            */
DCL &ctlsys     *CHAR 8     /* Name of the central system = this system      */
DCL &lclnetid   *CHAR 8     /* Network Id of this system                     */
DCL &interactiv *CHAR 1     /* Indicator: Is this an interactiv job?         */
DCL &text       *CHAR 50    /* Descriptive text for CRQD                     */
DCL &qtime      *CHAR 6     /* Current time, to show only the most recent CRQ */

DCL &error      *lgl   VALUE('0')  /* Indicator: "unmonitored" error occured  */
MONMSG CPF0000 EXEC(GOTO StdError) /* Standard error routine                 */
```

Figure 115 (Part 1 of 3). CL Program SNDPTFPKG - Prepare Remote PTF Install

```
  RTVJOBA    TYPE(&interactiv)
  RTVSYSVAL  QTIME  &qtime
  RTVNETA    LCLCPNAME(&ctlsys) LCLNETID(&lclnetid)

  IF (&prd = *EXIST) +
    CHGVAR  &text ('Prepare PTF Pkg for all products for'|>&mgdsys)
  ELSE +
    CHGVAR  &text ('Prep. PTF Pkg for'|>&prd|>&vrm|>' for'|>&mgdsys)

  DLTCRQD    &lib/&crqd
    MONMSG CPF0000
  CRTCRQD &lib/&crqd TEXT(&text)

/*    Create a "Software and PTF inventory" of the managed system            */
/*-----------------------------------------------------------------           */

  IF &rtvptfsts  DO         /* If requested, retrieve PTF Status first       */

/*     DSPPTF into an OUTFILE on the managed system                          */

    ADDCMDCRQA CRQD(&lib/&crqd) ACTIVITY(A1DSPPTF)                            +
        CMD(DSPPTF OUTPUT(*OUTFILE) OUTFILE(&lib/PTFSTS) OUTMBR(&mgdsys))     +
            CPNAME((NETID &mgdsys))                                          +
          TEXT('DSPPTF into an OUTFILE on the managed system')               +
          COND(*NONE)
/*     Retrieve OUTFILE from the managed system                              */

    ADDOBJCRQA CRQD(&lib/&crqd) ACTIVITY(A2RTVPTFST) ACTION(*RTV)             +
        OBJ(&lib/PTFSTS) OBJTYPE(*FILE) MBR(&mgdsys) REPLACE(*YES)            +
            CPNAME((NETID &mgdsys))                                          +
          TEXT('Retrieve OUTFILE from the managed system')                   +
          COND((*PRV *EQ *SUCCESS *SAMENODE))
  ENDDO
  IF &rtvsfwinv  DO         /* If requested, retrieve Software Inventory first*/

/*     DSPSFWRSC into an OUTFILE on the managed system                       */

  ADDCMDCRQA &lib/&crqd A3DSPSFWRS                                          +
       CMD(DSPSFWRSC OUTPUT(*OUTFILE) OUTFILE(&lib/SFWRSC) OUTMBR(&mgdsys)) +
            CPNAME((NETID &mgdsys))                                          +
          TEXT('DSPPTF into an OUTFILE on the managed system')               +
          COND(*NONE)
      /*  COND((A1DSPPTF *EQ *SUCCESS *SAMENODE)) */
/*     Retrieve SFWRSC from the managed system                               */

    ADDOBJCRQA CRQD(&lib/&crqd) ACTIVITY(A4RTVSFWRS) ACTION(*RTV)             +
      OBJ(&lib/SFWRSC) OBJTYPE(*FILE) MBR(&mgdsys) REPLACE(*YES)             +
            CPNAME((NETID &mgdsys))                                          +
          TEXT('Retrieve OUTFILE from the managed system')                   +
          COND((*PRV *EQ *SUCCESS *SAMENODE))
  ENDDO
/* 5.  Send to and install the PTFs on the managed system                   */

  ADDOBJCRQA CRQD(&lib/&crqd) ACTIVITY(B5INSPTF) ACTION(*RUN)                +
       OBJ(&lib/INSPTFPKG) OBJTYPE(*PGM) PARM((&mgdsys) (&prd) (&vrm))       +
            CPNAME((&lclnetid &ctlsys))                                      +
          TEXT('Call Program INSPTFPKG to send & install PTFs')              +
          COND((A* *EQ *SUCCESS *ALLNODES))
```

Figure 115 (Part 2 of 3). CL Program SNDPTFPKG - Prepare Remote PTF Install

```
  SBMCRQ     &lib/&crqd

  IF (&interactiv = '1') DO               /* If this is an interactive job,   */
    CHGVAR  &crqd (%SST(&crqd 1 5)||'*')    /* we want to take the user to the*/
    WRKSBMCRQ &crqd PERIOD((&qtime *CURRENT)) /* appropriate WRKSBMCRQ A cmd  */
  ENDDO                                        /* using a generic CRQ-Name.  */

  RETURN

StdError:                   /* In case of any error not specifically monitored*/
  IF (*NOT &error) DO       /* we resend all diagnostic and escape messages to*/
    CHGVAR &error '1'       /* the calling program.                           */
    CALL QMHMOVPM ('    ' '*DIAG      ' X'00000001' '*' X'00000001' X'00000000')
    CALL QMHRSNEM ('    ' X'00000000')
  ENDDO
ENDPGM
```

Figure 115 (Part 3 of 3). CL Program SNDPTFPKG - Prepare Remote PTF Install

Install PTF Package

```
PGM (&mgdsys &licpgm &vrm)

/* Program INSPTFPKG  Install a PTF package on a remote managed System       */
/*         ---------  ================================================       */
/*                                                                           */
/* Input:                                                                    */
/*    CALL Parameters:                                                       */
/*         &mgdsys      CP Name of the Remote Managed System                 */
/*         &licpgm      Licensed Program (Product) Name                      */
/*         &vrm         Version, Release, Modification of the Product        */
/*                                                                           */
/*    Member &mgdsys in Physical File PTFSTS in Library GG244372             */
/*                      contains names of those PTFs currently installed at  */
/*                      at system &mgdsys.                                   */
```

Figure 116 (Part 1 of 6). CL Program INSPTFPKG - Install PTF Package

```
/*  CALL Parameters:                                                    */

DCL &mgdsys     *CHAR 8      /* CP Name of the Remote Managed System         */
DCL &licpgm     *CHAR 7      /* Licensed Program (Product) Name              */
DCL &vrm        *CHAR 6      /* Version, Release, Modification of the Product */

/*  Constants used in this Program which are likely to be changed:           */

DCL &delayed    *CHAR 18 'Delayed           '  /* Depending on National Lang.!*/
DCL NETID      *CHAR 8  *NETATR      /* Network ID is the same for all nodes */
DCL SMGUIxx        *CHAR 10 GG244372     /* Working library f. CRQD, PF, ...     */
DCL &crqd       *CHAR 10 INSPTFPKG    /* Name of CRQD to be created           */
/*  Work variables                                                          */

DCL &vrm2       *CHAR 6      /* VRM in Format 2: 0x0y0z (see Pgm CHKLICPGM)   */
DCL &ctlsys     *CHAR 8      /* Name of the central system = this system      */
DCL &lclnetid   *CHAR 8      /* Network Id of this system                     */
DCL &logclpgm   *CHAR 10     /* Status of job attribute LOGCLPGM before       */
DCL &prvprd     *CHAR 7  ' ' /* Product name of the previously read PTF record*/
DCL &eof        *LGL  1  '0' /* End of file for file PTFSTS Mbr(NEWPTFS) found*/
DCL &installed  *LGL  1  '0' /* Product &SCPPID installed on system &mgdsys   */
DCL &ptfcnt     *DEC  (2 0)  /* Number of PTFs per package found (max =50)    */
DCL &pkgcnt#    *DEC  (1 0)  /* Number of packages per product (max = 9)      */
DCL &pkgcnt     *CHAR 1      /*   "    "     "      "    "    *CHAR variable  */
DCL &ipl        *LGL  1  '0' /* At least one delayed PTF found => add IPL CRQA*/
DCL &apydelay   *LGL  1  '0' /* PTFs for this product must be applied delayed */
DCL &crqa       *CHAR 10     /* Name of Change Request Activity and Save File */
DCL &savf       *CHAR 10     /* Name of SAve File to contain PTF package      */
DCL &prvlod     *CHAR 10 ' ' /* Name of Previous CRQA for load PTF            */
DCL &prvapy     *CHAR 10     /* Name of Previous CRQA for apply PTF           */
DCL &text       *CHAR 50     /* Descriptive text for CRQD and CRQAs           */
DCL &ptfstrng   *CHAR 400    /* String to contain all PTF names per package   */
DCL &offset     *dec (3 0) 0 /* Offset to place PTF name within &ptfstrng     */
DCL &cmd        *CHAR 500    /* To build full command for CPYPTF              */
DCL &cmdlen     *DEC (15 5) 500  /* Length of command string for CPYPTF       */
DCLF PTFSTS                         /* DB file containing current PTFs        */

DCL &error      *LGL   VALUE('0')   /* Standard error routine                 */
MONMSG CPF0000 EXEC(GOTO StdError)

  RTVJOBA LOGCLPGM(&logclpgm)
  CHGJOB  LOGCLPGM(*YES)
  RTVNETA LCLCPNAME(&ctlsys) LCLNETID(&lclnetid)
                                                          /* Ensure the LF   */
  RMVM    FILE(&lib/ALLSFW) MBR(ALLSFW)                   /* ALLSFW covers   */
  ADDLFM  FILE(&lib/ALLSFW) MBR(ALLSFW) DTAMBRS(*ALL)     /* all members of  */
                                                          /* ph.file SFWRSC  */
  OVRDBF  ALLSFW &lib/ALLSFW ALLSFW
  OVRDBF  PTFSTS &lib/PTFSTS NEWPTFS

  CHGVAR  &vrm2 &vrm
  CHGVAR  %sst(&vrm2 1 1) '0'
  CHGVAR  %sst(&vrm2 3 1) '0'
  CHGVAR  %sst(&vrm2 5 1) '0'
```

Figure 116 (Part 2 of 6). CL Program INSPTFPKG - Install PTF Package

```
/* Build file PTFSTS in SMGUIxx containing the names of those PTFs           */
/* currently not installed at the managed system                              */

  CRTPTFPKG  OUTFILE(&lib/PTFSTS) OUTMBR(NEWPTFS) +
                          OMIT(&lib/PTFSTS &mgdsys)

/* Create a Change Request Descrition for sending and aplying all PTFs       */

  DLTCRQD    &lib/&crqd
    MONMSG CPF2105

  CHGVAR  &text +
           ('Send & Install PTF Package for'|>&licpgm|>&vrm|>' to'|>&mgdsys)
  CRTCRQD &lib/&crqd TEXT(&text)
/* Each record in &lib/PTFSTS contains the name of a PTF we need to send  */

NextPtf:
  RCVF
  MONMSG CPF0864 EXEC(CHGVAR &eof '1')

  IF (&prvprd *NE ' ')  DO              /* At least one PTF per LicPgm found */
/* Whenever we find a PTF for a newe licensed program, or the number of       */
/* PTFs for the current lic pgm has exceeded 50, or we have reached the       */
/* end of the input file (PTFSTS MBR(NEWPTFS)), we create a save file,        */
/* copy the PTFs to that save file, add a change request activity (CRQA)      */
/* to send that save file and another one to load the PTFs from SAVF.         */

    IF ((&prvprd *NE &SCPPID) *OR &eof +
           *OR (&ptfcnt = 50))       DO  /* New LicPgm or End of File or 50PTF*/

      CHGVAR &pkgcnt# (&pkgcnt# + 1)
      CHGVAR &pkgcnt  &pkgcnt#
      CHGVAR &crqa    ('A'||&prvprd||&pkgcnt||'D')
      CHGVAR &savf    &crqa

      CLRSAVF &lib/&savf
        MONMSG CPF9812 EXEC(CRTSAVF &lib/&savf)
/*  Because we don't know, how many PTFs per product we have (maximum 50),    */
/*  we have to build a command string and execute it using QCMDEXC.           */
/*                                                                            */
/*  The command must look like this:                                          */
/*  CPYPTF   &prvprd  *SERVICE *SAVF TOSAVF(&lib/&savf) +               */
/*           RLS(&vrm)   SELECT(pppppp1 pppppp2 .... ppppppn)               */

      CHGVAR &cmd +
        ('CPYPTF'|>&prvprd|>'*SERVICE *SAVF TOSAVF('|<&lib|<'/'|<&savf|<   +
             ') RLS('|<&vrm|<') SELECT('||&ptfstrng|<')')

      CHGDTAARA *LDA &cmd          /* This is for debugging only             */

      CALL QCMDEXC (&cmd &cmdlen)  /* Execute CPYPTF with variable number PTFs*/
      MONMSG CPF0000
```

Figure 116 (Part 3 of 6). CL Program INSPTFPKG - Install PTF Package

```
    CHGVAR &text ('Send PTF SavF for'|>&prvprd|>' to system'|>&mgdsys)

    ADDOBJCRQA CRQD(&lib/&crqd) ACTIVITY(&crqa) +
               ACTION(*SND) OBJ(&lib/&savf) OBJTYPE(*FILE) REPLACE(*YES) +
               CPNAME((NETID &mgdsys)) TEXT(&text) COND(*NONE)

    CHGVAR &crqa ('A'||&prvprd||&pkgcnt||'L')

    CHGVAR &text ('Load PTFs from SavF for'|>&prvprd|>' on system'|>&mgdsys)

    IF (&prvlod = ' ') +
      ADDCMDCRQA CRQD(&lib/&crqd) ACTIVITY(&crqa) +
           CMD(LODPTF &prvprd DEV(*SAVF) SAVF(&lib/&savf)) +
               CPNAME((NETID &mgdsys)) TEXT(&text) +
               COND((*PRV *EQ *SUCCESS *SAMENODE))
    ELSE +
      ADDCMDCRQA CRQD(&lib/&crqd) ACTIVITY(&crqa) +
            CMD(LODPTF &prvprd DEV(*SAVF) SAVF(&lib/&savf)) +
               CPNAME((NETID &mgdsys)) TEXT(&text) +
               COND((*PRV *EQ *SUCCESS *SAMENODE) +
                    (&prvlod *EQ *ANY *SAMENODE) )

    CHGVAR &prvlod &crqa       /* Remember name of previous CRQA for LODPTF */
                               /* to ensure only one LODPTF runs at a time  */
    CHGVAR &crqa ('A'||&prvprd||&pkgcnt||'M')

    CHGVAR &text ('Delete PTF SAVF for'|>&prvprd|>' at'|>&mgdsys)

    ADDOBJCRQA CRQD(&lib/&crqd) ACTIVITY(&crqa) +
               ACTION(*DLT) OBJ(&lib/&savf) OBJTYPE(*FILE)              +
               CPNAME((NETID &mgdsys)) TEXT(&text)  +
               COND((&prvlod *EQ *SUCCESS *SAMENODE))

    CHGVAR &crqa ('A'||&prvprd||&pkgcnt||'N')

    CHGVAR &text ('Delete PTF SAVF for'|>&prvprd|>' at'|>&ctlsys)

    ADDOBJCRQA CRQD(&lib/&crqd) ACTIVITY(&crqa) +
               ACTION(*DLT) OBJ(&lib/&savf) OBJTYPE(*FILE)              +
               CPNAME((&lclnetid &ctlsys)) TEXT(&text)  +
               COND((&prvlod *EQ *SUCCESS *ALLNODES))

    CHGVAR &ptfcnt   0
    CHGVAR &ptfstrng ' '
  ENDDO
```

Figure 116 (Part 4 of 6). CL Program INSPTFPKG - Install PTF Package

```
/* Create a CRQA to apply the PTFs whenever we find a different              */
/* licensed program (&SCPPID) or at End-of-File. However, we do not do       */
/* that here for either LIC (Licensed Internal Code) or operating system     */
/* PTFs. Those have to be aplied before all others. We will add those two    */
/* CRQAs later                                                               */

    IF ((&prvprd *NE &SCPPID) *OR &eof) DO
      IF ((%SST(&prvprd 5 3) *NE '999')  +
        & (%SST(&prvprd 5 3) *NE 'SS1')) DO

        IF (&prvapy = ' ') +
          CHGVAR &prvapy APYSS1PTFS
        CHGVAR &text ('Apply all PTFs for'|>&prvprd|>' at system'|>&mgdsys)
        CHGVAR &crqa ('APY'||&prvprd)

        ADDPTFCRQA CRQD(&lib/&crqd) ACTIVITY(&crqa) +
                      ACTION(*APY) PTFID(*ALL &prvprd &vrm) +
                      CPNAME((&NETID &MGDSYS)) TEXT(&text) +
                      COND((&prvapy *EQ *ANY     *SAMENODE))
        CHGVAR &prvapy  &crqa         /* Remember the name of last APYPTF     */
        IF &apydelay DO               /* At least one delayed PTF for this prd*/
          CHGVAR &text ('Apply delayed PTFs for'|>&prvprd|>' at system'|>&mgdsys)
          CHGVAR &crqa ('APY'||&prvprd||'D')

          ADDCMDCRQA CRQD(&lib/&crqd) ACTIVITY(&crqa) +
            CMD(APYPTF LICPGM(&prvprd) DELAYED(*YES))              +
                        CPNAME((&NETID &MGDSYS)) TEXT(&text) +
                        COND((&prvapy *EQ *ANY     *SAMENODE))
          CHGVAR &prvapy  &crqa       /* Remember the name of last APYPTF     */
        ENDDO

        CHGVAR &apydelay '0'          /* Reset all variables for this product */
        CHGVAR &prvprd  ' '
        CHGVAR &pkgcnt# 0
      ENDDO
    ENDDO
  ENDDO
  IF &eof  GOTO APyLICPTFs

  IF ((&licpgm = *EXIST) & (&prvprd *NE &SCPPID)) DO
    CALL &lib/CHKLICPGM (&mgdsys &SCPPID &SCPTFV &installed)
    IF &installed DO
      CHGVAR &vrm  &SCPTFV       /* Field &SCPTFV from the outfile of DSPPTF  */
      CHGVAR %sst(&vrm 1 1) 'V'  /* has the Version, Release, Modification in */
      CHGVAR %sst(&vrm 3 1) 'R'  /* the form xxyyzz. For the CPYPTF, we need  */
      CHGVAR %sst(&vrm 5 1) 'M'  /* it in "VxRyMz" form.                      */
    ENDDO
  ENDDO
  IF (((&SCPPID  = &licpgm) & (&SCPTFV = &vrm2)) *OR &installed)   DO

    CHGVAR &prvprd &SCPPID         /* Remember the product ID for this PTF    */
    CHGVAR &ptfcnt (&ptfcnt + 1)   /* Number of PTFs for this product         */

    IF (&SCTYPE = &delayed) DO
      CHGVAR &ipl      '1'       /* IPL is necessary because of delayed PTFs  */
      CHGVAR &apydelay '1'       /* Need APYPTF DELAYED(*YES) for this Product*/
    ENDDO

    CHGVAR &offset (((&ptfcnt-1)*8)+1)           /* Put PTF ID at next postion*/
    CHGVAR (%SST(&ptfstrng &offset 7)) &SCPTFID  /* within &ptfstrng          */

  ENDDO

  GOTO NextPtf
```

Figure 116 (Part 5 of 6). CL Program INSPTFPKG - Install PTF Package

```
ApyLICPTFs:
    CHGVAR &text ('Apply all PTFs for 5763999 at system'|>&mgdsys)
    ADDPTFCRQA &lib/&crqd ACTIVITY(Apy999PTFs) +
                   ACTION(*APY) PTFID(*ALL '5763999' &vrm) +
                   CPNAME((&NETID &MGDSYS)) TEXT(&text) +
                   COND((&prvlod *EQ *ANY *SAMENODE))

    CHGVAR &text ('Apply all PTFs for 5763SS1 at system'|>&mgdsys)
    ADDPTFCRQA CRQD(&lib/&crqd) ACTIVITY(ApySS1PTFs) +
                   ACTION(*APY) PTFID(*ALL '5763SS1' &vrm) +
                   CPNAME((&NETID &MGDSYS)) TEXT(&text) +
                   COND((Apy999PTFs  *EQ *ANY *SAMENODE))
    IF &ipl DO
      ADDRSCCRQA CRQD(&lib/&crqd) ACTIVITY(AIPLSYS) +
                   ACTION(*RESTART) DELAY(600)  +
                   CPNAME((&NETID &MGDSYS)) TEXT(&text) +
                   COND((&prvapy *EQ *any *SAMENODE))
    ENDDO

    SBMCRQ     &lib/&crqd
    CALL &lib/CHKLICPGM (*ENDPGM ' ' ' ' ' ' ')  /* End RPG Program         */

    GOTO EndPgm
StdError:
  IF (*NOT &error) DO
    CHGVAR &error '1'
    DSPJOBLOG OUTPUT(*PRINT)
    MONMSG CPF0000
  ENDDO

EndPgm:
  IF (&logclpgm = *NO) DO
    CHGJOB LOGCLPGM(*NO)
    MONMSG CPF0000
  ENDDO
  RCLRSC *CALLER

  IF &error DO    /* Resend any Escape Messages to Caller (QCQSVSRV this time)*/
    CALL QMHRSNEM ('    ' X'00000000')
  ENDDO
ENDPGM
```

Figure 116 (Part 6 of 6). CL Program INSPTFPKG - Install PTF Package

Check for Installed Licensed Programs

```
      *
      * Program CHKLICPGM    Check for Installed Licensed Programs
      *         ---------    ====================================
      *
      * Input:
      *    CALL Parameters:
      *         SCSSYSN      CP Name of the System to be checked
      *         SCPPID       Licensed Program (Poduct) Name
      *         SCPTFV       Release of the Product
      *    Logical File ALLSFW
      *   8  15 LCSYSN (key)          System name
      *  56  62 LCPRDI (key)          Product identification
      *  76  79 LCVRSL (key)          Product version level
      *  80  81 LCRLSL (key)          Product release level
      *  82  83 LCMODL (key)          Release modification level
      *
```

Figure 117 (Part 1 of 2). RPG Program CHKLICPGM - Check for Installed Licensed Programs

```
 * Ouput
 *   CALL Parameter:
 *         INSFLG       '0' = Product is NOT installed on System SCSSYSN
 *                      '1' = Product IS     installed on System SCSSYSN
 *
 * File ALLSFW, created by a "Display Software Resources (DSPSFWRSC)" is
 * used to check, whether a licensed program (SCPPID) with Release (SCPTFV)
 * is installed on a system (SCSSYSN).
 *
 * File ALLSFW actually is a logical file over ALL members in physical file
 * SFWRSC. Each member contains the "Software Inventory" of one managed
 * system.
 *
FALLSFW  IF  E           K        DISK
ISCPTFV      DS
I                                       2   2 V
I                                       4   4 R
I                                       6   6 M
 *
C           *ENTRY    PLIST
C                     PARM           SCSYSN  8        System Name
C                     PARM           SCPPID  7        Licensed Program
C                     PARM           SCPTFV           PTF Release
C                     PARM           INSFLG  1        Installed?
 *
C           KEY       KLIST
C                     KFLD           LCSYSN           System name
C                     KFLD           LCPRDI           Product identific
C                     KFLD           LCVRSL           Product version l
C                     KFLD           LCRLSL           Product release l
C                     KFLD           LCMODL           Release modificat
 *
C           SCSYSN    IFEQ '*ENDPGM'                  Close files and
C                     SETON                     LR    end the pgm
C                     ELSE                            otherwise keep
C                     MOVE SCSYSN    LCSYSN           it open for every
C                     MOVE SCPPID    LCPRDI           call.
 *
 * The "Release"-Parameter has three different Formats:
 *    1. VxRyMz  Necessary for parameter RLS of command CPYPT, LODPTF, ...
 *               or parameter PTFID with command ADDPTFCRQA
 *
 *    2. OxOyOz  Field SCPTFV in the outfile format of command DSPPTF
 *
 *    3. OOOx  LCVRSL  In three seperate fields of the outfile format
 *         Oy  LCRLSL  of command DSPSFWRSC (File ALLSFW in this program)
 *         Oz  LCMODL
 *
 *    So we have to convert from format 2 to 3 here:
 *
C                     MOVE V         LCVRSL
C                     MOVEL'000'     LCVRSL
C                     MOVE R         LCRLSL
C                     MOVEL'0'       LCRLSL
C                     MOVE M         LCMODL
C                     MOVEL'0'       LCMODL           3.
C                     MOVE '0'       INSFLG
 *
C           KEY       CHAINALLSFW               54
C  N54                MOVE '1'       INSFLG
C                     RETRN
C                     ENDIF
```

Figure 117 (Part 2 of 2). RPG Program CHKLICPGM - Check for Installed Licensed Programs

```
                                  Submitted Change Request Message Details                                    Page     1
5763SM1 V3R1M0  940909                                                                                RCHASM03  07/08/94  22:32:25
 Change request  . . . . . . . . . . . . . . :   INSPTFPKG
   Number  . . . . . . . . . . . . . . . . . :     000010
 Activity name . . . . . . . . . . . . . . . :   A1SUEPDA1L
 Managed system node name:
   Network ID  . . . . . . . . . . . . . . . :   ITSCNET
   Control point name  . . . . . . . . . . . :   RCHAS040
 Message ID  . . . . . . . . . . . . . . . . :   SMU18A2
 Severity  . . . . . . . . . . . . . . . . . :   30
 Date/time sent  . . . . . . . . . . . . . . :   07/08/94  22:09:44
 Message . . . . :   Remote command request failed.
 Cause . . . . . :   The request to run a command on a remote system failed.
 Recovery  . . . :   The remote command failed with a sense code of 081C0000.
   The remote command status is 3.
 From job  . . . . . . . . . . . . . . . . . :   QCQSVSRV
   User  . . . . . . . . . . . . . . . . . . :     ITSCID11
   Number  . . . . . . . . . . . . . . . . . :     008049
                                   * * * * *  E N D   O F   L I S T I N G   * * * * *
```

Figure 118. Printout Change Request Activities Messages Details

```
                                  Submitted Change Request Activities List                                    Page     1
5763SM1 V3R1M0  940909                                                                                RCHASM03  07/08/94  22:09:54
 Change request . . . . . . . . . . . . . . :   INSPTFPKG
   Number . . . . . . . . . . . . . . . . . :     000010
 Text . . . . . . . . . . . . . . . . . . . :   Send & Install PTF Package for *EXIST *ALL to RCHA
 ----------------Activities----------------                                Highest
 Activity                                                                    End
 Name         Type         Node                Status                      Code     Conditions
 APYSS1PTFS   *PTF         ITSCNET.RCHAS040    Wait                                 (APY999PTFS *EQ *ANY)
 APY1SUEPDA   *PTF         ITSCNET.RCHAS040    Wait                                 (APYSS1PTFS *EQ *ANY)
 APY1234INT   *PTF         ITSCNET.RCHAS040    Wait                                 (APY1SUEPDA *EQ *ANY)
 APY5763RG1   *PTF         ITSCNET.RCHAS040    Wait                                 (APY1234INT *EQ *ANY)
 APY5763WP1   *PTF         ITSCNET.RCHAS040    Wait                                 (APY5763RG1 *EQ *ANY)
 APY999PTFS   *PTF         ITSCNET.RCHAS040    Wait                                 (A57639994L *EQ *ANY)
 A1SUEPDA1D   *OBJ         ITSCNET.RCHAS040    Ended                        00
 A1SUEPDA1L   *CMD         ITSCNET.RCHAS040    Ended                        20      (A1SUEPDA1D *EQ *SUCCESS)
 A1234INT1D   *OBJ         ITSCNET.RCHAS040    Ended                        00
 A1234INT1L   *CMD         ITSCNET.RCHAS040    Ended                        20      (A1234INT1D *EQ *SUCCESS) (A1SUEPDA1L *EQ ...
 A5763RG11D   *OBJ         ITSCNET.RCHAS040    Ended                        00
 A5763RG11L   *CMD         ITSCNET.RCHAS040    Ended                        20      (A5763RG11D *EQ *SUCCESS) (A1234INT1L *EQ ...
 A5763SS11D   *OBJ         ITSCNET.RCHAS040    Running
 A5763SS11L   *CMD         ITSCNET.RCHAS040    Wait                                 (A5763SS11D *EQ *SUCCESS) (A5763RG11L *EQ ...
 A5763SS12D   *OBJ         ITSCNET.RCHAS040    Running
 A5763SS12L   *CMD         ITSCNET.RCHAS040    Wait                                 (A5763SS12D *EQ *SUCCESS) (A5763SS11L *EQ ...
 A5763SS13D   *OBJ         ITSCNET.RCHAS040    Running
 A5763SS13L   *CMD         ITSCNET.RCHAS040    Wait                                 (A5763SS13D *EQ *SUCCESS) (A5763SS12L *EQ ...
 A5763SS14D   *OBJ         ITSCNET.RCHAS040    Running
 A5763SS14L   *CMD         ITSCNET.RCHAS040    Wait                                 (A5763SS14D *EQ *SUCCESS) (A5763SS13L *EQ ...
 A5763SS15D   *OBJ         ITSCNET.RCHAS040    Running
 A5763SS15L   *CMD         ITSCNET.RCHAS040    Wait                                 (A5763SS15D *EQ *SUCCESS) (A5763SS14L *EQ ...
 A5763WP16D   *OBJ         ITSCNET.RCHAS040    Running
 A5763WP16L   *CMD         ITSCNET.RCHAS040    Wait                                 (A5763WP16D *EQ *SUCCESS) (A5763SS15L *EQ ...
 A57639991D   *OBJ         ITSCNET.RCHAS040    Running
 A57639991L   *CMD         ITSCNET.RCHAS040    Wait                                 (A57639991D *EQ *SUCCESS) (A5763WP16L *EQ ...
 A57639992D   *OBJ         ITSCNET.RCHAS040    Running
 A57639992L   *CMD         ITSCNET.RCHAS040    Wait                                 (A57639992D *EQ *SUCCESS) (A57639991L *EQ ...
 A57639993D   *OBJ         ITSCNET.RCHAS040    Running
 A57639993L   *CMD         ITSCNET.RCHAS040    Wait                                 (A57639993D *EQ *SUCCESS) (A57639992L *EQ ...
 A57639994D   *OBJ         ITSCNET.RCHAS040    Running
 A57639994L   *CMD         ITSCNET.RCHAS040    Wait                                 (A57639994D *EQ *SUCCESS) (A57639993L *EQ ...
 XIPLSYS      *RSC         ITSCNET.RCHAS040    Held                                 (APYSS1PTFS *EQ *SUCCESS)
                                   * * * * *  E N D   O F   L I S T I N G   * * * * *
```

Figure 119. Printout Change Request Activities

Change the Startup Program at the Managed Systems

Whenever an IPL is performed, a user-written program can be run to start certain functions that always need to be active. One function that needs to be started, for example, is the *SNA Distribution Services (QSNADS)* subsystem.

The name of that program must be specified in system value QSTRUPPGM. The default is the CL program QSTRUP that is provided by OS/400 in library QSYS. Although this program starts many necessary functions, it does not include starting the QSNADS subsystem. Therefore, we suggest that you use the Retrieve the CL Source (RTVCLSRC) command, change the source accordingly, and recompile it. Do *not* store the changed version of that program back in library QSYS for two reasons:

1. Keep a copy of the original program so you can see how it was before you changed it.
2. By looking at the system value QSTRUPPGM, you can tell immediately whether the original or the changed version is in use. This is especially important when you manage many systems.

The more managed systems you have in your network, the more important it becomes to have the same startup programs on *all* of those systems. It is very confusing for the system administrator if, for example, some systems do start the QSNADS subsystem while others do not. Send the latest version of QSTRUP to all of the systems whenever you change it.

Figure 120 on page 209 shows a change request description to perform these tasks:

- Send new version of QSTRUP.
- Change system value QSTRUPPGM.
- Restart (IPL) the system.

```
                                        Change Request Description                                                  Page     1
5763SM1 V3R1M0  940909                                                    GG244372/CHGIPLPGM    RCHASM02  12/04/94  18:00:18
 Change request description . . . . . . . . . :   CHGIPLPGM
   Library  . . . . . . . . . . . . . . . . . :     GG244372
 User profile . . . . . . . . . . . . . . . . :   *SBM
 Problem ID . . . . . . . . . . . . . . . . . :   *NONE
   Origin . . . . . . . . . . . . . . . . . . :
 Text . . . . . . . . . . . . . . . . . . . . :   Send new STRUPPGM, Change SYSVAL QTRUPPGM and IPL
                                                     ------- Activity -------
 Activity name . . . . . . . . . . . . . . . :   QACT000010
 Activity type  . . . . . . . . . . . . . . . :   *OBJ
 Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
   Library  . . . . . . . . . . . . . . . . . :     *LIBL
 Scheduled start:
   Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . . :   Send  *PGM QGPL/QSTRUP.
 --------------------Conditions----------------------
                                        Condition
 Activity       Relation     Code        Mode
 *PRV             *EQ        *SUCCESS    *ALLNODES
                                           Specific activity data                                                   Page     2
5763SM1 V3R1M0  940909                                                                RCHASM02  12/04/94  18:00:19
 Action . . . . . . . . . . . . . . . . . . . :   Send object
 Object . . . . . . . . . . . . . . . . . . . :   QSTRUP
   Library  . . . . . . . . . . . . . . . . . :     QGPL
 Object type  . . . . . . . . . . . . . . . . :   *PGM
 Target release . . . . . . . . . . . . . . . :   *CURRENT
 Data object class  . . . . . . . . . . . . . :   AS/400 program
 Replace  . . . . . . . . . . . . . . . . . . :   *ALLOWED
                                                     ------- Activity -------
 Activity name . . . . . . . . . . . . . . . :   QACT000020
 Activity type  . . . . . . . . . . . . . . . :   *CMD
 Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
   Library  . . . . . . . . . . . . . . . . . :     *LIBL
 Scheduled start:
   Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . . :   'Run CMD: CHGSYSVAL QSTRUPPGM ('QSTRUP    QGPL')'
                                           Specific activity data                                                   Page     3
5763SM1 V3R1M0  940909                                                                RCHASM02  12/04/94  18:00:19
 Action . . . . . . . . . . . . . . . . . . . :   Run command
 Command:
   CHGSYSVAL SYSVAL(QSTRUPPGM) VALUE('QSTRUP    QSYS')
 Managed system start time:
 Time zone  . . . . . . . . . . . . . . . . . :   *LCLSYS
   Start after date and time  . . . . . . . . :     *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :     *ANY        *ANY
 Return spooled files . . . . . . . . . . . . :   *YES
 User profile . . . . . . . . . . . . . . . . :   WILFRIED
 Password specified . . . . . . . . . . . . . :   *YES
                                                     ------- Activity -------
 Activity name . . . . . . . . . . . . . . . :   QACT000030
 Activity type  . . . . . . . . . . . . . . . :   *RSC
 Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
   Library  . . . . . . . . . . . . . . . . . :     *LIBL
 Scheduled start:
   Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
   Start before date and time . . . . . . . . :   *ANY        *ANY
 Hold . . . . . . . . . . . . . . . . . . . . :   *NO
 Text . . . . . . . . . . . . . . . . . . . . :   Restart the specified resource.
 --------------------Conditions----------------------
                                        Condition
 Activity       Relation     Code        Mode
 *PRV             *EQ        *SUCCESS    *SAMENODE
 QACT000010       *EQ        *SUCCESS    *SAMENODE
                                           Specific activity data                                                   Page     4
5763SM1 V3R1M0  940909                                                                RCHASM02  12/04/94  18:00:20
 Action . . . . . . . . . . . . . . . . . . . :   Restart resource
 Option . . . . . . . . . . . . . . . . . . . :   *IMMED
 Activation use . . . . . . . . . . . . . . . :   *PROD
 Resource name  . . . . . . . . . . . . . . . :   SYS
                                     * * * * *  E N D   O F   L I S T I N G   * * * * *
```

Figure 120. Change Request Activities for Changing the Startup Program

Tip

The default user profile QSVMSS as provided with the product Managed System Services/400 does not have the authority to change a system value. These solutions are available to you:

- Whenever you want to change a system value, use a command activity and specify the proper password, as we did for this example. We suggest this solution.
- Grant the proper authority to the user profile QSVMSS. To ensure a secure system, you might want to implement the security exit programs.
- Grant the proper authority to the user profile QSVMSS.

Change the Communication Configuration or Network Attributes

If you need to apply certain changes to the communication configuration, such as a different communication protocol, additional or changed virtual circuits for X.25, or a different network ID, it may be necessary to interrupt the connection between the central site system and the managed systems. The steps for the entire task are:

1. Shut down communications.
2. Apply changes to the configuration.
3. Restart the system (IPL) or the communications.

As long as you do not need to stop communications between the central site system and the managed system, it is no problem to create a CRQD to perform the needed tasks. However, there may be some situations requiring you to quiesce the connection between the central site system and the managed system. Although the preceding tasks 1 to 3 are logically dependent on each other, you cannot use conditions for the CRQD activities. The conditions are always controlled by System Manager/400 at the central site system, so if task 2 specifies a condition based on the success (or any other end code) of task 1, System Manager/400 waits for a response of the managed system indicating the end of task 1. Since 1 actually stops communications between the managed and the central site system, that response never arrives.

The only solution for this is to use the Start Time on Managed System (RMTSTRTIME) parameter for all of the activities, to allow enough time between the execution of each activity. Make sure that you specify a remote start time for the first activity that is long enough after you submit the CRQD to allow System Manager/400 to send all of the requests to the managed systems, before the connection is cut by the first activity.

Chapter 5. Using the Distribution Repository and Global Naming

This chapter provides examples of Operations Control Center/400 distributions using the distribution repository, global names, and the distribution catalog. Before proceeding with the next sections, you should familiarize yourself with the following concepts:

- *Distribution Repository*. Refer to *Managed System Services/400 Use*, SC41-3323, chapter 6 and to "Distribution Repository" on page 19.
- *Global Names*. Refer to *Managed System Services/400 Use*, SC41-3323, chapter 7, and to "Concept of Global Names" on page 17.
- *Distribution Catalog*. Refer to *Managed System Services/400 Use*, SC41-3323, chapter 7 and to "The Distribution Catalog" on page 17.

Storing an Object on Different Libraries Across the Network

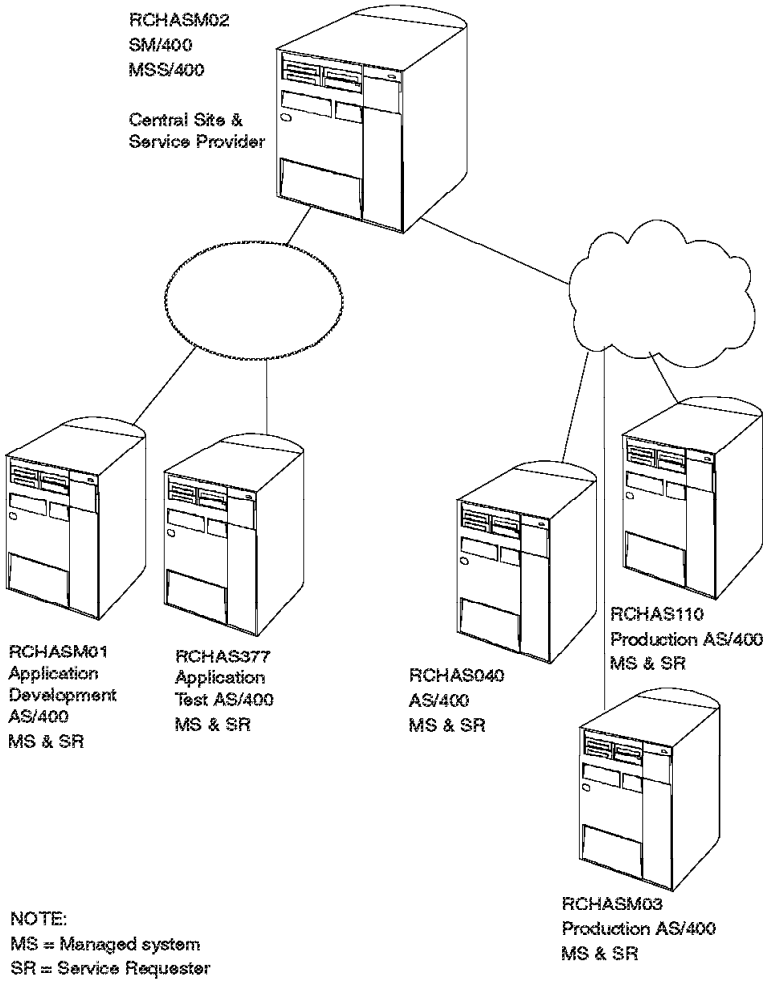


Figure 121. Sample Network

On every system in our sample network there is a library named after the system name, that is, library RCHASM02 on system RCHASM02, library RCHASM03 on system RCHASM03, and so on. We refer to this library as the *site library*.

We want to send the object GG244372/PGMX from the central site system library to the site libraries of all of the managed systems. Obviously, we cannot use standard AS/400 names since using standard object names requires the name of the object and the library to be identical at both systems, the AS/400 system that is sending the object and on the AS/400 system that is receiving the object. Therefore, we must use global names to accomplish the task. We chose the following global name for the object:

```
Token 1 = Network ID       = *NETID
Token 2 = Application Name = SITE
Token 3 = Program Name     = PGMX
Token 4 = Date             = Y1994M12D28
```

Add DST Catalog Entry at Managed System for Site Library Objects: Before you can distribute objects using global names, you must add the catalog entries to your managed systems.

```
 /*****************************************************************************/
 /*                                                                           */
 /*   PROGRAM NAME : SITELIB                                                  */
 /*   LANGUAGE : CLP                                                          */
 /*                                                                           */
 /* FUNCTION : Add DST Catalog Entry to all managed systems for SiteLib/PGMX  */
 /*            This program should run on all managed systems. Although the   */
 /*            global name for the distribution catalog entry added by this   */
 /*            program is the same at each managed system, it points to pgm   */
 /*            PGMX in different libraries. That is, the library name is the  */
 /*            as the control point name (CP name) of each managed system.    */
 /*                                                                           */
 /*****************************************************************************/
PGM
DCL &cpname   *CHAR 8     /* System name same as the site library name       */

  RTVNETA    LCLCPNAME(&cpname)

  CRTLIB     &cpname TEXT('Site Library for this system only ')
    MONMSG CPF2111        /* Ignore, if Site Library already exists          */

  ADDDSTCLGE GLBNAME(*NETID SITE PGMX Y1994M12D28) +
             OBJTYPE(*PGM) OBJ(&cpname/PGMX) TEXT('PGMX in Site Library')

ENDPGM
```

Figure 122. CL Pgm SITELIB - Add DST Catalog Entry at Managed System for Site Library Objects

CL Commands to Distribute Site Library Objects: The following steps are also included as CL program DSTSITLIB delivered with this book. However, you might want to follow these steps by entering the commands manually and compare the results by running the program.

The implementation steps are:

1. Add a catalog entry on the central site system that points to the AS/400 object on the central system site library (RCHASM02/PGMX). Use the following command:

   ```
   ADDDSTCLGE GLBNAME(*NETID SITE PGMX Y1994M12D28) OBJTYPE(*PGM) +
   OBJ(GG244372/PGMX) TEXT('PGMX in Systems Site Libraries')
   ```

Note: This needs to be done only once. Therefore, we did not include this step with the CRQD.

2. Create a change request description that contains the activities to perform the tasks at the managed systems. Enter the command:

```
CRTCRQD CRQD(GG244372/DST2SITLIB) TEXT('Distribute PGMX to Site Libraries')
```

3. Add an activity to create a catalog entry on each managed system pointing to corresponding site library. Because the site library name is different for each managed system, we send and run a simple program to perform this task.

```
ADDOBJCRQA CRQD(GG244372/DST2SITLIB) ACTION(*SNDRUN) OBJ(GG244372/SITELIB) +
OBJTYPE(*PGM) NODL(GG244372/PRODUCTION)                                     +
TEXT('Add DST Catalog Entry for PGMX at Managed Systems')
```

The printout of the CL program *SITELIB* to add the DST catalog entries on each managed system for this example is shown in Figure 122 on page 212.

Tip

Because the program SITELIB does not exist on the managed systems, it is sent and run. Note that the *SNDRUN activity also includes the deletion of the program after execution. If you want to keep the program at the managed system, you must use two activities: one for sending (*SND) and the other for running (*RUN) the program.

4. Add an activity to send the program object PGMX to the managed systems site libraries:

```
ADDOBJCRQA CRQD(GG244372/SITELIB) ACTION(*SND) OBJ(*GLOBAL)                 +
GLBNAME(*NETID SITE PGMX Y1994M12D28) NODL(GG244372/PRODUCTION) REPLACE(*YES) +
TEXT('Send PGMX to Managed systems') COND((*PRV *LE 20 *SAMENODE))
```

Because the previous activity attempts to add a DST catalog entry that might already exist on the managed system, it might end with End Code 20. For that reason, we condition the current activity by the *PRV activity ending with End Code *LE 20.

Figure 123 on page 214 shows the printout of the SITELIB CRQD in library GG244372. To print the contents of a CRQD, use option 6=Print of the Work with CRQ Descriptions (WRKCRQD) display.

```
                                        Change Request Description                                          Page     1
Change request description . . . . . . . . . :   SITELIB
  Library  . . . . . . . . . . . . . . . . . :     GG244372
User profile . . . . . . . . . . . . . . . . :   *SBM
Problem ID . . . . . . . . . . . . . . . . . :   *NONE
  Origin . . . . . . . . . . . . . . . . . . :
Text . . . . . . . . . . . . . . . . . . . . :   Distribute PGMX to Site Libraries

                                                   ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000010
Activity type  . . . . . . . . . . . . . . . :   *CMD
Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   ADDDSTCLGE for PGMX in Site Library  Local System
---------------------Conditions----------------------
                                          Condition
Activity       Relation     Code          Mode
*PRV             *EQ        *SUCCESS      *ALLNODES
Action . . . . . . . . . . . . . . . . . . :   Run command
Command:
  ADDDSTCLGE GLBNAME(*NETID SITE PGMX Y1994M12D28) OBJTYPE(*PGM) OBJ(RCHASM02/PGMX) TEXT('PGMX in Site Library')



                                                   ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000020
Activity type  . . . . . . . . . . . . . . . :   *OBJ
Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   Add DST Catalog Entry for PGMX on Managed systems
---------------------Conditions----------------------
                                          Condition
Activity       Relation     Code          Mode
*PRV             *LE        20            *SAMENODE
Action . . . . . . . . . . . . . . . . . . :   Send and run
Object . . . . . . . . . . . . . . . . . . :   SITELIB
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Object type  . . . . . . . . . . . . . . . . :   *PGM
Target release . . . . . . . . . . . . . . . :   *CURRENT
Data object class  . . . . . . . . . . . . . :   AS/400 program
Object disposition . . . . . . . . . . . . . :   *DELETE
Replace  . . . . . . . . . . . . . . . . . . :   *NO



                                                   ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000030
Activity type  . . . . . . . . . . . . . . . :   *OBJ
Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   Send PGMX to managed systems
---------------------Conditions----------------------
                                          Condition
Activity       Relation     Code          Mode
*PRV             *LE        20            *SAMENODE
Action . . . . . . . . . . . . . . . . . . :   Send object
Global object name:
  To be sent . . . . . . . . . . . . . . . . :   *NETID SITE PGMX Y1994M12D28
Data object class  . . . . . . . . . . . . . :   '00000000'X
Replace  . . . . . . . . . . . . . . . . . . :   *ALLOWED
                                   * * * * *   E N D   O F   L I S T I N G   * * * * *
```

Figure 123. SITELIB Change Request Description

5. Submit the CRQ SITELIB using the Submit Change Request (SBMCRQ) command and track the progress of execution using the command:

   WRKSBMCRQA (SITELIB 000010)

.

A display such as the one in Figure 124 is shown.

```
                                                                System:   RCHASM02
Change request  . . . . . :   SITELIB
  Number  . . . . . . . . :     000010
Text  . . . . . . . . . . :   Distribute PGMX to Site Libraries



Type options, press Enter.
  3=Hold   5=Display details   6=Release   8=Work with nodes for activity
  10=Display messages          13=End

                                                                      Highest
     Activity                                                           End
Opt  Name        Type        Node                Status                Code
     QACT000010  *OBJ        ITSCNET.RCHASM...   Ended                  00
     QACT000020  *OBJ        ITSCNET.RCHASM...   Running
```

Figure 124. SITELIB Submitted Change Request

6. Upon completion, an entry has been added to the central site distribution catalog; to display it use the Work with Distribution Catalog Entries (WRKDSTCLGE) command. See Figure 125.

```
                        Work with DST Catalog Entries
                                                                System:   RCHASM02
Type options, press Enter.
  1=Add   3=Copy DST repository object   4=Remove   5=Display detail
  6=Print detail   8=Display token attributes
Opt     Global Name

        ITSCNET ROCHESTER MEM BAIRES QCLSRC02 ITSCTRN02 V2R3M0
        ITSCNET ROCHESTER OBJ QGPL COOK DTAARA V2R3M0
 5      ITSCNET SITE PGMX Y1994M12D28
        I3IBM1 AS400 9A0CC01 V1R0M0 BASE ALL ALL REF 001 V3R1M0
        PFXTOKEN1 PFXTOKEN2 OBJ WILFRIED CRTPTFSTSF PGM
```

Figure 125. Catalog Entry on Central Site System

Choose option 5, Display detail, to verify that the entry links the global name to PGMX in library RCHASM02 as shown in Figure 126.

```
                      Display DST Catalog Entry - Detail
                                                                System:   RCHASM02
Global name  . . . . :   ITSCNET SITE PGMX Y1994M12D28



Local storage location . . . . . . . . . . . . :   *STD
Object . . . . . . . . . . . . . . . . . . . . :   PGMX
  Library  . . . . . . . . . . . . . . . . . . :     RCHASM02
Object type  . . . . . . . . . . . . . . . . . :   *PGM
Target release . . . . . . . . . . . . . . . . :   V3R1M0
Data object class  . . . . . . . . . . . . . . :   AS/400 program

Object description language ID . . . . . . . . :   ENU
Catalog entry description  . . . . . . . . . . :   PGMX in Systems Site Libraries
```

Figure 126. Catalog Entry on Central Site System - Detail

7. Display the catalog entry on the managed system and look at the detail information as shown in Figure 127 and Figure 128.

```
                        Work with DST Catalog Entries
                                                                 System:   RCHASM03
 Type options, press Enter.
   1=Add   3=Copy DST repository object   4=Remove   5=Display detail
   6=Print detail   8=Display token attributes
 Opt     Global Name

         ITSCNET RCHASM03 SMTNA QAMTNA
         ITSCNET RCHASM03 SMTSV QAMTSV
         ITSCNET RCHASM03 SUMMARY APPL1
         ITSCNET RCHASM03 SUMMARY APPL2
         ITSCNET RCHASM03 USERPROFILE OCCUSRPRF
  5      ITSCNET SITE PGMX Y1994M12D28
         I3IBM1 AS400 9AOCC02 V1R0M0 BASE ALL ALL REF 001 V3R1M0
```

Figure 127. Catalog Entry on Managed System

```
                       Display DST Catalog Entry - Detail
                                                                 System:   RCHASM03
 Global name  . . . . :   ITSCNET SITE PGMX Y1994M12D28



 Local storage location . . . . . . . . . . . . :   *STD
Object . . . . . . . . . . . . . . . . . . . . :   PGMX
   Library  . . . . . . . . . . . . . . . . . . :     RCHASM03
 Object type  . . . . . . . . . . . . . . . . . :   *PGM
 Target release . . . . . . . . . . . . . . . . :   V3R1M0
 Data object class  . . . . . . . . . . . . . . :   AS/400 program

 Object description language ID . . . . . . . . :   ENU
 Catalog entry description  . . . . . . . . . . :   PGMX in Systems Site Library
```

Figure 128. Catalog Entry on Managed System - Detail

Distributing Folders

Office documents and PC files are stored in AS/400 folders. Folders are only referred to by their global name and, therefore, you *must* add a DST catalog entry before distributing folders. Folders cannot be distributed or operated upon using fast path commands.

In this example, we distribute the folder FRANCE with the subfolders and documents shown in Figure 129 on page 217.

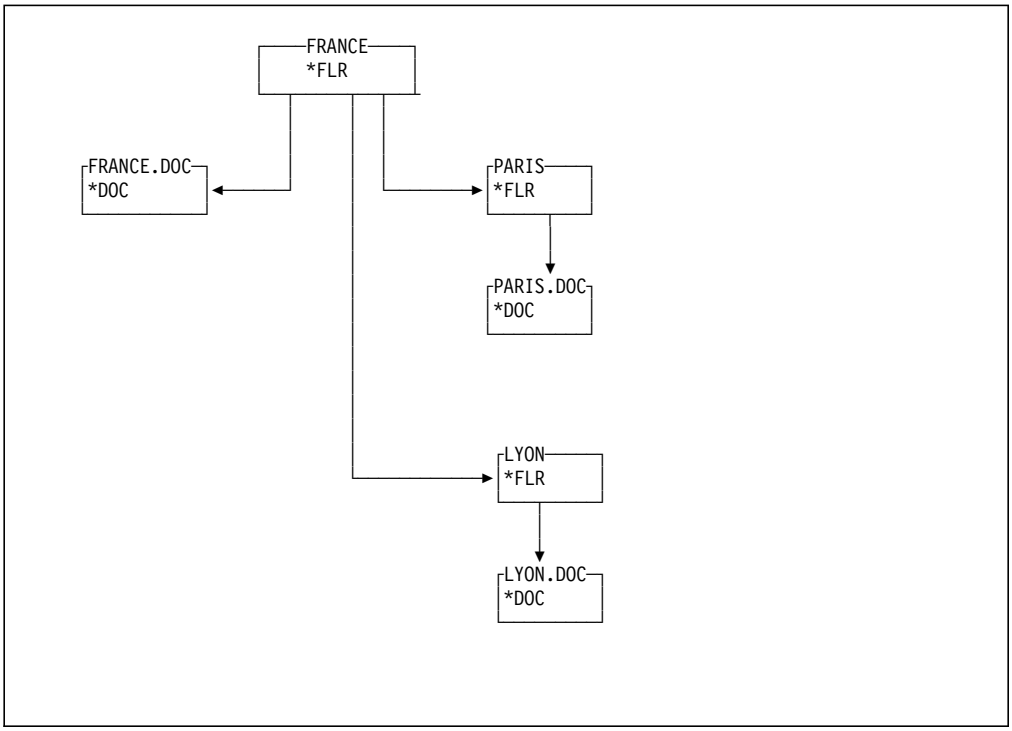


Figure 129. Folder and Document Structure for FRANCE

EXAMPLE 16

CL Commands to Distribute Folders to Managed Systems: The following steps are also included as CL program DSTFLR delivered with this book. However, you might want to follow these steps by entering the commands manually and compare the results by running the program.

1. Create a change request description that contains the activities to perform the tasks. Enter the command:

   ```
   CRTCRQD CRQD(GG244372/DSTFLR) TEXT('Distributing Folders')
   ```

2. Add a command type activity to add a DST catalog entry for the folder FRANCE. Remember that folders *must* have a catalog entry on the central system in order to be distributed.

   ```
   ADDCMDCRQA CRQD(GG244372/DSTFLR) CMD(ADDDSTCLGE GLBNAME(*NETID FRANCE FLR) +
   OBJTYPE(*FLR) FLR(FRANCE) TEXT('FRANCE Folder')) USRPRF(ADAN) PASSWORD () +
   TEXT('ADDDSTCLGE for Folder FRANCE on Central System')
   ```

   Note: This needs to be done only once. You might want to perform this step outside the CRQD.

3. Add an object type activity to distribute the folder FRANCE to the managed systems. In this example, we want to distribute the folder and all of the subfolders and documents in the tree structure shown in Figure 129. Everything under the path specified in the catalog entry (folder FRANCE in our example) is distributed to the managed systems. Enter the command:

   ```
   ADDOBJCRQA CRQD(GG244372/DSTFLR) ACTION(*SND) OBJ(*GLOBAL) +
   GLBNAME(*NETID FRANCE FLR) NODL(GG244372/PRODUCTION) REPLACE(*YES) +
   TEXT('Send Folder FRANCE to Managed Systems') COND((*PRV *LE 20))
   ```

Because the previous activity attempts to add a DST catalog entry that might already exist on the central system, it might end with End Code 20; for that reason we condition the current activity by the *PRV activity ending with End Code *LE 20.

4. Add a command type change request activity to copy the folder from the distribution repository to the AS/400 document library.

5. Add a command type change request activity to copy the folder from the distribution repository to the AS/400 document library:

```
ADDCMDCRQA CRQD(GG244372/DSTFLR) NODL(GG244372/PRODUCTION) CPNAME(*NONE)      +
        CMD(CPYDSTRPSO GLBNAME(*NETID FRANCE FLR) FLR(FRANCE) REPLACE(*YES)) +
        USRPRF(&usrprf) PASSWORD(&password)                                  +
        COND((*PRV *EQ *SUCCESS *SAMENODE))                                  +
        TEXT('CPYDSTRPSO to Folder FRANCE on Managed Systems')
```

Tip

- When you distribute an object or folder using global names to a system where there is no catalog entry for the object or folder being distributed, a catalog entry is added and the object or folder is stored in the distribution repository on the managed system.
- You must copy the library object or the document library object from the distribution repository to the AS/400 library or document library.
- When you distribute a folder such as the one in this example:
  - All documents within the folder are sent.
  - All sub folders within the folder are sent.
  - All documents within the subfolders are sent.

Figure 130 on page 219 shows the printout of the DSTFLR CRQD in library GG244372.

```
                                        Change Request Description                                          Page     1
Change request description . . . . . . . . . :   DSTFLR
  Library  . . . . . . . . . . . . . . . . . :     GG244372
User profile . . . . . . . . . . . . . . . . :   *SBM
Problem ID . . . . . . . . . . . . . . . . . :   *NONE
  Origin . . . . . . . . . . . . . . . . . . :
Text . . . . . . . . . . . . . . . . . . . . :   Distributing Folders


                                                     ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000010
Activity type  . . . . . . . . . . . . . . . :   *CMD
Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   ADDDSTCLGE for Flr FRANCE on Central System
--------------------Conditions----------------------
                                          Condition
Activity       Relation     Code          Mode
*PRV             *EQ        *SUCCESS      *ALLNODES


Action . . . . . . . . . . . . . . . . . . :   Run command
Command:
  ADDDSTCLGE GLBNAME(*NETID FRANCE FLR) OBJTYPE(*FLR) FLR(FRANCE) TEXT('FRANCE Folder')



                                                     ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000020
Activity type  . . . . . . . . . . . . . . . :   *OBJ
Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   Send Folder FRANCE to Managed Systems
--------------------Conditions----------------------
                                          Condition
Activity       Relation     Code          Mode
*PRV             *LE        20            *ALLNODES

Action . . . . . . . . . . . . . . . . . . :   Send object
Global object name:
  To be sent . . . . . . . . . . . . . . . . :   *NETID FRANCE FLR
Data object class  . . . . . . . . . . . . . :   '00000000'X
Replace  . . . . . . . . . . . . . . . . . . :   *ALLOWED



                                                     ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000030
Activity type  . . . . . . . . . . . . . . . :   *CMD
Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   CPYDSTRPSO to Folder FRANCE on Managed Systems
--------------------Conditions----------------------
                                          Condition
Activity       Relation     Code          Mode
*PRV             *EQ        *SUCCESS      *SAMENODE
Action . . . . . . . . . . . . . . . . . . :   Run command
Command:
  CPYDSTRPSO GLBNAME(*NETID FRANCE FLR) FLR(FRANCE) REPLACE(*YES)
Managed system start time:
Time zone  . . . . . . . . . . . . . . . . :   *LCLSYS
  Start after date and time  . . . . . . . . :     *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :     *ANY        *ANY
Return spooled files . . . . . . . . . . . . :   *YES
User profile . . . . . . . . . . . . . . . . :   ADAN
Password specified . . . . . . . . . . . . . :   *YES
```

Figure 130. DSTFLR CRQD: Distributing Folders

Distributing Documents

In this example, we want to distribute *only* the document LYON.DOC in FRANCE/LYON. Figure 131 on page 221 shows the printout of the DSTDOC change request description. This is a particular case of the example "Distributing Folders" on page 216; pay special attention to the document and folder path specifications.

```
                                        Change Request Description                                          Page     1
Change request description . . . . . . . . . :   DSTDOC
  Library  . . . . . . . . . . . . . . . . . :     GG244372
User profile . . . . . . . . . . . . . . . . :   *SBM
Problem ID . . . . . . . . . . . . . . . . . :   *NONE
  Origin . . . . . . . . . . . . . . . . . . :
Text . . . . . . . . . . . . . . . . . . . . :   Distributing Folders


                                                      ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000010
Activity type  . . . . . . . . . . . . . . . :   *CMD
Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   ADDDSTCLGE for FRANCE/LYON/LYON.DOC on Central Sys
---------------------Conditions----------------------
                                          Condition
Activity       Relation     Code           Mode
*PRV             *EQ        *SUCCESS       *ALLNODES
Action . . . . . . . . . . . . . . . . . . :   Run command
Command:
  ADDDSTCLGE GLBNAME(*NETID FRANCE LYON LYONDOC DOC) OBJTYPE(*DOC) +
DLO(LYON.DOC) FLR(′FRANCE/LYON′) TEXT(′FRANCE/LYON/LYON.DOC′)



                                                      ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000020
Activity type  . . . . . . . . . . . . . . . :   *OBJ
Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   Send DOC FRANCE/LYON/LYON.DOC to Managed Systems
---------------------Conditions----------------------
                                          Condition
Activity       Relation     Code           Mode
*PRV             *LE        20             *ALLNODES
Action . . . . . . . . . . . . . . . . . . :   Send object
Global object name:
  To be sent . . . . . . . . . . . . . . . . :   *NETID FRANCE LYON LYONDOC DOC
Data object class  . . . . . . . . . . . . . :   ′00000000′X
Replace  . . . . . . . . . . . . . . . . . . :   *ALLOWED



                                                      ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000030
Activity type  . . . . . . . . . . . . . . . :   *CMD
Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   CPYDSTRPSO LYON.DOC on Managed Systems
---------------------Conditions----------------------
                                          Condition
Activity       Relation     Code           Mode
*PRV             *EQ        *SUCCESS       *SAMENODE
Action . . . . . . . . . . . . . . . . . . :   Run command
Command:
  CPYDSTRPSO GLBNAME(*NETID FRANCE LYON LYONDOC DOC) DLO(LYON.DOC) +
FLR(′FRANCE/LYON′) REPLACE(*YES)
Managed system start time:
Time zone  . . . . . . . . . . . . . . . . . :   *LCLSYS
  Start after date and time  . . . . . . . . :     *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :     *ANY        *ANY
Return spooled files . . . . . . . . . . . . :   *YES
User profile . . . . . . . . . . . . . . . . :   ADAN
Password specified . . . . . . . . . . . . . :   *YES
                    ***** E N D  O F  L I S T I N G *****
```

Figure 131. DSTDOC CRQD: Distributing Documents

Partial Global Name Matching

When you send or retrieve objects using the global names, you do not need to specify all of the tokens of that global name. One or more tokens can be used to identify different *versions* of the same object.

For example, you might want to describe different versions of the same object if they were:

- Created or updated at different times or dates.
- Retrieved from different systems, but have the same name.
- Created by different applications.

Using partial global name matching, you can use ″wildcards″ for one or more tokens, thus allowing you to use the same global name in a single CRQ activity to refer to:

- The same object at more than one managed system.
- The latest or oldest version of an object when more than one version exists in the distribution catalog.

When you add an entry to the distribution catalog, you must specify whether a wildcard may be used for a certain token (MATCH attribute), and if so whether a certain order sequence (specified with the VERSION attribute) is used to select the highest or lowest entry.

The match attribute *NOMATCH means a wildcard can be used. The version attributes *ORDCHAR, *ORDDATE, *ORDDEC, and *ORDTIME define the data formats for the token providing special order sequences.

The following topics describe some examples on how to use partial global name matching.

Partial Global Name Matching - Examples

This section includes a few examples of how to create catalog entries with the appropriate token attributes and how to use the match and *version* attributes in partial global name matching.

EXAMPLE 17

CL Program to Distribute the Latest Version of a File: The objective of this example is to show the use of partial global name matching with match flag *NOMATCH and version attributes *ORDDATE and *ORDTIME.

In this example, the structure of the global name is:

```
Token 1 = network ID
Token 2 = originating system
Token 3 = originating application
Token 4 = application data type
Token 5 = create date
Token 6 = create time

″ITSCNET RCHASM02 ACCOUNTING FICATBL Y1995M01D03 H15M00S00″
```

Perform the following steps:

- At the central site system:
  - Use the ADDDSTCLGE command to add a DST catalog entry in the local (central site) system:

    ```
    ADDDSTCLGE GLBNAME(*NETID *CPNAME ACCOUNTING FICATBL Y1995M01D03 H15M00S00) +
    OBJTYPE(*FILE)  OBJ(GG244372/FICATBL) TEXT(FICATBL) +
       VERSIONATR(*UNSPEC *UNSPEC *UNSPEC *UNSPEC *ORDDATE *ORDTIME)
    ```

    Notice that we gave token 4 a version attribute of *ORDDATE and token 5 a version attribute of *ORDTIME. If we had used the wildcards *DATE and *TIME rather than Y1995M01D03 and H15M00S00, the result is the same as if the command had been entered on January 3, 1995 at 3 PM.

    The tokens *NETID and *CPNAME are automatically replaced by the local network ID and CP name. Thus, you may use the same command at different systems to add entries with different global names.
  - Display the token attributes selecting option 8, Display token attributes, on the Work with DST Catalog Entries display. Figure 132 shows the token attributes for the DST catalog entry that we added before.

```
                     Display DST Catalog Entry - Attributes
                                                          System:   RCHASM02
 Global name  . . . . :   ITSCNET RCHASM02 ACCOUNTING FICATBL Y1995M01D03
S00


 Global name          -------Attributes--------
 token                Match          Version
 ITSCNET              *MATCH         *UNSPEC
 RCHASM02             *NOMATCH       *UNSPEC
 ACCOUNTING           *NOMATCH       *UNSPEC
 FICATBL              *NOMATCH       *UNSPEC
 Y1995M01D03          *NOMATCH       *ORDDATE
 H15M00S00            *NOMATCH       *ORDTIME
```

Figure 132. Token Attributes

    Notice that we did not specify any match attribute for the tokens of the global name; the first token match attribute value must always be *MATCH and we accept the default, *NOMATCH, for the other tokens.
  - To send the object to the managed system, you must use a change request description with an activity type of Object. Remember that global names cannot be used in fast path commands.

    ```
    CRTCRQD CRQD(GG244372/EXAMPLE1) TEXT('Partial Global Name Matching')

    ADDOBJCRQA CRQD(GG244372/EXAMPLE1) ACTION(*SND) OBJ(*GLOBAL)  +
    GLBNAME(*NETID *CPNAME ACCOUNTING FICATBL *HIGHEST *HIGHEST) +
    NODL(GG244372/PRODUCTION) CPNAME(*NONE) REPLACE(*YES)         +
    TEXT('Send FICATABL to Managed System')
    ```

    Note that only because we gave token 4 and 5 version attributes *ORDDATE and *ORDTIME, now we can use the match flag *HIGHEST in partial global name matching.
  - Submit the CRQ, so the file FICATBL is sent to the managed system or systems.

  Assumed there is no entry in the distribution catalog of the managed system having exactly the same global name (the date and time should make it unique), a new entry is automatically added and the file is stored in the distribution repository.

- Therefore, an additional step needs to be performed at the managed system:
  - Copy the object from the DST repository to standard storage using partial global name matching. Enter the command:

    ```
    CPYDSTRPSO GLBNAME(*NETID RCHASM02 ACCOUNTING *ANY *HIGHEST *HIGHEST) +
    OBJ(GG244372/FICATABL)
    ```

    Note that:

    - *NETID is replaced by the local (managed system) network ID.
    - Token 4 match attribute is *NOMATCH and, therefore, we can specify *ANY as token value in the CPYDSTRPSO operation.
    - Token 5 version value is *ORDDATE, token 6 version attribute is *ORDTIME and, therefore, we can specify *HIGHEST as match flag values for both tokens.
    - If there are multiple catalog entries with token 1 through 4 having the same token values, specifying match flag value *HIGHEST matches the latest date and time.

EXAMPLE 18

In this example, the global name is:

```
Token 1 = enterprise ID
Token 2 = DATA
Token 3 = originating system
Token 4 = originating application
Token 5 = application data type
Token 6 = create date
Token 7 = create time

   "ITSCNET DATA *CPNAME ACCOUNTING FICATBL YxxxxMxxDxx HxxMxxSxx"       03"
```

Let's set the scenario for this example. The program FICAGEN in the accounting application (ACCOUNTING) runs at least once a day and generates the file FICATBLxxx in library GG244372. A catalog entry pointing to the physical file in library GG244372 is created by the same program. Figure 133 on page 225 shows a printout of the CL program FICAGEN.

CL Program to Generate a New File Version for Distribution: The sequence of the parameters for command ADDDSTCLGE shown in Figure 133 on page 225 is different from what you see when you prompt for that command. The way it is shown should demonstrate how the contents of each token (defined in GLBNAME) relates to its version and match attribute. There is no need to code parameter MATCHATR because we used all of the defaults; again this was only added for documentation.

```
PGM  ≈

/* PGM Name: FICAGEN                                                    */
/* PGM Functions: This program generates a file for the application     */
/*    specified in the &APP input field.  The program creates a catalog */
/*    entry that point to the application file generated               */
/*    The version attributes for token 4 is *ORDCHAR, Token 6 *ORDDATE, */
/*    Token 7 *ORDTIME                                                 */

DCL ≈      *CHAR 10
DCL &nbr      *DEC (3 0)  0
DCL &nbrc     *CHAR 3
DCL &filenam  *CHAR 10

  RTVDTAARA  DTAARA(GG244372/NUMBER) RTNVAR(&NBR)
    MONMSG CPF1015 EXEC(DO)
      CRTDTAARA  GG244372/NUMBER *DEC (3 0)
    ENDDO

  CHGVAR &nbr  (&nbr +1)
  CHGVAR &nbrc  &nbr
  CHGVAR &FILENAM  ('FICATBL' *CAT &NBRC)
  CHGDTAARA  GG244372/NUMBER VALUE(&NBR)
  CRTPF      FILE(GG244372/&FILENAM) RCDLEN(132)
  OVRDBF     FILE(FICATBL) TOFILE(GG244372/&FILENAM)

/* RPG Program FICAGENRPG is  just an example for calling an application  */
/* program at this point. While it just adds one record to the file, a   */
/* "normal real life" program would collect all transaction records which */
/* created since the program was called the last time.                   */

  CALL       GG244372/FICAGENRPG

/* Now we add the distribution catalog entry (DSTCLGE) for the file we just  */
/* created in the previous steps.                                            */

  ADDDSTCLGE  OBJTYPE(*FILE) OBJ(GG244372/&FILENAM) STGLOC(*STD)            +
       GLBNAME(*NETID  DATA    *CPNAME  &APP     FICATBL  *DATE    *TIME)    +
    VERSIONATR(*UNSPEC *UNSPEC *CPNAME  *ORDCHAR *UNSPEC  *ORDDATE *ORDTIME)  +
      MATCHATR(*MATCH *NOMATCH *NOMATCH *NOMATCH *NOMATCH *NOMATCH *NOMATCH)

ENDPGM
```

Figure 133. FICAGEN CL Program

The default is also used for the Storage Location parameter STGLOC(*STD) and coded for documentation, because it is important: The value *STD means the object where the catalog entry is referring to (file FICATBL in our case) is actually a *standard AS/400 object*, as opposed to an object stored in the distribution repository (*DSTRPS), that is not usable by the AS/400 system (and it could even be an object type of another system).

If we had used STGLOC(*DSTRPS), the example would still work. The difference is, at the time when the ADDDSTCLGE command is performed, the contents of the object (file FICATBL) is *copied* into the distribution repository and when the central site system retrieves it (Figure 136 on page 227), the copy rather than the original object is used.

After the program FICAGEN runs a few times on the managed systems, we get the DST Catalog entries shown in Figure 134 on page 226 on RCHASM03 and Figure 135 on page 226 on RCHAS040.

```
                         Work with DST Catalog Entries
                                                                System:   RCHASM03
Type options, press Enter.
  1=Add   3=Copy DST repository object   4=Remove   5=Display detail
  6=Print detail   8=Display token attributes
Opt     Global Name

        ITSCNET DATA RCHASM03 ACCOUNTING FICATBL Y1994M12D01 H14M07S10
        ITSCNET DATA RCHASM03 ACCOUNTING FICATBL Y1994M12D01 H14M24S55
        ITSCNET DATA RCHASM03 ACCOUNTING FICATBL Y1994M12D05 H14M08S10
        ITSCNET DATA RCHASM03 ACCOUNTING FICATBL Y1994M12D15 H14M08S22
```

Figure 134. Catalog Entries Created by FICAGEN on RCHASM03

```
                         Work with DST Catalog Entries
                                                                System:   RCHAS040
Type options, press Enter.
  1=Add   3=Copy DST repository object   4=Remove   5=Display detail
  6=Print detail   8=Display token attributes
Opt     Global Name

        ITSCNET DATA RCHAS040 ACCOUNTING FICATBL Y1994M12D15 H14M07S02
        ITSCNET DATA RCHAS040 ACCOUNTING FICATBL Y1994M12D24 H14M09S11
        ITSCNET DATA RCHAS040 ACCOUNTING FICATBL Y1995M01D04 H14M09S27
        ITSCNET DATA RCHAS040 ACCOUNTING FICATBL Y1995M01D05 H14M09S40
```

Figure 135. Catalog Entries Created by FICAGEN on RCHAS040

At the central site system, we want to:

1. Retrieve the *oldest* version of the FICATBLxxx files.
2. Copy the retrieved files from the distribution repository into members of GG244372/FICATBL on the central site system.

   To accomplish our objectives, we used the CRQD shown in Figure 136 on page 227.

```
                                        Change Request Description                                          Page     1
Change request description . . . . . . . . . :   EXAMPLE2A
  Library  . . . . . . . . . . . . . . . . . :     GG244372
User profile . . . . . . . . . . . . . . . . :   *SBM
Problem ID . . . . . . . . . . . . . . . . . :   *NONE
  Origin . . . . . . . . . . . . . . . . . . :
Text . . . . . . . . . . . . . . . . . . . . :
                                                   ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000010
Activity type  . . . . . . . . . . . . . . . :   *OBJ
Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   Retrieve oldest FICATBLxxx
--------------------Conditions----------------------
                                          Condition
Activity       Relation     Code          Mode
*PRV             *EQ        *SUCCESS      *ALLNODES
Action . . . . . . . . . . . . . . . . . . :   Retrieve object
Global object name:
  To be retrieved  . . . . . . . . . . . . :   *NETID DATA *ANY ACCOUNTING FICATBL *LOWEST *LOWEST
Data object class  . . . . . . . . . . . . :   '00000000'X
Replace  . . . . . . . . . . . . . . . . . :   *NO
                                                   ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000020
Activity type  . . . . . . . . . . . . . . . :   *CMD
Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   CPYDSTRPSO RCHASM03
--------------------Conditions----------------------
                                          Condition
Activity       Relation     Code          Mode
*PRV             *EQ        *SUCCESS      *ALLNODES
Action . . . . . . . . . . . . . . . . . . :   Run command
Command:
  CPYDSTRPSO GLBNAME(*NETID DATA RCHASM03 ACCOUNTING FICATBL *LOWEST *LOWEST) OBJ(GG244372/FICATBL)
MBR(RCHASM03) REPLACE(YES)
                                                   ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000030
Activity type  . . . . . . . . . . . . . . . :   *CMD
Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM01
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   CPYDSTRPSO RCHAS040
--------------------Conditions----------------------
                                          Condition
Activity       Relation     Code          Mode
*PRV             *EQ        *SUCCESS      *ALLNODES
Action . . . . . . . . . . . . . . . . . . :   Run command
Command:
  CPYDSTRPSO GLBNAME(*NETID DATA RCHAS040 ACCOUNTING FICATBL *LOWEST *LOWEST) OBJ(GG244372/FICATBL) MBR(RCHAS040) REPLAC
```

Figure 136. EXAMPLE2A Change Request Description

- After retrieving the files, the entries shown in Figure 137 are created in the central site distribution catalog:

```
                        Work with DST Catalog Entries
                                                                System:   RCHASM02
 Type options, press Enter.
   1=Add   3=Copy DST repository object   4=Remove   5=Display detail
   6=Print detail   8=Display token attributes
 Opt     Global Name

         ITSCNET DATA RCHASM03 ACCOUNTING FICATBL Y1994M12D01 H14M07S10
         ITSCNET DATA RCHAS040 ACCOUNTING FICATBL Y1994M12D15 H14M07S02
```

Figure 137. Catalog Entries Created by FICAGEN on Central System

Note that by specifying the value of *ANY for Token 3 (Originating system name), we only need one operation to retrieve the files from *all* of the managed systems.

- After the CPYDSTRPSO command is executed, the data from RCHASM03 is stored in GG244372/FICATBL(RCHASM03) and the data from RCHAS040 is stored in GG244372/FICATBL(RCHAS040).

  Refer to "PTF Inventory" on page 231 for an example of storing data from the managed systems files into members of a central system physical file automatically.

The scenario for this example should be completed by the following steps:

3. Process the data received from each system.
4. Delete the received files and the corresponding catalog entry at the central site system.
5. Delete the received files and the corresponding catalog entry at the managed system.
6. Repeat the entire process starting with item 1 on page 226 to retrieve the second but oldest version of the FICATBLxxx files until all files at all managed systems have been processed successfully.

Using the Distribution Repository as Staging Area

The distribution repository is a staging area for sending and receiving objects and for program objects that are to be run. Globally named Objects, for example, are stored in the distribution repository.

You can store objects in the distribution repository or in a library or folder. Using the distribution repository, you can send objects to a system without disturbing the system. They are copied into libraries or folders at a convenient time. The distribution repository provides a place where objects are captured and held so you can update the real object. Also, the distribution repository can hold non-AS/400 objects. For example, you can store PS/2 files in the distribution repository, and later they can be distributed to a PS/2. Using a library or folder, the objects are readily accessible.

Distributing During the Day and Installing at Night

In this example, we want to distribute an object during the day while the operators are watching the systems and can react to problems, but we do not want to replace the object in the production library as soon as the distribution ends. We must delay the installation of the object in production until 10 o'clock at night when the object is not being used. The object is temporally stored in the distribution repository of the managed system.

Using the Add Distribution Catalog Entry (ADDDSTCLGE) command, you have these possibilities (this applies to both, the managed systems and the central site systems):

1. Add an entry to the distribution catalog that refers to an object in standard storage.

2. Add an entry to the distribution catalog that later[8] refers to an object in the distribution repository when the object is received from the central site system (or from the managed system, if the central site did a retrieve).
3. Add an entry to the distribution catalog that refers to the object loaded into the distribution repository from an AS/400 library or folder.

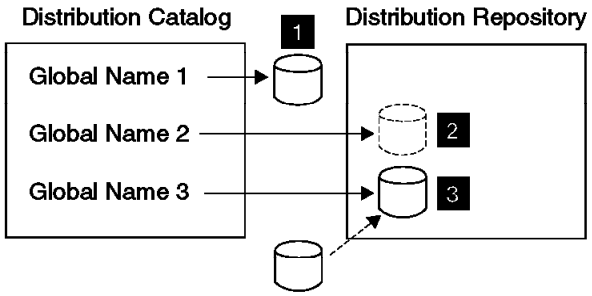


Figure 138. Functions of the ADDDSTCLGE Command

In order to achieve our goal for this example, some tasks have to be performed at the central site system and some on each managed system. Of course we do the latter by creating and submitting a change request.

- At the central site system, we:
  1. Add an entry to the distribution catalog pointing to the AS/400 object type *PGM DLYRPT in library DEVELOP (case **1** in Figure 138).

     ```
     ADDDSTCLGE GLBNAME(ITSCNET RCHASM02 PROGRAM DEVELOP DLYRPT) +
                OBJTYPE(*PGM) OBJ(DEVELOP/DLYRPT) STGLOC(*STD)
     ```

  2. Create a change request description:

     ```
     CRTCRQD    CRQD(DEVELOP/SNDDLYRP) TEXT('Send program DLYRPT')
     ```

  3. Add an object activity to send the object to the managed system:

     ```
     ADDOBJCRQA CRQD(DEVELOP/SNDDLYRP) ACTIVITY(*GEN) ACTION(*SND) +
                OBJ(*GLOBAL) GLBNAME(ITSCNET RCHASM02 DAILY REPORTS PROGRAM)  +
                CPNAME(*NETID RCHAS040)
     ```

  4. Add a command activity to copy the object from the distribution repository to the AS/400 standard storage at 10 o'clock in the evening:

     ```
     ADDCMDCRQA CRQD(DEVELOP/SNDDLYRP) ACTIVITY(*GEN)                    +
           CMD(CPYDSTRPS0 GLBNAME(ITSCNET RCHASM02 DAILY REPORTS PROGRAM) +
                      OBJ(ACTGLIB/DLYRPT) REPLACE(*YES) )     +
           NODL(MGDSYS) CPNAME(*NONE) RMTSTRTIME((22:00:00 *CURRENT))
     ```

     Notice that, on the managed system, we want to copy the object from the distribution repository into ACTLIB/DLYRPT using a different library from the one where the object was stored on the central system.

  5. Submit the Change Request:

     ```
     SBMCRQ     CRQD(DEVELOP/SNDDLYRP)
     ```

  And this is what happens:

- At the managed system:

[8] **Tip:** You may even refer to an object that does not exist at the time when you add the catalog entry. However, in this case you must not use the default value for the text parameter TEXT(*OBJTEXT), because it tries to refer to the nonexistent object and the command fails. Use either a meaningful text or TEXT(*NONE).

1. Managed System Services/400 reads the global name from the envelop of the received object, and searches the distribution catalog with the global name as a key. Because we *did not* add an entry to the distribution catalog prior to sending the object (such as in the case in **2** Figure 138), Managed System Services/400 does not find a matching entry and automatically adds one with local storage location *DSTRPS (see Figure 138 on page 229 case **3**).

   At this time, the object is *not* installed in the AS/400 standard storage and users or applications cannot directly access the object.

2. Managed System Services/400 receives the command activity to copy the object from the distribution repository to the AS/400 library and schedules it to run at 10:00 PM as specified in the RMTSTRTIME parameter.

3. At 10:00 PM, Managed System Services/400 submits the CPYDSTRPSO command for execution. This command copies the object from the distribution repository into the requested AS/400 library as shown in Figure 139.

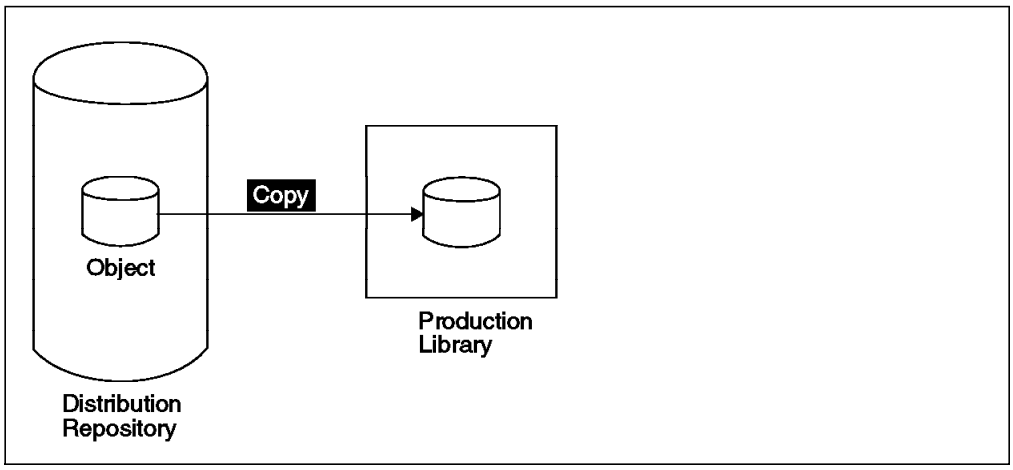


Figure 139. Function Performed by the CPYDSTRPSO Command

Using the Distribution Repository for Store and Forward

You might have the need to send objects from one managed system to another managed system without affecting the objects installed on the central system. Consider the sample network shown in Figure 121 on page 211. We want to retrieve an object from the application development system (RCHASM01) to be tested on RCHASM03.

We do not want to install the object on the central site system at this point. Therefore, we retrieve the object from RCHASM01 into the distribution repository on RCHASM02 (central site system) and distribute from the repository to the target system (RCHASM03).

Using the data compression (DTACPR(*SNA)) parameter in the activity type object action *RTV when retrieving the object from RCHASM01 to RCHASM02 caused the object to be stored in compressed form in the distribution repository on the central system. Compression and decompression only takes place on the sending and receiving systems.

In this example, we want to send the program DLYRPT from library DEVELOP on RCHASM01 to library ACTLIB in RHCASM03.

At the central site system, we must:

1. Create a change request description:

```
CRTCRQD CRQD(GG244372/TRSDLYRPT) TEXT('Using DST Repository as Store and
Forward')
```

2. Add a command change request activity to add a DST catalog entry to the distribution catalog on RCHASM01, the development system:

```
ADDCMDCRQA CRQD(GG244372/TRNSDLYRPT) CMD(ADDDSTCLGE GLBNAME(*NETID RCHASM01 +
PROGRAM DEVELOP DLYRPT) OBJTYPE(*PGM) OBJ(DEVELOP/DLYRPT)                   +
STGLOC(*STD) CPNAME((*NETATR RCHASM01)) USRPRF(ADAN) PASSWORD()
TEXT('ADDDSTCLGE on RHCASM01')
```

3. Add an object change request activity to retrieve the program from RCHASM01 and store it in RCHASM02 distribution repository:

```
ADDOBJCRQA CRQD(GG244372/TRnsDLYRPT) ACTION(*RTV) OBJ(*GLOBAL) +
GLBNAME(*NETID RCHASM01 PROGRAM DEVELOP DLYRPT)  +
 CPNAME((*NETATR RCHASM01)) REPLACE(*YES) +
TEXT('Retrieve object from RCHASM01 to RHCASM02 DST rep') +
```

4. Add an object change request activity to send the object from the DST repository on RHCASM02 to the distribution repository on RCHASM03:

```
ADDOBJCRQA CRQD(GG244372/TRNSDLYRPT) ACTION(*SND) +
GLBNAME(*NETID RCHASM01 PROGRAM DEVELOP DLYRPT) +
CPNAME((*NETATR RCHASM03)) REPLACE(*YES) +
TEXT('Send object from RCHASM02 to RHCASM03 DST rep')
```

5. Add a command change request activity to copy the object from the distribution repository to the library on RCHASM03:

```
ADDCMDCRQA CRQD(GG244372/TRNSDLYRPT) CMD(CPYDSTRPS0   +
GLBNAME(*NETID RCHAS01 PROGRAM DEVELOP DLYRPT)        +
OBJ(ACTGLIB/DLYRPT)) CPNAME((*NETATR RCHASM03         +
USRPRF(ADAN) PASSWORD() TEXT('CPYDSTRPS0 on RHCASM03')
```

6. Submit the change request:

```
SBMCRQ     CRQD(DEVELOP/TRNSDLYRPT)
```

PTF Inventory

The objective of this section is to provide some examples of how to set up a PTF database at the central site and how to use the information in the database to produce reports or answer inquires that helps you centrally manage the PTF distribution and installation process in your AS/400 network.

Note: In this section, we assume that all of the *managed systems* are also defined as *service requesters*. That is, we use the terms *service requesters* and *managed systems* interchangeably. Also the *central site system* is assumed to be set up as a *service provider*.

Creating the Central PTF Database

The first step is to create a centralized repository of PTF information for all of the systems in the network. To create a central PTF database, you must:

1. Set up the necessary catalog entries on the central site system and all of the managed systems. Refer to “Setting up Catalog Entries Across the Network.”
2. Produce or refresh the PTF information on the managed systems using the Display PTF (DSPPTF) command to an output file.
3. Retrieve all of the PTF files from the managed systems into multiple members of a single physical file on the central system. However, you should use a different file for each release of OS/400 because the record format for file QADSPPTF (the model for the outfile for the DSPPTF command) may change for a new release. Therefore, we also suggest creating a node list for each group of systems having the same release of OS/400 installed and repeating the entire process described for each node list.
4. Create a logical file over all of the members to have a single view of the PTF information in the network.

Setting up Catalog Entries Across the Network

To set up the catalog entries to enable retrieving of all the PTF files from the managed systems into the members of the database file on the central system, you must:

1. Create a catalog entry on each managed system pointing to the outfile produced by the DSPPTF command.
2. Create one catalog entry on the central site system per managed system pointing to a member of the outfile created by the DSPPTF command on the central site system.

To automate the process of setting up the distribution catalog entries on the managed system and central site system, we wrote the Setup DST Catalog Entry (STPDSTCLGE) command. Our requirements and assumptions implemented in the STPDSTCLGE command and command processing program are:

- Naming Convention: Global name token 1 must be the network ID and global name token 2 must be the CP name of the managed system.
- The distribution catalog entry is set up on all of the service requesters defined to the central site service provider. We use the file QUSRSYS/QANSSRI on the service provider (central site system) to retrieve the service requester information.

Note:

Another option is to use the systems in a node list and the List Node List Entries (QFVLSTNL) API to retrieve the CP names of the systems defined in the node list. You could also modify the STPDSTCLGE command to allow the user to select:

a. All service requesters (our example).
b. Systems in a node list and node list name.
c. CP name and network ID.

Figure 140 on page 233 shows the source code for the STPDSTCLGE command and Figure 141 on page 234 shows the source code for the STPDSTCLGE command processing program.

EXAMPLE 19

CMD Source: Set Up DST Catalog Entry

```
 CMD        PROMPT('Setup DST Catalog Entry')
 PARM       KWD(GLBNAME) TYPE(GLBNMLIST) PROMPT('Global name')
GLBNMLIST:  ELEM TYPE(*CHAR) LEN(16) RSTD(*YES) DFT(*NETID) +
             VALUES(*NETID) PROMPT('Global name token 1')
 ELEM       TYPE(*CHAR) LEN(16) RSTD(*YES) DFT(*CPNAME)
             VALUES(*CPNAME) PROMPT('Global name token 2')
 ELEM       TYPE(*NAME) LEN(16) PROMPT('Global name token 3')
 ELEM       TYPE(*NAME) LEN(16) PROMPT('Global name token 4')
 ELEM       TYPE(*NAME) LEN(16) PROMPT('Global name token 5')
 ELEM       TYPE(*NAME) LEN(16) PROMPT('Global name token 6')
 ELEM       TYPE(*NAME) LEN(16) PROMPT('Global name token 7')
 ELEM       TYPE(*NAME) LEN(16) PROMPT('Global name token 8')
 ELEM       TYPE(*NAME) LEN(16) PROMPT('Global name token 9')
 ELEM       TYPE(*NAME) LEN(16) PROMPT('Global name token 10')

 PARM       KWD(FILE) TYPE(QUALFILE) SNGVAL((*NONE))  PROMPT('File Name')
 QUALFILE:   QUAL       TYPE(*NAME) LEN(10)
             QUAL       TYPE(*NAME) LEN(10)
```

Figure 140. Setup DST Catalog Entry (STPDSTCLGE) Command

CL Program: Set Up DST Catalog Entry - Command Processing Program

```
PGM        PARM(&GLBNAME &QUALFILE)

/* PGM NAME : STPDSTCLGE                                                */
/*OBJECTIVE : 1) CREATE DST CATALOG ENTRIES ON ALL MANAGED SYSTEMS AND    */
/*            POINTING TO A DATABASE FILE                               */
/*            2) CREATE ONE CATALOG ENTRY PER SERVICE REQUESTERS ON     */
/*            CENTRAL SYSTEM POINTING TO MEMBERS OF SINGLE *PF          */
/*                                                                      */
DCL &GLBNAME  *CHAR 162                /* Global Name Entered by the user */
DCL &TOKEN1   *CHAR 16                 /* Global Name Token 1 */
DCL &TOKEN2   *CHAR 16                 /* Global Name Token 2 */
DCL &TOKEN3   *CHAR 16                 /* Global Name Token 3 */
DCL &TOKEN4   *CHAR 16                 /* Global Name Token 4 */
DCL &TOKEN5   *CHAR 16                 /* Global Name Token 5 */
DCL &TOKEN6   *CHAR 16                 /* Global Name Token 6 */
DCL &TOKEN7   *CHAR 16                 /* Global Name Token 7 */
DCL &TOKEN8   *CHAR 16                 /* Global Name Token 8 */
DCL &TOKEN9   *CHAR 16                 /* Global Name Token 9 */
DCL &TOKEN10  *CHAR 16                 /* Global Name Token 10 */

DCL &QUALFILE *CHAR 20
DCL &FILENAME *CHAR 10
DCL &LIBNAME  *CHAR 10

DCL &TEXT) TYPE(*CHAR) LEN(50)
DCLF       FILE(QUSRSYS/QANSSRI)

  CHGVAR &TOKEN1     %SST(&GLBNAME  3  16)
  CHGVAR &TOKEN2     %SST(&GLBNAME 19  16)
  CHGVAR &TOKEN3     %SST(&GLBNAME 35  16)
  CHGVAR &TOKEN4     %SST(&GLBNAME 51  16)
  CHGVAR &TOKEN5     %SST(&GLBNAME 67  16)
  CHGVAR &TOKEN6     %SST(&GLBNAME 83  16)
  CHGVAR &TOKEN7     %SST(&GLBNAME 99  16)
  CHGVAR &TOKEN8     %SST(&GLBNAME 115 16)
  CHGVAR &TOKEN9     %SST(&GLBNAME 131 16)
  CHGVAR &TOKEN10    %SST(&GLBNAME 147 16)

  CHGVAR &FILENAME   %SST(&QUALFILE 1 10)
  CHGVAR &LIBNAME)   %SST(&QUALFILE 11 10)

 /* Add a distribution catalog entry on each managed system pointing         */
 /* to a database file on the system                                         */
 /*                                                                          */

  RUNSMGCMD  CMD( +
    ADDDSTCLGE GLBNAME(&TOKEN1 &TOKEN2 &TOKEN3 &TOKEN4 &TOKEN5 &TOKEN6 &TOKEN7 +
              &TOKEN8 &TOKEN9 &TOKEN10) OBJTYPE(*FILE) OBJ(&LIBNAME/&FILENAME)  +
                MBR(*FIRST)) NODL(GG244372/PRODUCTION) USRPRF(MYUSRPRF)         +
                PASSWORD(xxxxxx) ENCODE(*NO)

/* Create a Catalog Entry on the central site for each service requester     */
/*We use the information in the file QUSRSYS/QANSSRI where the               */
/*Service Requester information is stored.                                   */
/* The API QFVLSTNL, List Node Entries, could be used to get the list of     */
/* managed systems from the NODL                                            */
/* &WNSRNET = Service Requester NetID                                       */
/* &WNSRCPN = Service Requester CP Name                                     */
LOOP:
  RCVF       RCDFMT(QNSSRI)
    MONMSG     MSGID(CPF0864) EXEC(GOTO CMDLBL(ENDPGM))
  CHGVAR  &TEXT (&wnsrcpn *TCAT &FILENAME)
  ADDDSTCLGE GLBNAME(&WNSRNET &WNSRCPN &TOKEN3 &TOKEN4 &TOKEN5 &TOKEN6 &TOKEN7 +
                     &TOKEN8 &TOKEN9 &TOKEN10) OBJTYPE(*FILE)                 +
                     OBJ(&LIBNAME/&FILENAME) MBR(&WNSRCPN) TEXT(&TEXT)
    MONMSG     MSGID(MSS0132)               /* Catalog Entry Already Exists */
  GOTO LOOP
ENDPGM:
  ENDPGM
```

Figure 141. Setup DST Catalog Entry (STPDSTCLGE) Command Processing Program

Enter the command STPDSTCLGE and the display in Figure 142 on page 235 is shown:

```
                    Setup DST Catalog Entry (STPDSTCLGE)

Type choices, press Enter.

Global name:
  Global name token 1  . . . . .   *NETID__________
  Global name token 2  . . . . .   *CPNAME_________
  Global name token 3  . . . . . > PTFINV__________
  Global name token 4  . . . . . > DSPPTF__________
  Global name token 5  . . . . .   ________________
  Global name token 6  . . . . .   ________________
  Global name token 7  . . . . .   ________________
  Global name token 8  . . . . .   ________________
  Global name token 9  . . . . .   ________________
  Global name token 10 . . . . .   ________________
File Name  . . . . . . . . . . . > DSPPTF____     Name, *NONE
                                     GG244372__   Name

                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 142. STPDSTCLGE Display

Figure 143 shows the catalog entry created by the STPDSTCLGE on the managed system RCHASM03.

```
                        Work with DST Catalog Entries
                                                          System:   RCHASM03
 Type options, press Enter.
   1=Add   3=Copy DST repository object   4=Remove   5=Display detail
   6=Print detail   8=Display token attributes
 Opt     Global Name

         ITSCNET RCHASM03 PTFINV DSPPTF
```

Figure 143. Catalog Entry Created by the STPDSTCLGE Command on RCHASM03

Figure 144 shows the catalog entry created by the STPDSTCLGE on the central site system RCHASM02.

```
                        Work with DST Catalog Entries
                                                          System:   RCHASM02
 Type options, press Enter.
   1=Add   3=Copy DST repository object   4=Remove   5=Display detail
   6=Print detail   8=Display token attributes
 Opt     Global Name

         ITSCNET RCHASM03 PTFINV DSPPTF
         ITSCNET RCHAS040 PTFINV DSPPTF
```

Figure 144. Catalog Entry Created by the STPDSTCLGE Command on Central System

Building the Central PTF database

To build the central PTF database, we created the change request description PTFINV in library GG244372. The change request activities perform the following tasks:

1. DSPPTF to outfile DSPPTF on the central site system.
2. DSPPTF to outfile DSPPTF on the managed systems.
3. Retrieve DSPPTF files from managed systems to central site DSPPTF file members.
4. CRTLF PTFINV over all of the members of DSPPTF *PF on central system.

Figure 145 shows the change request description PTFINV.

```
                                        Change Request Description                                          Page     1
Change request description . . . . . . . . . :   PTFINV
  Library  . . . . . . . . . . . . . . . . . :     GG244372
User profile . . . . . . . . . . . . . . . . :   *SBM
Problem ID . . . . . . . . . . . . . . . . . :   *NONE
  Origin . . . . . . . . . . . . . . . . . . :
Text . . . . . . . . . . . . . . . . . . . . :   Generate PTF Outfile DSPPTF and retrieve it to CS


                                                      ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000010
Activity type  . . . . . . . . . . . . . . . :   *CMD
Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   DSPPTF on Central System
--------------------Conditions----------------------
                                          Condition
Activity       Relation     Code          Mode
*PRV             *EQ        *SUCCESS      *ALLNODES
Action . . . . . . . . . . . . . . . . . . :   Run command
Command:
  DSPPTF OUTPUT(*OUTFILE) OUTFILE(GG244372/DSPPTF) OUTMBR(RCHASM02)


                                                      ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000020
Activity type  . . . . . . . . . . . . . . . :   *CMD
Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   DSPPTF on Managed Systems

Action . . . . . . . . . . . . . . . . . . . :   Run command
Command:
  DSPPTF OUTPUT(*OUTFILE) OUTFILE(GG244372/DSPPTF)
Managed system start time:
Time zone  . . . . . . . . . . . . . . . . . :   *LCLSYS
  Start after date and time  . . . . . . . . :     *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :     *ANY        *ANY
Return spooled files . . . . . . . . . . . . :   *YES
User profile . . . . . . . . . . . . . . . . :   ADAN
Password specified . . . . . . . . . . . . . :   *YES
```

Figure 145 (Part 1 of 2). Change Request Description PTFINV

```
                                                  ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000030
Activity type  . . . . . . . . . . . . . . . :   *OBJ
Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   Retrieve DSPPTF from all Managed Systems
--------------------Conditions----------------------
                                          Condition
Activity       Relation     Code          Mode
*PRV             *EQ        *SUCCESS      *SAMENODE
Action . . . . . . . . . . . . . . . . . . :   Retrieve object
Global object name:
  To be retrieved  . . . . . . . . . . . . :   *NETID *ANY PTFINV DSPPTF
Data object class  . . . . . . . . . . . . :   '00000000'X
Replace  . . . . . . . . . . . . . . . . . :   *ALLOWED
                                                  ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000040
Activity type  . . . . . . . . . . . . . . . :   *OBJ
Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   Run *PGM GG244372/CRTPTFINV to CRTLF PTFINV
--------------------Conditions----------------------
                                          Condition
Activity       Relation     Code          Mode
*PRV             *EQ        *SUCCESS      *ALLNODES
Action . . . . . . . . . . . . . . . . . . :   Run procedure
Object . . . . . . . . . . . . . . . . . . :   CRTPTFINV
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Object type  . . . . . . . . . . . . . . . . :   *PGM
Target release . . . . . . . . . . . . . . . :
Data object class  . . . . . . . . . . . . . :   '00000000'X
Object disposition . . . . . . . . . . . . . :   *KEEP
                                   * * * * *  E N D  O F  L I S T I N G  * * * * *
```

Figure 145 (Part 2 of 2). Change Request Description PTFINV

Inquiries to the PTF Database

Now that the network PTF information is stored in the central PTF database, we can produce reports or queries that help us manage the PTF process in the network. To produce the reports, we used DB2/400 Query Manager; you can use your favorite query program.

Note: You must know the fields and field descriptions of the DSPPTF file (outfile produced by the DSPPTF command). Refer to the DSPPTF command for a description of the fields in the *AS/400 CL Reference* manual.

Listing PTFs by Licensed Program

In this example, we want to list the PTFs for licensed program 5763PT1 (Performance Tools) found on our central site system and managed systems.

We selected the following fields from the DSPPTF file:

SCSYSNM System Name

SCPPID ID of product to which PTF applies

SCPTFV Version, release and modification level of the product

SCPTFID PTF ID

EXAMPLE 20

SQL Query: List PTFs by Licensed Program: We created the SQL/400 query PTFLICPGM:

```
SELECT
      SCSYSNM, SCPPID, SCPTFV, SCPTFID
      FROM "GG244372"/"PTFINV"
      WHERE (SCPPID  = '5763PT1')
      ORDER BY SCSYSNM, SCPPID, SCPTFV, SCPTFID
```

Figure 146. PTFLICPGM SQL

Figure 147 shows the report obtained after running the query using the data in the central PTF database.

```
01/08/95 19:40:05                                                    1
                          RCHASM02
  SYSTEM            PTF
   NAME     LIC PGM RELEASE  PTF
  --------  ------- ------   -------
  RCHASM02  5763PT1 030100   SF18074
                             SF18075
                             SF18222
                             SF18223
                             SF18520
                             SF18851
                             SF19048
                             SF19049
                             SF19050
                             SF19051
                             SF19052
                                   *
                                  **
  RCHASM03  5763PT1 030100   SF18074
                             SF18075
                             SF18222
                             SF18223
                             SF18520
                             SF18851
                             SF19048
                             SF19049
                             SF19050
                             SF19051
                             SF19052
                                   *
                                  **
  RCHAS040  5763PT1  030100  SF18074
                             SF18075
                             SF18222
                             SF18223
                             SF18520
                             SF18851
                             SF19048
                             SF19049
                             SF19050
                             SF19051
                             SF19052
                                   *
                                  **
```

Figure 147. Report of PTFs by Licensed Program

Listing PTF by PTF Status

In this example, we want to list the PTFs with PTF status:

- On order only
- Save file only
- Not applied
- Damaged

In other words, we want to *exclude* from our report, the PTFs with status:

- Temporally applied
- Permanently applied
- Permanently removed
- Superseded

We selected the following fields from the DSPPTF file:

SCSYSNM System Name

SCPPID ID of product to which PTF applies

SCPTFID PTF ID

SCSTATUS Status of this PTF

EXAMPLE 21

SQL Query: List PTF by Status: We created the SQL/400 query PTFSTATUS:

```
SELECT
      SCSYSNM, SCPPID, SCSTATUS, SCPTFID
      FROM "GG244372"/"PTFINV"
      WHERE ((SCSTATUS  = 'On order only')
           OR (SCSTATUS  = 'Save file only')
           OR (SCSTATUS  = 'Not applied')
           OR (SCSTATUS  = 'Damaged'))
      ORDER BY SCSYSNM, SCPPID, SCSTATUS, SCPTFID
```

Figure 148. PTFSTATUS SQL

Figure 149 on page 240 shows the report obtained after running the query using the data in the central PTF database.

```
01/08/95 20:22:53                                                    1
                         RCHASM02

  SYSTEM
   NAME     LIC PGM  STATUS                                  PTF
  --------  -------  --------------------------------------  -------
  RCHASM02  5763SS1  On order only                           SF18894
                                                             SF19057
                                                             SF19097
                                                             SF19127
                                                             SF19141
                                                             SF19295
                                                             SF19340
                                                             SF19343
                                                             SF19348
                                                             SF19349
                                                                  **
            5763XC1  On order only                           SF19303
                                                             SF19783
                                                             SF19785
                                                             SF19795
                                                             SF19797
                                                             SF19798
                                                                   *
                                                                  **
            5763999  Save file only                          MF08125
                                                             MF08167
                                                             MF08211
                                                             MF08239
                                                             MF08247
                                                             MF08270
                                                             MF08391
  SYSTEM
   NAME     LIC PGM  STATUS                                  PTF
  --------  -------  --------------------------------------  -------
  RCHASM03  5763SS1  Damaged                                 SF19172
                                                                   *
                                                                  **
            5763TC1  Damaged                                 SF18686
                                                                   *
                                                                  **
            9AOCC01  On order only                           9A01001
                                                                   *
                                                                  **
                                                                 ***

  SYSTEM
   NAME     LIC PGM  STATUS                                  PTF
  --------  -------  --------------------------------------  -------
  RCHAS040  5763TC1  Damaged                                 SF18686
                                                                   *
                                                                  **
            5763XC1  Not applied                             SF20487
                                                                   *
                                                                  **
                                                                 ***
```

Figure 149. Report of PTFs by PTF Status

Listing PTF by Date

In this example, we want to list the PTFs that changed their status on our systems on 1/5/95. *Changing the status* of a PTF means it was either loaded, applied, removed, or deleted. However, if a PTF was *removed and deleted* it no longer appears in this list.

We selected the following fields from the DSPPTF file:

SCSYSNM System Name

SCPPID ID of product to which PTF applies

SCPTFID PTF ID

SCSTDATE Date of last PTF activity

EXAMPLE 22

SQL Query: List PTF by Date: We created the SQL/400 query PTFDATE:

```
SELECT
      SCSYSNM, SCPPID, SCSTDATE, SCPTFID
      FROM "GG244372"/"PTFINV" A
      WHERE (SCSTDATE  = '01/05/95')
      ORDER BY SCSYSNM, SCPPID, SCSTDATE, SCPTFID
```

Figure 150. PTFDATE SQL

Figure 151 shows the report obtained after running the query using the data in the central PTF database. Because on the selected date (1/5/95) we installed a cumulative PTF package, our report is 30 pages long. Therefore, we cut the report to include it in this example.

```
SYSTEM          STATUS
 NAME    LIC PGM   DATE    PTF
-------- -------  -------- -------
RCHASM02  5763AF1  01/05/95  SF18186
                   SF19508
                   SF19757
                   SF20370
                       *
                      **
       5763CB1  01/05/95  SF18783
                   SF19714
                       *
                      **
       5763DFH  01/05/95  SF19668
                       *
                      **
       5763MG1  01/05/95  SF19607
                   SF20074
                       *
                      **
       5763MS1  01/05/95  SF18249
                   SF18765
                       *
                      **
       5763PT1  01/05/95  SF18520
                   SF18851
                       *
                      **
       5763PW1  01/05/95  SF17052
                   SF17170
                   SF17629
                   SF18439
                       *
                      **
```

Figure 151 (Part 1 of 3). Report of PTFs Downloaded to the Systems on 1/5/95

```
01/08/95 20:39:00                                        2
        5763RG1  01/05/95  SF19284
                     SF19756
                     SF19935
                     SF20063
                     SF20097
                         *
                        **
        5763SM1  01/05/95  SF18773
                     SF19467
                     SF19496
                     SF19503
                     SF20049
                         *
                        **
        5763SS1  01/05/95  SF19235
                     SF19415
                     SF19470
                     SF20268
                     TA94329
                     TA94340
                     TA94350
                         *
        5763999  01/05/95  MF07847
                     TL94329
                     TL94340
                     TL94350
                         *
                        **
                       ***
 SYSTEM          STATUS
  NAME    LIC PGM   DATE    PTF
 --------  -------  --------  -------
 RCHASM03  5763AF1  01/05/95  SF19508
                     SF19757
                     SF20370
                         *
                        **
        5763MG1  01/05/95  SF19607
                     SF20074
                         *
                        **
        5763MQ1  01/05/95  SF18147
                     SF18870
                     SF19059
                     SF19074
                     SF19960
                     SF19967
                     SF20007
                     SF20013
                         *

        5763SS1  01/05/95  SF18305
                     SF19114
                     SF19130
                     SF19153
                     SF19171
                     SF19188
                     SF19209
                     SF19235
                     SF19237
                     SF19288
        5763999  01/05/95  MF07847
                     MF07854
                     TL94350
                         *
                        **
                       ***
```

Figure 151 (Part 2 of 3). Report of PTFs Downloaded to the Systems on 1/5/95

```
SYSTEM          STATUS
 NAME    LIC PGM   DATE    PTF
--------  -------  --------  -------
RCHAS040  5763AF1  01/05/95  SF18186
                   SF19757
                   SF20370
                       *
                      **
       5763MG1  01/05/95  SF19607
                   SF20074
                       *
                      **
       5763PW1  01/05/95  SF17399
                   SF18439
                   SF18515
                       *
       5763SM1  01/05/95  SF19467
                   SF19496
                   SF19503
                   SF20049
                       *
                      **
       5763SS1  01/05/95  SF19114
                   SF19235
                   SF19330
                   SF19415
                   SF19463
                       *
                      **
       5763999  01/05/95  MF07847
                   MF07854
                   MF07865
                   MF07870
                   TL94350
                       *
                      **
                     ***
```

Figure 151 (Part 3 of 3). Report of PTFs Downloaded to the Systems on 1/5/95

Where is PTF MF07867?

In this example, we want to find out which systems a particular PTF is installed on.

We selected the following fields from the DSPPTF file:

SCSYSNM System Name

SCPPID ID of product to which PTF applies

SCPTFID PTF ID

EXAMPLE 23

SQL Query: List a Specific PTF: We created the SQL/400 query PTFWHEREIS:

```
SELECT
      SCSYSNM, SCPPID, SCPTFID
      FROM "GG244372"/"PTFINV"
      WHERE ((SCPPID  = '5763999')
           AND (SCPTFID  = 'MF07867'))
```

Figure 152. PTFWHEREIS SQL

Figure 153 on page 244 shows the results of the query using the data in the central PTF database.

```
SYSTEM
 NAME     LIC PGM  PTF
--------  -------  -------
RCHASM01  5763999  MF07867
RCHASM03  5763999  MF07867
RCHAS040  5763999  MF07867
```

Figure 153. PTFWHEREIS Results

Producing PTF Exception Reports

In this example, we want to list all of the PTFs that are on the central site system but not on a particular managed system. To produce the list of PTFs that meet the selection criteria, we use the Create PTF Package (CRTPTFPKG) command.

The Create PTF Package command (CRTPTFPKG) provides an easier way of creating PTF packages than the CPYPTF command. Rather than specifying individual PTFs, this command operates against all PTF save files for all supported products and accepts output file PTF lists for select and omit control. The input files for this command must have the same format as the output file created by the Display PTF (DSPPTF) command.

An output list of PTFs is created, and optionally, the PTFs are copied to a magnetic tape. When creating large packages, it is recommended to first specify *NONE for the device (DEV) parameter. This allows the package output file to be reviewed before saving to tape.

We use the select/omit capabilities of the CRTPTFPKG command to produce a list of all of the PTFs that are on the central site system but *not* on the managed system. For example, to list all of the PTFs that are on RCHASM02 (central site system) but *not* on RCHAS040, run the command:

```
CRTPTFPKG OUTFILE(GG244372/PTFEXCEPT) OUTMBR(RCHAS040)
SELECT(GG244372/DSPPTF RCHASM02) OMIT(GG244372/DSPPTF RCHAS040)
```

This command creates the file GG244372/PTFEXCEPT, adds member RCHAS040, and lists all of the PTFs that are in the SELECT file member (GG244372/DSPPTF RCHASM02), excluding those PTFs in the OMIT file. The OMIT file member lists the PTFs already on RCHAS040.

The program PTFEXCEPT automates the creation of the PTF exceptions file members for all of the server requesters in our network. We use the file QUSRSYS/QANSSRI on the service provider (central site system) to retrieve the service requester information.

Notes:

1. The disadvantage of this approach is that the format of the file QANSSRI in library QSURSYS may change with a new release of OS/400.
2. An alternative is to use the systems in a node list and the List Node Entries (QFVLSTNL) API to retrieve the CP names of the systems defined in the node list.
3. You can also create a command to allow the user to select:
   a. All service requesters (our example).
   b. Systems in a node list and node list name.

c. CP name and network ID.

EXAMPLE 24

CL Program to Produce List of PTF Exceptions: Figure 154 shows the source for the PTFEXCEPT CL program.

```
 PGM

/* PGM Name : PTFEXCEPT                                                  */
/*    LANGUAGE : CLP                                                     */
/*                                                                       */
/*    FUNCTION :                                                         */
/*     Produce list of PTFs on Central System but NOT on managed Systems.    */

DCL &PTFDATA    *CHAR 10  VALUE(DSPPTF)        /* PTF database file          */
DCL &PTFLIB     *CHAR 10  VALUE(GG244372)      /* PTF database file library  */
DCL &CENTRALSYS *CHAR 10  VALUE(RCHASM01)      /* Central System Name        */

DCLF FILE(QUSRSYS/QANSSRI) /* File contains Service Requester Information    */

/* Run CRTPTFPKG  on the central site for each service requester             */
/* We use the data in the file QUSRSYS/QANSSRI where the Service Requester   */
/* information is stored.                                                    */
/* The API QFVLSTNL, List Node Entries, could be used to get the list of     */
/* managed systems from the NODL                                             */

LOOP:
  RCVF RCDFMT(QNSSRI)
    MONMSG CPF0864  EXEC(GOTO EndPgm)        /* End of File reached          */

  CRTPTFPKG  OUTFILE(GG244372/PTFEXCEPT) OUTMBR(&WNSRCPN)               +
             SELECT(&PTFLIB/&PTFDATA &CENTRALSYS)                        +
             OMIT(&PTFLIB/&PTFDATA &WNSRCPN)
    MONMSG  (CPF4102 SMU1424)      /* Service Requester Member NOT found     */

  GOTO LOOP

EndPgm:
  ENDPGM
```

Figure 154. PTFEXCEPT CL Program

Figure 155 shows the report produced over the data created by the CRTPTFPKG command.

```
                                                RCHAS040 PTF Exceptions
                                      QUERY NAME . . . . . PTFEXCEPT
                                      LIBRARY NAME . . . . GG244372
                                      FILE         LIBRARY      MEMBER       FORMAT
                                      PTFEXCEPTP   GG244372     RCHAS040     QSCPTF
                                      DATE . . . . . . . . . 01/09/95
                                      TIME . . . . . . . . . 16:50:35
                                                RCHAS040 PTF Exceptions


01/09/95  16:50:35  RCHAS040 PTF Exceptions  PAGE    1
LIC PGM  PTF
5763999  MF08125
         MF08167
         MF08198
         MF08211
         MF08239
         MF08247
         MF08270
         MF08391
* * *  E N D  O F  R E P O R T  * * *
```

Figure 155. PTF Exceptions Report for RCHAS040

Electronic Distribution of IBM PTFs

This section describes a process that is used to keep all of the AS/400 systems in the network at the latest PTF level using electronic distribution of PTFs and centralized tracking and control. You can use this process as an alternative to the distribution and installation of cumulative PTF packages.

Process Overview

The starting point to the process is to load from tape all of the currently available PTFs and from that point on, begin a continuous process with the following tasks:

1. Download PTFs available for supported products. Every night the service provider requests all of the PTFs available for the supported products using the Order Supported Product PTFs (ORDSPTPTF) command through electronic customer support (ECS).
2. Every day (or as often as desired), the service provider sends the new PTFs to the service requesters. The immediate PTFs are applied and the delayed PTFs are marked for apply at the next initial program load (IPL).
3. Once a week (or as often as desired), the PTFs are applied at the service requesters and the systems are IPLed.

Note: In the next section, we assume that the central site system is configured as a service provider and that the target or managed systems are configured as service requesters.

Initial Installation of Available PTFs

The biggest challenge in keeping the PTFs current in all of the systems is to synchronize the starting point so that daily you only need to distribute very few new PTFs (often none). If you are planning to start the implementation of this process after changing to a new release of OS/400, at the central site system (service provider) you must:

1. Install the new release of OS/400.
2. Install the latest cumulative PTF package available.
3. Decide which products you are planning to support and select them using the Work with Supported Products (WRKSPTPRD) display.

   The Work with Supported Products display allows you to select products or product options for which you want to provide service support. When you select the products for which you want to provide support, you are indicating that you want to be able to order program temporary fixes (PTFs) to maintain that product both on your system and the service requesters you are entitled to service.

   When you enter the WRKSPTPRD command, the display in Figure 156 is shown.

```
                          Work with Supported Products
                                                                System:   RCHASM02
Release:   *CURRENT

Type options, press Enter.
  4=Remove support   5=Display   6=Print
  8=Work with supported language features

              Product
Opt  Product  Option   Description
     5763999   *BASE   AS/400 Licensed Internal Code
     5763SS1   *BASE   Operating System/400
     5763SS1   1       OS/400 - Extended Base Support
     INFOAS4   *BASE   Information APARs
     INFODSL   *BASE   Information APARs
     5763CX2   *BASE   ILE C/400
     5763ES1   *BASE   IBM OMEGAMON/400
     5763ES1   1       IBM OMEGAMON/400 - AUTOMATED FACILITIES/400
                                                                          More...
Command
===>
F3=Exit   F5=Refresh   F6=Print list   F11=Display releases   F12=Cancel
F14=Support additional products        F17=Position to
```

Figure 156. Work with Supported Products (WRKSPTPRD)

   Press F14 to add more licensed products to the list of supported products.

4. Order the PTFs available for the products you are planning to support using the ORDSPTPTF command through ECS.

   If there are too many PTFs available and they cannot be sent electronically, order the PTFs on magnetic media and install them on the central site system. Specify Delivery method *ANY in the DELIVERY parameter in the ORDSPTPTF command. See Figure 157 on page 248.

```
                    Order Supported Product PTFs (ORDSPTPTF)

 Type choices, press Enter.

 Delivery method  . . . . . . . . DELIVERY     > *ANY
 Product  . . . . . . . . . . . . LICPGM         *ALL
```

Figure 157. Order Supported Product PTFs (ORDSPTPTF)

5. Create the IBM Licensed Program Distribution Tape. Refer to *OS/400 Central Site Distribution V3R1*, SC41-3308, for information on how to plan and implement a centralized distribution and the installation of licensed programs and PTFs in a network of AS/400 systems.
6. Distribute and install the new release of OS/400, licensed programs, and PTFs on all of the managed systems in your network using the distribution tape created at the central site system.

If you are implementing this process in between OS/400 releases (you are *not* installing a new release of OS/400), the steps are:

1. Get the latest PTF cumulative tape available.
2. Install the PTF cumulative tape on the central site system.
3. Decide which products you are planning to support and select them using the Work with Supported Products (WRKSPTPRD) display.
4. From the central site system (service provider), order the PTFs through ECS that are available for your supported products using the Order Supported Product PTFs (ORDSPTPTF) command. Specify Delivery method *ANY in the DELIVERY parameter in the ORDSPTPTF command.
5. Distribute the cumulative PTF package tape and the tape you ordered from IBM to the managed systems (service requesters).
6. Load and apply the PTFs to all of the managed systems in your network.

In a large network, it might be difficult to synchronize the initial distribution and installation of the PTFs to all of the managed systems. Keep in mind that for the process that we describe in the next sections to work, you do not need to apply the PTFs (which in some cases requires an IPL); it is sufficient that the PTF is loaded on the managed systems.

Downloading Supported Product PTFs from IBM Service Support

Once you achieve your first goal of bringing all of the systems to the latest level of PTF available for the products you want to support, you must immediately begin the on-going process of downloading and distributing the new PTFs available for your supported products.

The Order Supported Product PTFs (ORDSPTPTF) command provides ″give me what I need″ PTF ordering capability for supported products, product options, and language features. When this command is processed, the PTFs that are on the service provider, either installed or in save files, are compared with what is available from IBM service support. The resulting order is all of the PTFs for products supported by the service provider that are not already installed on the service provider or currently on order.

This command is only available to AS/400 service providers with System Manager/400 installed. Use this command to order PTFs from IBM service

support only. This command does not order PTFs from other AS/400 systems. When you use this command, even some PTFs that are not yet eligible to be in a cumulative PTF package are ordered and sent. It is a good practice to use the Order Supported Product PTFs (ORDSPTPTF) command on a regular basis to keep your service provider at the most current maintenance level. Doing this may ensure that the PTFs ordered are delivered electronically.

Note: IBM service support includes a PTF in the list of PTFs to be distributed when an order is received through ORDSPTPTF, only after the PTF has been ordered *at least* 10 times for V3R1 licensed products, and at least five times for earlier releases, or if the PTF is a HIPER PTF.

When you order PTFs for one or more licensed programs using the Order Supported Product PTFs (ORDSPTPTF) command, you may receive message notifications indicating that you have a defective PTF on your system or a high-impact pervasive (HIPER) PTF that is missing from or not applied to your system. This notification occurs for defective and HIPER PTFs that are known for all of the products that you have installed on the service provider and for all of the products you currently support. The messages are sent to the service provider message queue you defined when you set up your system as a service provider using the Change Service Provider Attributes (CHGSRVPVDA) command.

The tasks involved in the daily process of downloading the supported products PTFs and distributing them to the managed systems are:

1. Schedule the execution of the ORDSPTPTF command every day (or every other day) at a convenient time. We use the system job scheduler and the Add Job Schedule Entry (ADDJOBSCDE) command.

   ```
   ADDJOBSCDE JOB(ORDSPTPTF) CMD(ORDSPTPTF DELIVERY(*LINKONLY)) FRQ(*WEEKLY) +
   SCDDATE(*NONE) SCDDAY(*ALL) SCDTIME('1:00:00') MSGQ(QUSRSYS/SRVPVD)       +
   TEXT('ORDSPTPTF daily')
   ```

2. Verify the results of the ORDSPTPTF command. After the ORDSPTPTF command has been executed, check the results by looking at the information provided by the job scheduler to make sure the command ran successfully.

   Look at the message queue defined in your service provider attributes. If no new PTFs were found, you receive the following message:

   ```
                          Additional Message Information

   Message ID . . . . . . :   SMU1211       Severity . . . . . . . :   30
   Message type . . . . . :   Completion
   Date sent  . . . . . . :   01/16/95      Time sent  . . . . . . :   01:2

   Message . . . . :   PTF ordering complete.
   Cause . . . . . :   The Order Supported Product PTFs (ORDSPTPTF) command has
     completed.  No defective program temporary fixes (PTFs) have been found on
     this system and no high impact pervasive (HIPER) PTFs are missing from this
     system.
   ```

   If new PTFs are found, they are downloaded to your system and a problem log entry is created. To see only the problem log entries for PTF order problems, select Problem Type 3 in the PRBTYPE parameter of the Work with Problems (WRKPRB) command.

   ```
   WRKPRB PRBTYPE(3)
   ```

Figure 158 on page 250 shows problem log entries opened by ORDSPTPTF when new PTFs were found.

```
                              Work with Problems
                                                                System:   RCHASM02
 Position to . . . . . . .                  Problem ID

 Type options, press Enter.
   2=Change   4=Delete   5=Display details    6=Print details
   8=Work with problem   9=Work with alerts   12=Enter text

 Opt  Problem ID  Status         Problem Description
      9501135156  ANSWERED       Order supported product PTFs.
      9500663715  ANSWERED       Order supported product PTFs.
      9500662392  ANSWERED       Order supported product PTFs.
      9500641490  ANSWERED       Order supported product PTFs.



                                                                          Bottom
 F3=Exit      F5=Refresh   F6=Print list     F11=Display dates and times
 F12=Cancel   F16=Report prepared problems   F24=More keys
```

Figure 158. Problem Log Entries Opened by ORDSPTPTF

Select option 6, Print details, if you want to print a report of all of the PTFs associated with this problem log entry.

By pressing F11, Display dates and times, you can see the date and time when the problem log entry was created.

```
                              Work with Problems
                                                                System:   RCHASm02
 Position to . . . . . . .                  Problem ID

 Type options, press Enter.
   2=Change   4=Delete   5=Display details    6=Print details
   8=Work with problem   9=Work with alerts   12=Enter text

 Opt  Problem ID  Date      Time      Origin
      9501135156  01/11/95  10:14:23  ITSCNET.RCHASM02
  5   9500663715  01/06/95  18:33:30  ITSCNET.RCHASM02
      9500662392  01/06/95  18:10:22  ITSCNET.RCHASM02
      9500641490  01/06/95  12:05:04  ITSCNET.RCHASM02
```

Figure 159. Problem Log Entries Opened by ORDSPTPTF: Display Dates and Times

Choose option 5, Display details, to look at the details of a particular problem log entry.

```
                            Display Problem Details
                                                                  System:   RCHASM02
 Problem ID . . . . . . . :   9500663715
 Origin . . . . . . . . . :   ITSCNET.RCHASM02
 Current status . . . . . :   ANSWERED
 Problem  . . . . . . . . :   Order supported product PTFs.


 Service assigned number . . . . . :   4X544
   Answer received . . . . . . . . :     Request for problem  complete. PTFs
will be mailed.

 PTF order options:
   PTF parts . . . . . . . . . . . :   *ALL
   Order . . . . . . . . . . . . . :   *PTFID
   Reorder . . . . . . . . . . . . :   *NO
   Delivery method . . . . . . . . :   *ANY
 Problem category  . . . . . . . . :   *REPORT
                                                                        More..
 Press Enter to continue.

 F3=Exit   F6=Display problem history   F9=Display PTFs   F12=Cancel
 F20=Display submitted change requests
```

Figure 160. Problem Log Entries Opened by ORDSPTPTF: Display Details

Press F9, Display PTFs, to see the list of PTFs that were or will be delivered by IBM in answer to this problem log entry. Notice that, for the problem log entry in our example, the delivery method chosen in the ORDSPTPTF command was *ANY (as opposed to *LINKONLY) because either the number of PTFs or the volume of data exceeded the limit allowed for electronic distribution.

```
                            Display PTF Information
                                                                  System:   RCHASM02
 Problem ID . . . . . . . :   9500663715
 Origin . . . . . . . . . :   ITSCNET.RCHASM02
 Current status . . . . . :   ANSWERED
 Problem  . . . . . . . . :   Order supported product PTFs.


 Type options, press Enter.
   5=Display details   8=Display cover letter

 Opt  PTF ID   Requested  PTF Save File
      SF19303  Yes        No
      SF19783  Yes        No
      SF19785  Yes        No
      SF19795  Yes        No
      SF19797  Yes        No
      SF19798  Yes        No
      SF19799  Yes        No
      SF19800  Yes        No

                                                                        More...
 F3=Exit   F5=Refresh   F11=Display product and release   F12=Cancel
```

Figure 161. Problem Log Entries Created by ORDSPTPTF: Display PTFs

From the display shown in Figure 161, you can select:

- Option 5, to display the PTF details.
- Option 8, to display the PTF cover letter (if the PTF has been loaded on your system).
- Press F11 to display the product and release the PTF applies to.

Distributing the PTFs Electronically to the Service Requesters

Once you have downloaded the new PTFs for your supported products on the service provider, you should distribute the PTFs to the service requesters in your network. We recommend that you do this every day or every other day to minimize the transmission time.

The following describes the tasks involved in this phase of the process:

1. Find the PTF differences between the service requester and service providers systems:
   a. Submit the PTFINV change request to update the PTFINV database with the latest PTF information on all of the systems. Refer to “PTF Inventory” on page 231 for more information on how to build a centralized PTF inventory database.
   b. Using the information retrieved by the PTFINV change request description, find the differences between the PTFs on each service requester and the service provider. Refer to “Producing PTF Exception Reports” on page 244 for more information on how to produce a database of PTF differences. As a result of running the program PTFEXCEPT, we obtain the file PTFEXCEPT; each member has the name of a service requester and contains the PTFs that were found on the service provider but *not* on the service requester.
2. Send the PTFs to the service requesters. Figure 162 on page 253 shows the printout of the program DSTSPTPTF that is used to automate the process of sending the PTFs differences to the service requesters.

EXAMPLE 25

CL Program to Distribute Supported PTFs

```
PGM  (&usrprf SMGUIxx &schtime)

/* PGM Name: DSTSPTPTF                                                  */
/* Function: Send to the Service Requesters the PTFs that               */
/*           are on Service Provider but not on Service Requester       */
/*                                                                      */
/* Input:    Members of PTFEXCEPT file (contains PTF on                 */
/*           Service Provider but not on Service Requester              */
/*                                                                      */
/* Output:   Send differences to Service Requester                      */
/*                                                                      */
/*                                                                      */
DCL &SCHTIME       *CHAR   6
DCL &LRIND         *CHAR   1  VALUE('0') /* Last Record for file PTFEXCEPT    */
DCL &SCPTFID       *CHAR   7                /* PTF ID */
DCL &SCPPID        *CHAR   7                /* Program Product ID */
DCL &PPIDPRV       *CHAR   7                /* Program Product ID */

DCL SMGUIxx       *CHAR 10  GG244372       /* Object library                    */
DCL &usrprf    *CHAR 10
DCL SMGUIxx  *CHAR 10
DCLF       FILE(QUSRSYS/QANSSRI)

IF (&usrprf = *CURRENT) RTVJOBA USER(&USRPRF)


NxtSrvReq:
  RCVF RCDFMT(QNSSRI)                      /* Process next service requester  */
    MONMSG  CPF0864 EXEC(GOTO ENDPGM)      /* Last record                     */

  DLTOVR FILE(PTFEXCEPT)
    MONMSG     MSGID(CPF0000)       /* Override not found at specified level. */
  OVRDBF FILE(PTFEXCEPT) TOFILE(*FILE) MBR(&WNSRCPN)

NxtPTF:                             /* Read next PTF to be sent               */
  CALL GG244372/SNDPTFRPG PARM(&SCPTFID &SCPPID &LRIND)

/* Send the INSPTF command if this is a new product or we reached EOF.        */
/* It will apply all immediate PTFs and mark all delayed PTFs to be applied   */
/* at the next IPL, which is scheduled for the time specified in &schtime.    */

  IF  (((&PPIDPRV *NE ' ') *AND (&PPIDPRV *NE &SCPPID)) +
   *OR (&LRIND *EQ '1') )   DO
     CHGVAR  &PPIDPRV &SCPPID
     RUNSMGCMD +
         CMD(INSPTF LICPGM((&PPIDPRV)) INSTYP(*IMMDLY))    +
         RMTSTRTIME(*LCLSYS (&SCHTIME)) +
         USRPRF(&usrprf) PASSWORD(&password) ENCODE(*NO)
  ENDDO

  IF   (&LRIND *EQ '1')   DO               /* If all PTF processed            */
     GOTO  NxtSrvReq                       /* Process next service requester  */
  ENDDO

/* Send PTF to Service Requester                                              */

  SNDPTF     PTFID((&SCPTFID)) DESTSRVRQS((*NETATR &WNSRCPN)) MAXDST(*NOMAX) +
             SNDRQT(*YES) CHECK(*YES) PTFPART(*ALL)
    MONMSG  (CPF0000 SMU0000)

  GOTO  NxtPTF

ENDPGM: ENDPGM
```

Figure 162. CL Program DSTSPTPTF: Distribute Supported PTFs to Service Requesters

The DSTSPTPTF program performs the following tasks:

1. For each service requester, send all of the PTFs found in the corresponding member of file PTFEXCEPT. The Send Program Temporary Fix (SNDPTF) command creates customized PTF packages including PTF requisites by specifying the *YES value for the send requisites (SNDRQT) parameter and *YES for the check (CHECK) parameter of the SNDPTF command. This tells the system to check each service requester that is receiving PTFs to determine which requisite PTFs are necessary to apply with the PTFs you want to distribute. Each service requester destination then receives only the PTFs that are necessary for that specific system. By using the SNDPTF command, we do not need to be concerned with licensed program products features or prerequisite PTFs, the checking is done automatically.
2. When all of the PTFs for a particular licensed program have been sent, install the PTFs using the Install PTF (INSPTF) command. In the program DSTSPTPTF, the INSPTF command is run using the fast path command RUNSMGCMD and we schedule the execution on the remote system at a later time (as specified in call parameter &SCHTIME). The parameter PTF apply type (INSTYP) in the INSPTF command allows you to specify the type of install to perform. By specifying *IMMDLY, all of the immediate PTFs are applied and all of the delayed PTFs are marked for delayed apply whenever an initial program load (IPL) is performed the next time. However, this program does *not* trigger an IPL; this should be scheduled by another change request or the power on and off tasks of Operational Assistant. The latter is activated by running the Change Power On/Off Schedule (CHGPWRSCD) command.

EXAMPLE 26

RPG Program to Retrieve Names of Supported PTFs: Figure 163 shows the printout of the RPG IV program SNDPTFRPG called by the CL program DSTSPTPTF The function of the SNDPTFRPG program is to retrieve the PTF ID and Licensed Program ID from the PTFEXCEPT database file. The fields are returned and used in the SNDPTF and INSPTF commands.

```
FPTFEXCEPT IF   E            DISK    USROPN
C     COUNT         IFNE      1
C     *IN99         OREQ      '1'
C                   SETOFF                                        99
C                   OPEN      PTFEXCEPT
C                   Z-ADD     1             COUNT             1 0
C                   ENDIF
C     *ENTRY        PLIST
C                   PARM                    SCPTFID
C                   PARM                    SCPPID
C                   PARM      *IN99         LR                1
C                   READ      PTFEXCEPT                               99
C     *IN99         IFEQ      '1'
C                   CLOSE     PTFEXCEPT
C                   ENDIF
C                   RETURN
```

Figure 163. SNDPTFRPG Program

Chapter 6. Security and Auditing Considerations

It is important that you have sufficient security and auditing procedures implemented on your AS/400 system. You want to protect the value of and investment made in your application programs and the confidentiality of your data. No one should be allowed to use applications, programs, or access data unless they have a need to know or use them. The AS/400 Security Administrator should explore all of the OS/400 and OCC/400 security and auditing functions available that make your AS/400 system a secured system.

This chapter gives examples on how you can implement security on both the central site or managing system and the managed systems. By using the examples in this chapter, you can control the remote commands and requests sent to the managed system and audit the actions performed based on the type of activity, object, and user.

It is important to understand that normal OS/400 security and authorization still apply to the objects being managed. For example, if a program or a database file is being replaced, the user profile that the change request runs under must have *ALL object authority to the program or database file.

On top of this, OCC/400 has its own security functions to control which users have access to the different OCC/400 commands and underlying programs or APIs. It is the specific OCC/400 security elements that we elaborate further on in this chapter.

As we describe the OCC/400 security aspects, you may want to know more details about all of the other OS/400 security and auditing features. The following IBM publications provide the detailed information on general OS/400 security and auditing:

- *AS/400 Advanced Series Security - Basic*, SC41-3301
- *AS/400 Advanced Series Security - Reference*, SC41-4302
- *An Implementation Guide for AS/400 Security and Auditing*, GG24-4200

About the Publications

This document applies to V3R1 and V3R1M1 of System Manager/400 and Managed System Services/400. The corresponding publications do not contain the latest updates on the security enhancements explained later in this chapter. New security programs and added functions are delivered with V3R6 of System Manager/400 and Managed System Services/400 and are documented in the corresponding publications for V3R6: The *System Manager/400 Use* and the *Managed System Services/400 Use*.

The new V3R6 security functions can also be used on V3R1 systems and for that reason, we explain what they are and what they can do for you. Also, we have included the V3R6 programming examples in this publication and on the diskette in the back of this document.

Security at the Central Site System

Managing multiple systems in a network requires planning and considerations in different areas. At the central site system, we have the following points to consider:

- Which users should be allowed to use System Manager/400?
- Should CRQDs run under the owner's profile?
- Can the central site system be managed by other systems?
- Should the systems encode passwords and command strings?

How to Authorize Users to System Manager/400

In addition to the security rules you have to set up at any AS/400 system, some additional considerations appear if you want to manage multiple systems from one central site. Some decisions have to be made for the central site system, others for each managed system, and there are also definitions that must match between the central and the managed systems.

At the central site system, you must decide which users are allowed to use System Manager/400. Depending on the size of your organization, you may want more then one operator to have authority to use System Manager/400 functions but you might not want to grant the *ALLOBJ special authority to all of them.

Some change requests may also require authorities to objects on the central site system such as sending files that have the public authority *EXCLUDE. This change request can be submitted by an operator, but it may run under the profile of the system administrator who owns the CRQD.

Because of the fact that you also need to install Managed System Services/400 at the central site system, this system can potentially be managed by other systems with System Manager/400 installed. You may want to disable that possibility or at least decide which other systems are allowed to do so.

Most commands are not available to the typical user or a user with user class *USER. To perform sensitive functions, you need to have one of the following authorities:

- *ALLOBJ special authority.
- QPGMR or QSYSOPR as your group profile name.
- *USE authority granted for each System Manager/400 command.

System Manager/400 Command Authorities

The System Manager/400 commands are divided into two groups:

1. The commands with public authority *USE.
2. The commands with public authority *EXCLUDE.

System Manager/400 Commands with Public Authority *USE

Public authority *USE means that all users can submit or track an existing change request description. Although every user is authorized to use the Submit Change Request (SBMCRQ) command, you also need *USE authority for the particular change request description (CRQD) because the default is *PUBLIC *EXCLUDE when you create a CRQD. These are the System Manager/400 commands that have public authority *USE:

- Submit Change Request (SBMCRQ)
- Delete Submitted CRQ (DLTSBMCRQ)
- Display Submitted CRQs (DSPSBMCRQ)
- Work with Submitted CRQs (WRKSBMCRQ)
- Display Submitted CRQ Activity (DSPSBMCRQA)
- End Submitted CRQ Activity (ENDSBMCRQA)
- Hold Submitted CRQ Activity (HLDSBMCRQA)
- Release Submitted CRQ Activity (RLSSBMCRQA)
- Work with Submitted CRQ Activities (WRKSBMCRQA)
- Display Submitted CRQ Messages (DSPSBMCRQM)
- Display Service Provider Attributes (DSPSRVPVDA)
- Work with Submitted CRQs (WRKSBMCRQ)
- Remove CRQD Activity (RMVCRQDA)

However, only the user who submitted a change request can work with it (WRKSBMCRQ), unless you have the special authority *JOBCTL.

Tip

When you install System Manager/400, the product commands are copied from QSMU to QSYS. If you then choose to restrict access to some of the commands by changing the public authority from *USE to *EXCLUDE, a user might, instead, call the command from library QSMU. So, remember to change the command authority both places.

System Manager/400 Commands with Public Authority *EXCLUDE

All other commands provided by System Manager/400 have public authority *EXCLUDE and most of them have the following IBM supplied user profiles authorized to use the commands:

- QSYSOPR
- QPGMR
- QSRV
- QSRVBAS

Tip

See Appendix G in the *System Manager/400 Use*, SC41-3321, for a complete list of all of the restricted commands with public authority *EXCLUDE and the authorization of the IBM supplied user profiles.

Recommendations for Authorizing Users

Users that need to create or modify change requests, must be authorized to the corresponding commands as they are shipped with the default public authority *EXCLUDE. As a general rule, *ALLOBJ special authority should be restricted and tightly controlled, so to avoid using this powerful authority, you may want to use one or a combination of the following options:

1. Use authority lists to secure the System Manager/400 command objects in QSYS and add the individual user profiles to the list with *USE authority. If the user profiles already are members of an existing group profile, you can just add the group profile name to the list with *USE authority. The users do not have to be authorized to the underlying command processing programs as they are shipped with public authority *EXECUTE.

2. Use QPGMR or QSYSOPR as the group profile name in the individual user profiles, depending on their roles. By doing that, you add the QPGMR or the QSYSOPR authorities to their individual user profile. QSRV and QSRVBAS should normally not be considered as group profiles since they are meant to be used by IBM services personnel.
3. Use USRPRF(*OWNER) when creating the CRQDs. Have an authorized user create the Change Request Description (CRTCRQD) using parameter USRPRF(*OWNER). That is, the user who submits the CRQ does not need permanent authority to the objects being handled by the CRQ; however *USE authority is needed for the CRQD object.

Tip

The following IBM supplied user profiles should not be used to submit CRQs: QDBSHR, QDFTOWN, QDOC, QLPAUTO, QLPINSTALL, QRJE, QSECOFR, QSPL, QSYS, and QTSTRQS.
The reason for this is that these user profiles are not allowed to run the SBMJOB command, which is used by the SBMCRQ command. Also, they should not own any CRQ created with parameter USRPRF(*OWNER).

Authorization List Example

An authorization list is created on your system when you install V3R1M1 of System Manager/400. It contains System Manager/400 commands that did not exist before you installed the System Manager/400 licensed program. The authorization list **QSM1AUTL** includes all of the commands and APIs that have public authority *EXCLUDE.

You can use the QSM1AUTL authorization list to grant users authority to all of these commands and APIs in a single step by adding them to the list instead of having to give individual authority to each command or API.

```
                          Edit Authorization List

Object . . . . . . . :   QSM1AUTL        Owner  . . . . . . . :   QSYS
  Library  . . . . . :     QSYS          Primary group  . . . :   *NONE

Type changes to current authorities, press Enter.

             Object    List
User        Authority  Mgt
QSYS        *ALL        X
MARCELA     *USE
BENT        *USE
*PUBLIC     *USE



F3=Exit   F5=Refresh   F6=Add new users
F11=Display detail object authorities   F12=Cancel   F24=More keys
```

Figure 164. Adding Users MARCELA and BENT to the QSM1AUTL Authorization List

Figure 164 shows how we now have added two more users to QSM1AUTL. Do not let it confuse you that *PUBLIC is *USE on the authorization list, because it is the public authority on the object itself that tells us where public authority is taken from. As the objects on this list all have *PUBLIC *EXCLUDE (instead of *PUBLIC *AUTL), public authority **is** excluded.

Example Authorization List Program AUTLPGM

A sample program **AUTLPGM** is included in V3R6 of System Manager/400 in file QANSSRC in the library QSMU. It is written in CL language and provides an example of how existing users are added to the QSM1AUTL authorization list. It also shows how additional authorization lists are created by the program and users are added to them depending on their user class, special authorities, or group profile.

Since the CL program can be used on **any** V3R1M1 system, we have included the source listing in Figure 165 on page 260 and on the diskette that comes with this publication.

Follow These Steps in Creating Your Own Program:

1. Read the comments in the program to see if it fits your environment.
2. Copy the sample CL source program to a physical file member in a different library. You then have the original source as a backup.
3. Tailor the copied source file member to your environment. The sample program checks if it is running under a user profile having *ALLOBJ or *SECADM special authorities. It is **not** recommended to remove this check.
4. Compile and run the program.

If you want different groups of users to have different authorities to different commands or APIs **without** using the sample program, you can create your own authorization list with the CRTAUTL command. But if you want to use your own authorization list, you must check if the command or API already is secured by an authorization list such as QSM1AUTL. If it is, just use the Grant Object Authority (GRTOBJAUT) command to add the object to your new authorization list. Since objects can only be secured by one authorization list, GRTOBJAUT will add the command or API to the new authorization list and will remove it from the existing one.

If working with authorization lists is new to you, we recommend that you refer to the general security manuals mentioned in the introduction to this chapter.

AUTLPGM

```
/*****************************************************************/
/*                                                               */
/* PROGRAM NAME: AUTLPGM                                         */
/*                                                               */
/* PROGRAM DESC: EXAMPLE AUTHORIZATION LIST PROGRAM              */
/*                                                               */
/* LANGUAGE:     CL                                              */
/*                                                               */
/* FUNCTION:     ADDS USERS TO THE AUTHORIZATION LIST SHIPPED WITH   */
/*               SYSTEM MANAGER/400, WHICH CONTROLS ACCESS TO    */
/*               COMMANDS AND APIS IN THAT PRODUCT (THOSE SHIPPED    */
/*               WITH PUBLIC *EXCLUDE AUTHORITY).                */
/*                                                               */
/*               IN THIS EXAMPLE, TWO ADDITIONAL AUTHORIZATION LISTS */
/*               ARE CREATED, THIS PROVIDES A MECHANISM TO CONTROL   */
/*               ACCESS TO SYSTEM MANAGER/400 FUNCTIONS FOR THREE    */
/*               MAJOR GROUPS OF USERS:                          */
/*                                                               */
/*                1.- GENERAL USAGE FUNCTIONS - AVAILABLE TO ALL     */
/*                    USERS.                                     */
/*                                                               */
/*                2.- SOFTWARE DEVELOPMENT/MAINTENANCE FUNCTIONS -   */
/*                    FOR USERS INVOLVED IN ACTIVITIES RELATED TO    */
/*                    CREATION, TEST AND MAINTENANCE OF SYSTEM       */
/*                    APPLICATIONS.                              */
/*                                                               */
/*                3.- ADMINISTRATOR FUNCTIONS - FOR USERS REQUIRING  */
/*                    ACCESS TO ALL SYSTEM MANAGER/400 COMMANDS AND  */
/*                    APIS, TYPICALLY TO PERFORM ADMINISTRATIVE AND  */
/*                    CONFIGURATION TASKS.                       */
/*                                                               */
/*               AFTER CREATING THE NEW AUTHORIZATION LISTS, THIS    */
/*               PROGRAM SETS THE COMMANDS THAT WILL BE SECURED BY   */
/*               EACH LIST AND GETS INFORMATION ABOUT ALL EXISTING   */
/*               USER PROFILES; EACH USER IS EVALUATED AND ADDED     */
/*               TO ONE OR MORE AUTHORIZATION LISTS.  USER CLASS,    */
/*               SPECIAL AUTHORITIES AND GROUP PROFILE ARE           */
/*               CONSIDERED IN THIS EVALUATION, AS FOLLOWS:          */
/*                                                               */
/*               - A USER PROFILE IS ADDED TO ALL AUTHORIZATION      */
/*                 LISTS IF ANY OF THE FOLLOWING CONDITIONS IS       */
/*                 SATISFIED:                                    */
/*                  - USER CLASS = *SECADM                       */
/*                  - SPECIAL AUTHORITIES = *ALLOBJ OR *SECADM   */
/*                  - GROUP PROFILE = 'SYSADMIN'                 */
/*                                                               */
/*               - USER IS ADDED TO "GENERAL USAGE" AND "SOFTWARE    */
/*                 DEVELOPMENT" LISTS IF: (ANY OF THE FOLLOWING)     */
/*                  - USER CLASS = *PGMR                         */
/*                  - SPECIAL AUTHORITIES = *SERVICE             */
/*                  - GROUP PROFILE = 'DEVELOPER'                */
/*                                                               */
/*               - ALL OTHER USERS ARE ADDED ONLY TO THE "GENERAL"   */
/*                 AUTHORIZATION LIST.                           */
/*                                                               */
/*               A CHECK IS MADE TO ENSURE THAT THIS PROGRAM IS RUN  */
/*               UNDER A USER PROFILE HAVING *ALLOBJ OR *SECADM      */
/*               SPECIAL AUTHORITIES.                            */
/*                                                               */
/* NOTES:       A).- THE AUTHORIZATION LIST SHIPPED WITH SYSTEM     */
/*                   MANAGER/400 (QSM1AUTL) IS USED HERE AS THE      */
/*                   "SOFTWARE DEVELOPMENT/MAINTENANCE FUNCTIONS"    */
/*                   LIST.                                       */
/*                                                               */
/*              B).- GROUP PROFILES 'SYSADMIN' AND 'DEVELOPER' ARE   */
/*                   USED IN THIS EXAMPLE ONLY FOR ILLUSTRATION      */
/*                   PURPOSES, THEY ARE NOT PART OF THE PRODUCT.     */
/*                                                               */
/* TO USE THIS EXAMPLE:                                          */
/*                                                               */
/* 1) COPY THIS SOURCE MEMBER TO A SOURCE PHYSICAL FILE MEMBER IN    */
/*    A DIFFERENT LIBRARY.                                       */
/* 2) MODIFY THE PROGRAM AS NEEDED FOR YOUR ENVIRONMENT.             */
/* 3) COMPILE THE SOURCE USING THE CRTCLPGM COMMAND.                 */
/* 4) RUN THE COMPILED PROGRAM.                                  */
/*                                                               */
/*****************************************************************/
```

Figure 165 (Part 1 of 5). Sample CL Program AUTLPGM Included with This Document's Diskette

```
 AUTPGMCL:   PGM

/*-----------------------------------------------------------------*/
/* LOCAL VARIABLES                                                 */
/*-----------------------------------------------------------------*/

/* THESE VARIABLES WILL CONTAIN THE NAME OF EACH AUTHORIZATION LIST  */
            DCL        VAR(&DEVEL_LIST) TYPE(*CHAR) LEN(10) +
                         VALUE('QSM1AUTL  ')
                         /* AUTHORIZATION LIST SHIPPED WITH SYSTEM +
                            MANAGER/400                            */
            DCL        VAR(&ADMIN_LIST) TYPE(*CHAR) LEN(10) +
                         VALUE('SM1ADMAUTL')
                         /* ADMINISTRATOR FUNCTIONS LIST, CREATED +
                            IN THIS PROGRAM                       */
            DCL        VAR(&GENER_LIST) TYPE(*CHAR) LEN(10) +
                         VALUE('SM1GENAUTL')
                         /* GENERAL USAGE FUNCTIONS LIST, CREATED +
                            IN THIS PROGRAM                       */

/* ERROR CODE PARAMETER FOR APIS                                     */
            DCL        VAR(&API_ERR) TYPE(*CHAR) LEN(8) +
                         VALUE(X'0000000800000000')

/* VARIABLES USED TO CREATE AND MANIPULATE A LIST OF USER PROFILES   */
            DCL        VAR(&NUMBER) TYPE(*CHAR) LEN(6)
                         /* CURRENT JOB NUMBER                     */
            DCL        VAR(&USR_SPC) TYPE(*CHAR) LEN(20) +
                         VALUE('AUTL      QTEMP     ')
                         /* USER SPACE NAME AND LIBRARY            */
            DCL        VAR(&NUM_ENT_B) TYPE(*CHAR) LEN(4)
                         /* NUMBER OF LIST ENTRIES IN BINARY 4 FORM */
            DCL        VAR(&NUM_ENT) TYPE(*DEC) LEN(8 0)
                         /* NUMBER OF LIST ENTRIES, DECIMAL 8,0 FORM*/
            DCL        VAR(&SIZE_ENT_B) TYPE(*CHAR) LEN(4)
                         /* SIZE OF EACH ENTRY, IN BINARY 4 FORM    */
            DCL        VAR(&SIZE_ENT) TYPE(*DEC) LEN(8 0)
                         /* SIZE OF EACH ENTRY, IN DECIMAL 8,0 FORM */
            DCL        VAR(&STR_POS_B) TYPE(*CHAR) LEN(4)
                         /* USER SPACE OFFSET, IN BINARY 4 FORM     */
            DCL        VAR(&STR_POS) TYPE(*DEC) LEN(8 0)
                         /* USER SPACE OFFSET, IN DECIMAL 8,0 FORM  */
            DCL        VAR(&THIS_USER) TYPE(*CHAR) LEN(10)
                         /* A USER PROFILE, RETRIEVED FROM THE LIST */

/* VARIABLES USED TO CHECK IF A USER PROFILE HAS SPECIAL AUTHORITIES */
/* OR IF IT BELONGS TO A GIVEN CLASS OR GROUP                        */
            DCL        VAR(&USER_INFO) TYPE(*CHAR) LEN(83)
                         /* TO GET INFORMATION ABOUT EACH USER      */
            DCL        VAR(&USER_CLASS) TYPE(*CHAR) LEN(10)
                         /* CLASS (SUBSTRING FROM &USER_INFO)       */
            DCL        VAR(&USER_SPEC) TYPE(*CHAR) LEN(15)
                         /* SPECIAL AUTHORITIES (FROM &USER_INFO)   */
            DCL        VAR(&USER_GROUP) TYPE(*CHAR) LEN(10)
                         /* GROUP PROFILE (FROM &USER_INFO          */
            DCL        VAR(&SPEC_AUT) TYPE(*CHAR) LEN(1)
                         /* INDICATES (Y/N) IF USER HAS A GIVEN +
                            SET OF SPECIAL AUTHORITIES              */

/*-----------------------------------------------------------------*/
/* START OF EXECUTABLE CODE                                        */
/*-----------------------------------------------------------------*/

/*-----------------------------------------------------------------*/
/* CHECK IF CURRENT JOB'S USER HAS *ALLOBJ OR *SECADM AUTHORITIES.  */
/* IF NOT, SEND A MESSAGE AND END EXECUTION                        */
/*-----------------------------------------------------------------*/
            CALL       PGM(QSYCUSRS) PARM(&SPEC_AUT '*CURRENT  ' +
                         '*ALLOBJ   *SECADM   ' X'00000002' +
                         X'00000000' &API_ERR)

            IF         COND(&SPEC_AUT = 'N')  THEN(DO)
            SNDPGMMSG  MSG('NOT AUTHORIZED TO RUN THIS PROGRAM')
            RETURN
            ENDDO
```

Figure 165 (Part 2 of 5). Sample CL Program AUTLPGM Included with This Document's Diskette

```
/*-----------------------------------------------------------------*/
/* CREATE THE NEW AUTHORIZATION LISTS (ONLY IF THEY DO NOT EXIST).   */
/*-----------------------------------------------------------------*/
            CRTAUTL    AUTL(&ADMIN_LIST) TEXT(*BLANK) AUT(*EXCLUDE)
            MONMSG     MSGID(CPF0000)

            CRTAUTL    AUTL(&GENER_LIST) TEXT(*BLANK) AUT(*EXCLUDE)
            MONMSG     MSGID(CPF0000)

/*-----------------------------------------------------------------*/
/* DEFINE THE COMMANDS AND APIS THAT WILL BE SECURED BY THE          */
/* ADMINISTRATOR FUNCTIONS" LIST CREATED IN THIS PROGRAM.  THIS WILL */
/* REMOVE THEM FROM THE AUTHORIZATION LIST SHIPPED WITH SYSTEM       */
/* MANAGER/400 (ONLY ONE AUTHORIZATION LIST CAN BE USED TO SECURE AN */
/* OBJECT).                                                          */
/*-----------------------------------------------------------------*/
            GRTOBJAUT  OBJ(CHGSRVPVDA) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* CHANGE SERVICE PROVIDER ATTRIBUTES      */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(WRKSRVRQS) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* WORK WITH SERVICE REQUESTERS            */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(DLTPRDDFN) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* DELETE PRODUCT DEFINITION               */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(DLTPRDLOD) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* DELETE PRODUCT LOAD                     */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(DLTRMTPTF) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* DELETE REMOTE PTF                       */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(HLDPTF) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* HOLD PROGRAM TEMPORARY FIX              */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(INSRMTPRD) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* INSTALL REMOTE PRODUCT                  */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(ORDSPTPTF) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* ORDER SUPPORTED PRODUCT PTFS             */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(RLSPTF) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* RELEASE PROGRAM TEMPORARY FIX           */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(RMVRMTPTF) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* DELETE PRODUCT DEFINITION               */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(RTVPRD) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* RETRIEVE PRODUCT                        */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(RTVPTF) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* RETRIEVE PROGRAM TEMPORARY FIX          */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(SNDLIC) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* SEND LICENSE                            */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(SNDPRD) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* SEND PRODUCT                            */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(SNDPTF) OBJTYPE(*CMD) AUTL(&ADMIN_LIST)
                         /* SEND PROGRAM TEMPORARY FIX              */
            MONMSG     MSGID(CPF0000)
```

Figure 165 (Part 3 of 5). Sample CL Program AUTLPGM Included with This Document's Diskette

```
/*-----------------------------------------------------------------*/
/* DEFINE THE COMMANDS AND APIS THAT WILL BE SECURED BY THE "GENERAL */
/* USAGE FUNCTIONS" LIST CREATED IN THIS PROGRAM.  THIS WILL REMOVE  */
/* THEM FROM THE AUTHORIZATION LIST SHIPPED WITH SYSTEM MANAGER/400  */
/* (ONLY ONE AUTHORIZATION LIST CAN BE USED TO SECURE AN OBJECT).    */
/*-----------------------------------------------------------------*/
            GRTOBJAUT  OBJ(ADDCMDCRQA) OBJTYPE(*CMD) AUTL(&GENER_LIST)
                         /* ADD COMMAND CRQ ACTIVITY                */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(ADDOBJCRQA) OBJTYPE(*CMD) AUTL(&GENER_LIST)
                         /* ADD OBJECT CRQ ACTIVITYY                */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(CHGCMDCRQA) OBJTYPE(*CMD) AUTL(&GENER_LIST)
                         /* CHANGE COMMAND CRQ ACTIVITY             */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(CHGOBJCRQA) OBJTYPE(*CMD) AUTL(&GENER_LIST)
                         /* CHANGE OBJECT CRQ ACTIVITY              */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(RTVSMGOBJ) OBJTYPE(*CMD) AUTL(&GENER_LIST)
                         /* RETRIEVE SMG OBJECT                     */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(RUNSMGCMD) OBJTYPE(*CMD) AUTL(&GENER_LIST)
                         /* RUN SMG COMMAND                         */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(RUNSMGOBJ) OBJTYPE(*CMD) AUTL(&GENER_LIST)
                         /* RUN SMG OBJECT                          */
            MONMSG     MSGID(CPF0000)

            GRTOBJAUT  OBJ(SNDSMGOBJ) OBJTYPE(*CMD) AUTL(&GENER_LIST)
                         /* SEND SMG OBJECT                          */
            MONMSG     MSGID(CPF0000)

/*-----------------------------------------------------------------*/
/* CREATE A USER SPACE TO CONTAIN A LIST OF ALL USER PROFILES IN THE */
/* SYSTEM. SIZE OF THE SPACE IS 87220 BYTES (X'0154B4'), IT ALLOWS   */
/* UP TO 500 PROFILES LISTED (220 BYTES FOR USER SPACE HEADER + 174  */
/* BYTES FOR EACH ENTRY IN THE LIST).                                */
/* CURRENT JOB NUMBER IS RETRIEVED AND ADDED TO THE USER SPACE NAME. */
/* IN CASE THE USER SPACE ALREADY EXISTS, IT IS DELETED BEFORE BEING */
/* CREATED AGAIN.                                                    */
/*-----------------------------------------------------------------*/
            RTVJOBA    NBR(&NUMBER)
            CHGVAR     VAR(%SST(&USR_SPC 5 6)) VALUE(&NUMBER)

            CALL       PGM(QUSDLTUS) PARM(&USR_SPC &API_ERR)

            CALL       PGM(QUSCRTUS) PARM(&USR_SPC 'AUTPGMCL  ' +
                         X'000154B4' ' ' '*EXCLUDE  ' 'USER SPACE +
                         TO LIST ALL USER PROFILES IN THE SYSTEM' +
                         '*YES      ' &API_ERR)

/*-----------------------------------------------------------------*/
/* CREATE THE LIST OF USER PROFILES, STORE IT IN THE USER SPACE.     */
/*-----------------------------------------------------------------*/
            CALL       PGM(QSYLAUTU) PARM(&USR_SPC 'AUTU0100' +
                         &API_ERR)

/*-----------------------------------------------------------------*/
/* FROM THE USER SPACE, GET TOTAL NUMBER OF ENTRIES IN THE LIST,     */
/* CONVERT IT TO DECIMAL FORM AND, IF ZERO, SEND MESSAGE AND END.    */
/*-----------------------------------------------------------------*/
            CALL       PGM(QUSRTVUS) PARM(&USR_SPC X'00000085' +
                         X'00000004' &NUM_ENT_B)
            CHGVAR     VAR(&NUM_ENT) VALUE(%BINARY(&NUM_ENT_B))
            IF         COND(&NUM_ENT = 0) THEN(GOTO CMDLBL(NOUSERS))

/*-----------------------------------------------------------------*/
/* RETRIEVE LIST ENTRY LENGTH, CONVERT TO DECIMAL.                   */
/*-----------------------------------------------------------------*/
            CALL       PGM(QUSRTVUS) PARM(&USR_SPC X'00000089' +
                         X'00000004' &SIZE_ENT_B)
            CHGVAR     VAR(&SIZE_ENT) VALUE(%BINARY(&SIZE_ENT_B))
```

Figure 165 (Part 4 of 5). Sample CL Program AUTLPGM Included with This Document's Diskette

```
/*-----------------------------------------------------------------*/
/* RETRIEVE OFFSET TO FIRST ENTRY IN THE LIST, CONVERT TO DECIMAL,   */
/* AND ADD ONE TO SET STARTING POSITION.                             */
/*-----------------------------------------------------------------*/
            CALL       PGM(QUSRTVUS) PARM(&USR_SPC X'0000007D' +
                         X'00000004' &STR_POS_B)
            CHGVAR     VAR(&STR_POS) VALUE(%BINARY(&STR_POS_B))
            CHGVAR     VAR(&STR_POS) VALUE(&STR_POS + 1)

/*-----------------------------------------------------------------*/
/* RETRIEVE EACH USER PROFILE IN THE LIST AND ADD IT TO THE "GENERAL */
/* USAGE FUNCTIONS" AUTHORIZATION LIST.  ALSO, IF THE PROFILE MEETS  */
/* THE CONDITIONS DEFINED, ADD IT TO ONE OR BOTH OF THE OTHER LISTS  */
/* ("ADMINISTRATOR FUNCTIONS" AND "SOFTWARE DEVELOPMENT/MAINTENANCE  */
/* FUNCTIONS").                                                      */
/*-----------------------------------------------------------------*/
 ADDUSR:    IF         COND(&NUM_ENT = 0) THEN(GOTO CMDLBL(ALLDONE))

            CHGVAR     VAR(%BINARY(&STR_POS_B)) VALUE(&STR_POS)

            CALL       PGM(QUSRTVUS) PARM(&USR_SPC &STR_POS_B +
                         X'0000000A' &THIS_USER)

            ADDAUTLE   AUTL(&GENER_LIST) USER(&THIS_USER) AUT(*USE)
            MONMSG     MSGID(CPF0000)

            CALL       PGM(QSYRUSRI) PARM(&USER_INFO X'00000053' +
                         'USRI0200' &THIS_USER &API_ERR)

            CHGVAR     VAR(&USER_CLASS) VALUE(%SST(&USER_INFO 19 10))

            CHGVAR     VAR(&USER_SPEC) VALUE(%SST(&USER_INFO 29 15))

            CHGVAR     VAR(&USER_GROUP) VALUE(%SST(&USER_INFO 44 10))

            IF         COND(&USER_CLASS = '*PGMR     ' *OR +
                            &USER_GROUP = 'DEVELOPER ' *OR +
                            (%SST(&USER_SPEC 6 1)) = 'Y') THEN(DO)
            ADDAUTLE   AUTL(&DEVEL_LIST) USER(&THIS_USER) AUT(*USE)
            MONMSG     MSGID(CPF0000)
            ENDDO

            IF         COND(&USER_CLASS = '*SECADM   ' *OR +
                            &USER_GROUP = 'SYSADMIN  ' *OR +
                            (%SST(&USER_SPEC 1 1)) = 'Y' *OR +
                            (%SST(&USER_SPEC 2 1)) = 'Y') THEN(DO)
            ADDAUTLE   AUTL(&DEVEL_LIST) USER(&THIS_USER) AUT(*USE)
            MONMSG     MSGID(CPF0000)
            ADDAUTLE   AUTL(&ADMIN_LIST) USER(&THIS_USER) AUT(*USE)
            MONMSG     MSGID(CPF0000)
            ENDDO

            CHGVAR     VAR(&STR_POS) VALUE(&STR_POS + &SIZE_ENT)

            CHGVAR     VAR(&NUM_ENT) VALUE(&NUM_ENT - 1)

            GOTO       CMDLBL(ADDUSR)

 NOUSERS:   SNDPGMMSG  MSG('NO USERS RETRIEVED')

/*-----------------------------------------------------------------*/
/* ALL DONE. NOW DELETE TEMPORARY SPACE THAT WAS CREATED             */
/*-----------------------------------------------------------------*/
 ALLDONE:   CALL       PGM(QUSDLTUS) PARM(&USR_SPC &API_ERR)
            MONMSG     MSGID(CPF0000)

/*-----------------------------------------------------------------*/
/* END OF EXECUTABLE CODE                                            */
/*-----------------------------------------------------------------*/

            ENDPGM
```

Figure 165 (Part 5 of 5). Sample CL Program AUTLPGM Included with This Document's Diskette

Group Profile Example

```
                        Change User Profile (CHGUSRPRF)

Type choices, press Enter.

User profile . . . . . . . . . . USRPRF       > BENT
User password  . . . . . . . . . PASSWORD       *SAME
Set password to expired  . . . . PWDEXP         *NO
Status . . . . . . . . . . . . . STATUS         *ENABLED
User class . . . . . . . . . . . USRCLS         *USER
Assistance level . . . . . . . . ASTLVL         *SYSVAL
Current library  . . . . . . . . CURLIB         *CRTDFT
Initial program to call  . . . . INLPGM         *NONE
Initial menu . . . . . . . . . . INLMNU         MAIN
  Library  . . . . . . . . . . .                  *LIBL
Limit capabilities . . . . . . . LMTCPB         *NO
Text 'description' . . . . . . . TEXT           'SM/400 User'
```

```
                        Change User Profile (CHGUSRPRF)

Type choices, press Enter.


                           Additional Parameters

Special authority  . . . . . . . SPCAUT         *NONE
                            + for more values
Special environment  . . . . . . SPCENV         *SYSVAL
Display sign-on information  . . DSPSGNINF      *SYSVAL
Password expiration interval . . PWDEXPITV      *SYSVAL
Limit device sessions  . . . . . LMTDEVSSN      *SYSVAL
Keyboard buffering . . . . . . . KBDBUF         *SYSVAL
Maximum allowed storage  . . . . MAXSTG         *NOMAX
Highest schedule priority  . . . PTYLMT         3
Job description  . . . . . . . . JOBD           QDFTJOBD
  Library  . . . . . . . . . . .                  QGPL
Group profile  . . . . . . . . . GRPPRF       > QSYSOPR
Owner  . . . . . . . . . . . . . OWNER        ? *USRPRF
```

*Figure 166. Adding QSYSOPR as Group Profile Name in a *USER Class User Profile*

Figure 166 illustrates how a *USER class user profile with no special authorities is added to the QSYSOPR user profile that is now a group profile. You also have to consider the next parameter (illustrated by a question mark (?)) that is the OWNER. If you specify *USRPRF as the value (and it is also the default), then the user profile, which in this case is BENT, becomes the owner of all objects created including all Change Request Descriptions (CRQD). User profile BENT may then authorize other users to work with the CRQDs for user profile BENT. If the OWNER becomes *GRPPRF, then all of the users who are included in the QSYSOPR group have *ALL authority to all of the objects created by user profile BENT.

Running a CRQ Under the Owner's Profile

```
                        Create CRQ Description (CRTCRQD)

Type choices, press Enter.

Change request description . . . CRQD
  Library  . . . . . . . . . . .                  *CURLIB
User profile . . . . . . . . . . USRPRF     >    *OWNER
Problem identifier . . . . . . . PRBID          *NONE
Problem origin:                  PRBORG
  Network identifier . . . . . .                 *NETATR
  Control point name . . . . . .                 *NETATR
Text 'description' . . . . . . . TEXT           *BLANK


                            Additional Parameters

Authority  . . . . . . . . . . . AUT            *EXCLUDE
```

*Figure 167. Using *OWNER as Authority Instead of *SBM, Which is the Default*

Figure 167 shows whether the authority checking (done while this change request is running) is based on the user who submitted the change request description USRPRF(*SBM) or on the owner of the change request description USRPRF(*OWNER). The user profile is used to run the change request and control which objects are used by the change request.

The possible values for USRPRF are:

- *SBM - The user profile of the submitter is used when the change request is run.
- *OWNER - The user profile of the change request description owner is used when the change request is run.

Tip

This is not the same as a program that runs under its owner's profile (adopted authority) for which both the program owner and the program user profiles are used. **Only** the owner's profile is used if this value is specified.

For example, if you want to send an object, System Manager/400 saves it into a save file before sending it. To save an object, the user needs object existence (*OBJEXIST) authority to that object or *SAVSYS special authority with the user profile.
Now, using parameter USRPRF(*OWNER) allows a user having one of those authorities to create a CRQD that then can be submitted by another user that does not have it.

Points to Remenber when Running a CRQ Under the Owner:

1. It relates only to those tasks to be performed on the **central site system** (for example, to save an object into a save file prior to distribution).
2. It is used not in addition, but **instead of the submitter's profile**.

The Central Site System Can Also Be a Managed System

Managed System Services/400 needs to be installed not only at the managed systems, but also at the central site system. Therefore, all of the functions are available to allow another system to manage your central site system.

This may or may not be desirable. In any case, you should make sure your system can only be managed by those systems and those users who are supposed to do so. For example:

- Systems that **only** have Managed System Services/400 installed **can send remote commands** using the Send Remote Command (QCQSRCMD) API, instead of using the command RUNSMGCMD, which is part of System Manager/400. The QCQSRCMD API is an entry point in the QCQROAPI service program included in Managed System Services/400. The QCQSRCMD API is shipped with public authority *EXCLUDE; only QSYSOPR has *USE authority to this API.
- Systems not belonging to your network (customers, software vendors, and so on), but having a communications connection to your central site system, are able to send objects or run programs (if they have System Manager/400 installed) without specifying a password, as a password is not required or sent with a CRQD.

```
                    Change Managed System Atr (CHGMGDSYSA)

 Type choices, press Enter.

 Accept received activities . . . ACCRCVCRQA  >  *NO
 Distribution security pgm  . . . SECPGM         *DFT
   Library  . . . . . . . . . . .
 Default user profile . . . . . . DFTUSRPRF      QSVMSS
 Inactive user time-out . . . . . INACTITV       0
 Send intermediate responses  . . SNDINTRSP      *YES
 Global name prefix tokens  . . . PFXTOKEN       ITSCNET
                            + for more values    STANDARD
 Remote command security pgm  . . RMTSECPGM      QVARSUXT
   Library  . . . . . . . . . . .                  QSVMSS
 Maximum return data  . . . . . . MAXDTA         *NOMAX
 Delete spool file  . . . . . . . DLTSPLF        *SUCCESS
 Remote command key . . . . . . . KEY            MY SECRET KEY
```

*Figure 168. ACCRCVCRQA(*NO) in the Changed Managed System Attributes*

Figure 168 shows one way to disable incoming change requests. You set the **Accept received activities** (ACCRCVCRQA) parameter to *NO with the Change Managed System Attributes (CHGMGDSYSA) command. The parameter specifies whether change request activities are to be accepted for processing. While this is the easiest way to avoid an incoming request to be honored, you are then not able to run change requests that have some activities that need to be performed at the central site system.

Therefore, use the methods described in “Security at the Managed Site System” on page 268 for securing the central site as you would secure managed systems in your network.

Encoded Passwords and Command Strings

Encoding is only used for remote commands and the following is encoded:

- The command string
- The user profile name
- The password

You specify the key that is used for encoding or decoding the remote command request in the KEY parameter in the Change Managed System Attribute command. The values must be the same for the system that sends the remote command and for the system that receives the remote command. The KEY parameter has the following options:

- *NONE - No encoding or decoding key is used.
- Key - Specify a 64-byte character string as a character string or hexadecimal string.

```
                    Change Managed System Atr (CHGMGDSYSA)

 Type choices, press Enter.

 Accept received activities . . . ACCRCVCRQA     *NO
 Distribution security pgm  . . . SECPGM         *DFT
   Library  . . . . . . . . . . .
 Default user profile . . . . . . DFTUSRPRF      QSVMSS
 Inactive user time-out . . . . . INACTITV       0
 Send intermediate responses  . . SNDINTRSP      *YES
 Global name prefix tokens  . . . PFXTOKEN       ITSCNET
                            + for more values    STANDARD
 Remote command security pgm  . . RMTSECPGM      QVARSUXT
   Library  . . . . . . . . . . .                  QSVMSS
 Maximum return data  . . . . . . MAXDTA         *NOMAX
 Delete spool file  . . . . . . . DLTSPLF        *SUCCESS
 Remote command key . . . . . . . KEY         >   MY SECRET KEY
```

Figure 169. Remote Command Key in the Changed Managed System Attributes

Security at the Managed Site System

Certain areas of security need to be considered in order to control who at the managed system is authorized to the Managed System Services/400 commands and to protect a managed system from being accessed by an unauthorized user at a central site system.

In this section, we discuss:

- How to control access to Managed System Services/400 commands.
- Distribution security considerations.
- Remote command security considerations.

Note

You may also want to refer to the *Managed System Services/400 Use*, which has additional information about security at the managed system.

How to Control Access to Managed System Services/400 Commands

Some users at the managed system may occasionally need access to Managed System Services/400 commands such as WRKRCVCRQA, PKGPRDDST, WRKDSTCLGE, and so on. To simplify the administration of authorizing users to the different commands on the managed system, we have provided a sample program that creates authorization lists, secures the Managed System Services/400 commands by one of the created lists, and adds users to the lists.

Normally you do not need to authorize all of your users to the Managed System Services/400 commands, as most of the managed systems run unattended. Therefore, you may want to tailor the sample authorization list program only to authorize specific users or user groups.

As the QPGMR and the QSYSOPR user profile is specifically authorized to the commands, you may not need to authorize additional users. In this case, you do not need the AUTLMSS sample program.

Example Authorization List Program AUTLMSS

A sample authorization list CL program to be used on Managed System Services/400 systems is included here and on the diskette in the back of this publication. It creates two authorizations lists (AUTLMSS1 and AUTLMSS2) to control access to Managed System Services/400 commands and APIs. The program then adds existing users to one or both of the lists, based on the user profile's special authority *JOBCTL. *This is the part of the program you may want to change just to include a limited group of users that may be using the commands*.

Follow These Steps in Creating Your Own Program:

1. Read the comments in the program to see if it fits your environment.
2. Copy the sample CL source program to a physical file member in a different library. You then have the original source as a backup.
3. Tailor the copied source file member to your environment. The sample program checks if it is running under a user profile having *ALLOBJ or *SECADM special authorities. It is **not** recommended to remove this check.
4. Compile and run the program.

```
/*****************************************************************/
/*                                                               */
/* PROGRAM NAME: AUTLMSS                                         */
/*                                                               */
/* PROGRAM DESC: EXAMPLE AUTHORIZATION LIST PROGRAM              */
/*                                                               */
/* LANGUAGE:     CL                                              */
/*                                                               */
/* FUNCTION:     CREATES 2 AUTHORIZATION LISTS TO CONTROL ACCESS TO  */
/*               MANAGED SYSTEM SERVICES/400 COMMANDS AND APIS.      */
/*                                                               */
/*               AUTLMSS1 - FOR COMMANDS/APIS WITH PUBLIC *EXCLUDE   */
/*                          AUTHORITY.                           */
/*               AUTLMSS2 - FOR COMMANDS/APIS REQUIRING *ALLOBJ OR   */
/*                          *JOBCTL SPECIAL AUTHORITY (ALSO HAVING   */
/*                          PUBLIC *EXCLUDE AUTHORITY).          */
/*                                                               */
/*               THESE LISTS CAN BE USED TO GRANT USERS AUTHORITY TO */
/*               COMMANDS AND APIS IN ONE SINGLE STEP, INSTEAD OF    */
/*               HAVING TO GIVE INDIVIDUAL AUTHORITY TO EACH COMMAND */
/*               OR API.                                         */
/*                                                               */
/*               AFTER CREATING THE AUTHORIZATION LISTS, THIS PROGRAM*/
/*               SETS THE COMMANDS/APIS THAT WILL BE SECURED BY EACH */
/*               LIST AND GETS INFORMATION ABOUT ALL EXISTING USER   */
/*               PROFILES; THOSE HAVING *JOBCTL SPECIAL AUTHORITY    */
/*               ARE ADDED TO BOTH AUTHORIZATION LISTS, OTHER USERS  */
/*               ARE ADDED ONLY TO THE FIRST ONE (AUTLMSS1).         */
/*                                                               */
/*               A CHECK IS MADE TO ENSURE THAT THIS PROGRAM IS RUN  */
/*               UNDER A USER PROFILE HAVING *ALLOBJ OR *SECADM      */
/*               SPECIAL AUTHORITIES.                            */
/*                                                               */
/* NOTES:        - THIS EXAMPLE PROGRAM ASSUMES THAT MANAGED SYSTEM  */
/*                 SERVICES/400 PRODUCT (5763MG1) IS INSTALLED IN    */
/*                 THE PRIMARY LANGUAGE OF THE SYSTEM (I.E. COMMANDS */
/*                 RESIDE IN QSYS LIBRARY).  IF THE PRODUCT IS       */
/*                 IN ANOTHER LANGUAGE, VARIABLE "&CMD_LIB" HAS TO   */
/*                 BE SET TO ITS CORRESPONDING 'QSYS29XX' LIBRARY.   */
/*                                                               */
/*               - THE AUTHORIZATION LISTS ARE CREATED ONLY THE FIRST*/
/*                 TIME THIS PROGRAM IS RUN.  IF THEY ALREADY EXIST, */
/*                 THE PROGRAM WILL UPDATE THE COMMANDS AND USER     */
/*                 PROFILES ASSOCIATED TO EACH LIST.  THIS ALLOWS    */
/*                 CHANGES WHEN NEW USER PROFILES ARE DEFINED IN THE */
/*                 SYSTEM.                                           */
/*                                                               */
/*               - THIS PROGRAM IS SET TO PROCESS UP TO 500 USER     */
/*                 PROFILES.  IF THIS LIMIT IS NOT ENOUGH, THE SIZE  */
/*                 FIELD IN THE SECOND CALL TO QUSCRTUS API HAS TO   */
/*                 BE CHANGED.                                       */
/*                                                               */
/* TO USE THIS EXAMPLE:                                          */
/*                                                               */
/* 1) COPY THIS SOURCE CODE INTO A SOURCE PHYSICAL FILE MEMBER.      */
/* 2) MODIFY THE CODE AS NEEDED FOR YOUR ENVIRONMENT.                */
/* 3) COMPILE THE SOURCE USING THE CRTCLPGM COMMAND.                 */
/* 4) RUN THE COMPILED PROGRAM.                                      */
/*                                                               */
/*****************************************************************/
```

Figure 170 (Part 1 of 6). Sample CL Program AUTLMSS Included with this Document's Diskette

```
 AUTLMSS:    PGM

/*-----------------------------------------------------------------*/
/* LOCAL VARIABLES                                                 */
/*-----------------------------------------------------------------*/

/* THESE VARIABLES WILL CONTAIN THE NAME OF EACH AUTHORIZATION LIST  */
            DCL        VAR(&LIST1_NAME) TYPE(*CHAR) LEN(10) +
                         VALUE('AUTLMSS1  ')
            DCL        VAR(&LIST2_NAME) TYPE(*CHAR) LEN(10) +
                         VALUE('AUTLMSS2  ')

/* LIBRARY CONTAINING THE COMMANDS THAT WILL BE SECURED             */
            DCL        VAR(&CMD_LIB) TYPE(*CHAR) LEN(10) +
                         VALUE('QSYS      ')

/* ERROR CODE PARAMETER FOR APIS                                    */
            DCL        VAR(&API_ERR) TYPE(*CHAR) LEN(8) +
                         VALUE(X'0000000800000000')

/* VARIABLES USED TO CREATE AND MANIPULATE A LIST OF COMMANDS AND A  */
/* LIST OF USER PROFILES                                            */
            DCL        VAR(&NUMBER) TYPE(*CHAR) LEN(6)
                         /* CURRENT JOB NUMBER                      */
            DCL        VAR(&USR_SPC) TYPE(*CHAR) LEN(20) +
                         VALUE('AUTL      QTEMP     ')
                         /* USER SPACE NAME AND LIBRARY (PROFILES)  */
            DCL        VAR(&NUM_ENT_B) TYPE(*CHAR) LEN(4)
                         /* NUMBER OF LIST ENTRIES IN BINARY 4 FORM */
            DCL        VAR(&NUM_ENT) TYPE(*DEC) LEN(8 0)
                         /* NUMBER OF LIST ENTRIES, DECIMAL 8,0 FORM*/
            DCL        VAR(&SIZE_ENT_B) TYPE(*CHAR) LEN(4)
                         /* SIZE OF EACH ENTRY, IN BINARY 4 FORM    */
            DCL        VAR(&SIZE_ENT) TYPE(*DEC) LEN(8 0)
                         /* SIZE OF EACH ENTRY, IN DECIMAL 8,0 FORM */
            DCL        VAR(&STR_POS_B) TYPE(*CHAR) LEN(4)
                         /* USER SPACE OFFSET, IN BINARY 4 FORM     */
            DCL        VAR(&STR_POS) TYPE(*DEC) LEN(8 0)
                         /* USER SPACE OFFSET, IN DECIMAL 8,0 FORM  */
            DCL        VAR(&THIS_ITEM) TYPE(*CHAR) LEN(10)
                         /* A SINGLE ITEM (COMMAND OR USER PROFILE) */

/* VARIABLES USED TO RETRIEVE PUBLIC AUTHORITY FOR A COMMAND        */
            DCL        VAR(&CMD_INFO) TYPE(*CHAR) LEN(18)
                         /* RECEIVER VARIABLE FOR QSYRUSRA API      */
            DCL        VAR(&CMD_NAME) TYPE(*CHAR) LEN(20)
                         /* QUALIFIED COMMAND NAME                  */
            DCL        VAR(&PUB_AUT) TYPE(*CHAR) LEN(10)
                         /* COMMAND'S PUBLIC AUTHORITY              */

/* VARIABLE USED TO CHECK IF A USER HAS SPECIAL AUTHORITIES         */
            DCL        VAR(&SPC_AUT) TYPE(*CHAR) LEN(1)
```

Figure 170 (Part 2 of 6). Sample CL Program AUTLMSS Included with this Document's Diskette

```
/*-------------------------------------------------------------------*/
/* START OF EXECUTABLE CODE                                          */
/*-------------------------------------------------------------------*/

/*-------------------------------------------------------------------*/
/* CHECK IF CURRENT JOB'S USER HAS *ALLOBJ OR *SECADM AUTHORITIES.   */
/* IF NOT, SEND A MESSAGE AND END EXECUTION                          */
/*-------------------------------------------------------------------*/
            CALL       PGM(QSYCUSRS) PARM(&SPC_AUT '*CURRENT  ' +
                         '*ALLOBJ   *SECADM   ' X'00000002' +
                         X'00000000' &API_ERR)

            IF         COND(&SPC_AUT = 'N') THEN(DO)
            SNDPGMMSG  MSG('NOT AUTHORIZED TO RUN THIS PROGRAM')
            RETURN
            ENDDO

/*-------------------------------------------------------------------*/
/* CREATE THE AUTHORIZATION LISTS (ONLY IF THEY DO NOT EXIST).       */
/*-------------------------------------------------------------------*/
            CRTAUTL    AUTL(&LIST1_NAME) TEXT(*BLANK) AUT(*EXCLUDE)
            MONMSG     MSGID(CPF0000)

            CRTAUTL    AUTL(&LIST2_NAME) TEXT(*BLANK) AUT(*EXCLUDE)
            MONMSG     MSGID(CPF0000)

/*-------------------------------------------------------------------*/
/* DEFINE THE COMMANDS AND APIS THAT WILL BE SECURED BY THE          */
/* AUTHORIZATION LISTS CREATED IN THIS PROGRAM.                      */
/*-------------------------------------------------------------------*/
/*-------------------------------------------------------------------*/
/* CREATE A USER SPACE TO STORE THE LIST OF COMMANDS SHIPPED WITH    */
/* MANAGED SYSTEM SERVICES/400 PRODUCT.  SIZE OF THE SPACE IS 1720   */
/* BYTES (X'06B8'),  IT ALLOWS UP TO 50 COMMANDS LISTED (220 BYTES   */
/* FOR USER SPACE HEADER + 30 BYTES FOR EACH ENTRY IN THE LIST).     */
/* CURRENT JOB NUMBER IS RETRIEVED AND ADDED TO THE USER SPACE NAME. */
/* IN CASE THE USER SPACE ALREADY EXISTS, IT IS DELETED BEFORE BEING */
/* CREATED AGAIN.                                                    */
/*-------------------------------------------------------------------*/
            RTVJOBA    NBR(&NUMBER)
            CHGVAR     VAR(%SST(&USR_SPC 5 6)) VALUE(&NUMBER)

            CALL       PGM(QUSDLTUS) PARM(&USR_SPC &API_ERR)

            CALL       PGM(QUSCRTUS) PARM(&USR_SPC 'AUTPGMCL  ' +
                         X'000006B8' ' ' '*EXCLUDE  ' 'USER SPACE +
                         TO LIST COMMANDS IN MSS/400 PRODUCT    ' +
                         '*YES      ' &API_ERR)

/*-------------------------------------------------------------------*/
/* CREATE THE LIST OF COMMANDS, STORE IT IN THE USER SPACE.          */
/*-------------------------------------------------------------------*/
            CALL       PGM(QUSLOBJ) PARM(&USR_SPC 'OBJL0100' +
                         '*ALL      QSVMSS    ' '*CMD      ' +
                         &API_ERR)
```

Figure 170 (Part 3 of 6). Sample CL Program AUTLMSS Included with this Document's Diskette

```
/*-----------------------------------------------------------------*/
/* FROM THE USER SPACE, GET TOTAL NUMBER OF ENTRIES IN THE LIST,    */
/* CONVERT IT TO DECIMAL FORM AND, IF ZERO, SEND MESSAGE AND END.   */
/*-----------------------------------------------------------------*/
            CALL       PGM(QUSRTVUS) PARM(&USR_SPC X'00000085' +
                         X'00000004' &NUM_ENT_B)
            CHGVAR     VAR(&NUM_ENT) VALUE(%BINARY(&NUM_ENT_B))
            IF         COND(&NUM_ENT = 0) THEN(GOTO CMDLBL(EMPTYLST))

/*-----------------------------------------------------------------*/
/* RETRIEVE LIST ENTRY LENGTH, CONVERT TO DECIMAL.                  */
/*-----------------------------------------------------------------*/
            CALL       PGM(QUSRTVUS) PARM(&USR_SPC X'00000089' +
                         X'00000004' &SIZE_ENT_B)
            CHGVAR     VAR(&SIZE_ENT) VALUE(%BINARY(&SIZE_ENT_B))

/*-----------------------------------------------------------------*/
/* RETRIEVE OFFSET TO FIRST ENTRY IN THE LIST, CONVERT TO DECIMAL,  */
/* AND ADD ONE TO SET STARTING POSITION.                            */
/*-----------------------------------------------------------------*/
            CALL       PGM(QUSRTVUS) PARM(&USR_SPC X'0000007D' +
                         X'00000004' &STR_POS_B)
            CHGVAR     VAR(&STR_POS) VALUE(%BINARY(&STR_POS_B))
            CHGVAR     VAR(&STR_POS) VALUE(&STR_POS + 1)

/*-----------------------------------------------------------------*/
/* RETRIEVE PUBLIC AUTHORITY FOR EACH COMMAND IN THE LIST.  IF IT IS */
/* PUBLIC *EXCLUDE, ADD COMMAND INTO THE FIRST AUTHORIZATION LIST   */
/*-----------------------------------------------------------------*/
 ADDCMD1:   IF         COND(&NUM_ENT = 0) THEN(GOTO CMDLBL(ADDCMD2))

            CHGVAR     VAR(%BINARY(&STR_POS_B)) VALUE(&STR_POS)

            CALL       PGM(QUSRTVUS) PARM(&USR_SPC &STR_POS_B +
                         X'0000000A' &THIS_ITEM)

            CHGVAR     VAR(%SST(&CMD_NAME 1 10)) VALUE(&THIS_ITEM)
            CHGVAR     VAR(%SST(&CMD_NAME 11 10)) VALUE(&CMD_LIB)

            CALL       PGM(QSYRUSRA) PARM(&CMD_INFO X'00000012' +
                         'USRA0100' '*PUBLIC   ' &CMD_NAME +
                         '*CMD      ' &API_ERR)

            CHGVAR     VAR(&PUB_AUT) VALUE(%SST(&CMD_INFO 9 10))

            IF         COND(&PUB_AUT = '*EXCLUDE  ') THEN(DO)
            GRTOBJAUT  OBJ(&CMD_LIB/&THIS_ITEM) OBJTYPE(*CMD) +
                         AUTL(&LIST1_NAME)
            MONMSG     MSGID(CPF0000)
            ENDDO

            CHGVAR     VAR(&STR_POS) VALUE(&STR_POS + &SIZE_ENT)

            CHGVAR     VAR(&NUM_ENT) VALUE(&NUM_ENT - 1)

            GOTO       CMDLBL(ADDCMD1)
```

Figure 170 (Part 4 of 6). Sample CL Program AUTLMSS Included with this Document's Diskette

```
/*-----------------------------------------------------------------*/
/* DEFINE THE COMMANDS AND APIS THAT WILL BE SECURED BY THE SECOND  */
/* AUTHORIZATION LIST CREATED IN THIS PROGRAM.  THIS WILL REMOVE    */
/* THEM FROM THE FIRST AUTHORIZATION LIST (AS/400 OBJECTS CAN BE    */
/* ASSOCIATED TO ONLY ONE LIST).                                    */
/*-----------------------------------------------------------------*/
 ADDCMD2:    GRTOBJAUT  OBJ(&CMD_LIB/CHGMGDSYSA) OBJTYPE(*CMD) +
               AUTL(&LIST2_NAME)
             MONMSG     MSGID(CPF0000)
               /* CHGMGDSYSA REQUIRES *ALLOBJ AUTHORITY   */

             GRTOBJAUT  OBJ(&CMD_LIB/ENDMGDSYS) OBJTYPE(*CMD) +
               AUTL(&LIST2_NAME)
             MONMSG     MSGID(CPF0000)
               /* ENDMGDSYS REQUIRES *JOBCTL AUTHORITY    */

             GRTOBJAUT  OBJ(QSVMSS/QCQROAPI) OBJTYPE(*SRVPGM) +
               AUTL(&LIST2_NAME)
               /* THIS SERVICE PROGRAM CONTAINS APIS USED +
                  TO PROCESS REMOTE COMMANDS: QCQCRCMD, +
                  QCQENDRM, QCQLRCMD, QCQSRCMD AND +
                  QCQSTRRM.  THE FIRST 2 APIS REQUIRE +
                  *JOBCTL AUTHORITY.                      */
             MONMSG     MSGID(CPF0000)

/*-----------------------------------------------------------------*/
/* DEFINE THE USER PROFILES THAT WILL BE ADDED TO THE AUTHORIZATION  */
/* LISTS CREATED IN THIS PROGRAM.                                   */
/*-----------------------------------------------------------------*/
/*-----------------------------------------------------------------*/
/* CREATE A USER SPACE TO CONTAIN A LIST OF ALL USER PROFILES IN THE */
/* SYSTEM. SIZE OF THE SPACE IS 87220 BYTES (X'0154B4'),  IT ALLOWS  */
/* UP TO 500 PROFILES LISTED (220 BYTES FOR USER SPACE HEADER + 174  */
/* BYTES FOR EACH ENTRY IN THE LIST).                               */
/*-----------------------------------------------------------------*/
             CALL       PGM(QUSDLTUS) PARM(&USR_SPC &API_ERR)

             CALL       PGM(QUSCRTUS) PARM(&USR_SPC 'AUTPGMCL  ' +
               X'000154B4' ' ' '*EXCLUDE  ' 'USER SPACE +
               TO LIST ALL USER PROFILES IN THE SYSTEM' +
               '*YES      ' &API_ERR)

/*-----------------------------------------------------------------*/
/* CREATE THE LIST OF USER PROFILES, STORE IT IN THE USER SPACE.    */
/*-----------------------------------------------------------------*/
             CALL       PGM(QSYLAUTU) PARM(&USR_SPC 'AUTU0100' +
               &API_ERR)

/*-----------------------------------------------------------------*/
/* FROM THE USER SPACE, GET TOTAL NUMBER OF ENTRIES IN THE LIST,    */
/* CONVERT IT TO DECIMAL FORM AND, IF ZERO, SEND MESSAGE AND END.   */
/*-----------------------------------------------------------------*/
             CALL       PGM(QUSRTVUS) PARM(&USR_SPC X'00000085' +
               X'00000004' &NUM_ENT_B)
             CHGVAR     VAR(&NUM_ENT) VALUE(%BINARY(&NUM_ENT_B))
             IF         COND(&NUM_ENT = 0) THEN(GOTO CMDLBL(EMPTYLST))
```

Figure 170 (Part 5 of 6). Sample CL Program AUTLMSS Included with this Document's Diskette

```
/*-----------------------------------------------------------------*/
/* RETRIEVE LIST ENTRY LENGTH, CONVERT TO DECIMAL.                 */
/*-----------------------------------------------------------------*/
            CALL       PGM(QUSRTVUS) PARM(&USR_SPC X'00000089' +
                         X'00000004' &SIZE_ENT_B)
            CHGVAR     VAR(&SIZE_ENT) VALUE(%BINARY(&SIZE_ENT_B))

/*-----------------------------------------------------------------*/
/* RETRIEVE OFFSET TO FIRST ENTRY IN THE LIST, CONVERT TO DECIMAL,  */
/* AND ADD ONE TO SET STARTING POSITION.                           */
/*-----------------------------------------------------------------*/
            CALL       PGM(QUSRTVUS) PARM(&USR_SPC X'0000007D' +
                         X'00000004' &STR_POS_B)
            CHGVAR     VAR(&STR_POS) VALUE(%BINARY(&STR_POS_B))
            CHGVAR     VAR(&STR_POS) VALUE(&STR_POS + 1)

/*-----------------------------------------------------------------*/
/* RETRIEVE EACH USER PROFILE IN THE LIST AND ADD IT TO THE FIRST   */
/* AUTHORIZATION LIST (AUTLMSS1). ALSO, IF THE USER HAS *JOBCTL     */
/* AUTHORITY, ADD IT TO THE SECOND AUTHORIZATION LIST (AUTLMSS2)    */
/*-----------------------------------------------------------------*/
 ADDUSR:    IF         COND(&NUM_ENT = 0) THEN(GOTO CMDLBL(ALLDONE))

            CHGVAR     VAR(&SPC_AUT) VALUE('N')

            CHGVAR     VAR(%BINARY(&STR_POS_B)) VALUE(&STR_POS)

            CALL       PGM(QUSRTVUS) PARM(&USR_SPC &STR_POS_B +
                         X'0000000A' &THIS_ITEM)

            ADDAUTLE   AUTL(&LIST1_NAME) USER(&THIS_ITEM) AUT(*USE)
            MONMSG     MSGID(CPF0000)

            CALL       PGM(QSYCUSRS) PARM(&SPC_AUT &THIS_ITEM +
                         '*JOBCTL   ' X'00000001' X'00000000' +
                         &API_ERR)

            IF         COND(&SPC_AUT = 'Y') THEN(DO)
            ADDAUTLE   AUTL(&LIST2_NAME) USER(&THIS_ITEM) AUT(*USE)
            MONMSG     MSGID(CPF0000)
            ENDDO

            CHGVAR     VAR(&STR_POS) VALUE(&STR_POS + &SIZE_ENT)

            CHGVAR     VAR(&NUM_ENT) VALUE(&NUM_ENT - 1)

            GOTO       CMDLBL(ADDUSR)

 EMPTYLST:  SNDPGMMSG  MSG('NO COMMANDS OR USERS RETRIEVED')

/*-----------------------------------------------------------------*/
/* ALL DONE. NOW DELETE TEMPORARY SPACE THAT WAS CREATED            */
/*-----------------------------------------------------------------*/
 ALLDONE:   CALL       PGM(QUSDLTUS) PARM(&USR_SPC &API_ERR)
            MONMSG     MSGID(CPF0000)

/*-----------------------------------------------------------------*/
/* END OF EXECUTABLE CODE                                          */
/*-----------------------------------------------------------------*/

            ENDPGM
```

Figure 170 (Part 6 of 6). Sample CL Program AUTLMSS Included with this Document's Diskette

Distribution Security Considerations

When a managed system is receiving a change request from a central site system, there are things you want to control:

- Which central system is allowed to manage this system?
- Which change request activity types do you allow to run?
- Which object types do you allow the change request to manage?
- Which user profile is used to run the change request?

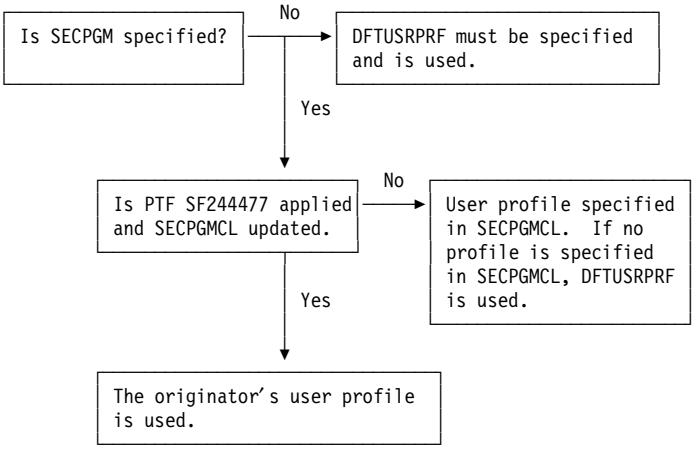
The combination of what you specify in the change managed system attribute (CHGMGDSYSA) (see Figure 171) and the function of the distribution security program determines what values are used when running a change request at the managed system.

```
                    Change Managed System Atr (CHGMGDSYSA)

Type choices, press Enter.

Accept received activities . . . ACCRCVCRQA     *YES
Distribution security pgm  . . . SECPGM      >   MYSECPGM
  Library  . . . . . . . . . . .                   QGPL
Default user profile . . . . . . DFTUSRPRF   >   QSVMSS
Inactive user time-out . . . . . INACTITV        0
Send intermediate responses  . . SNDINTRSP       *YES
Global name prefix tokens  . . . PFXTOKEN        ITSCNET
                          + for more values      STANDARD
Remote command security pgm  . . RMTSECPGM       QVARSUXT
  Library  . . . . . . . . . . .                   QSVMSS
Maximum return data  . . . . . . MAXDTA          *NOMAX
Delete spool file  . . . . . . . DLTSPLF         *SUCCESS
Remote command key . . . . . . . KEY             MY SECRET KEY
```

Figure 171. SECPGM and DFTUSRPRF Parameters Used for Distribution Security

How to Determine Which User Profile Is Used

The following flowchart illustrates which user profile is used by the managed system to run an incoming change request based on the distribution security values in CHGMGDSYSA. Note that this process applies *only* to distribution change request activities and it does *not* apply to remote command security. For remote command security considerations refer to “Remote Command Security Considerations” on page 287.



Default User Profile for Distribution Activities

The default user profile is used at the managed system to perform the functions defined in a incoming change request distribution activity. The IBM supplied default profile is QSVMSS and it comes with the same authorities as a system operator (except for the *SAVSYS special authority). You may either change the authorities for QSVMSS or define another user profile as the default profile using the Change Managed System Attributes (CHGMGDSYSA) command.

```
                         Display User Profile - Basic

User profile . . . . . . . . . . . . . . . :   QSVMSS

Previous sign-on . . . . . . . . . . . . . :
Sign-on attempts not valid . . . . . . . . :   0
Status . . . . . . . . . . . . . . . . . . :   *DISABLED
Date password last changed . . . . . . . . :   12/10/94
Password expiration interval . . . . . . . :   *SYSVAL
  Date password expires  . . . . . . . . . :     02/23/95
Set password to expired  . . . . . . . . . :   *NO
User class . . . . . . . . . . . . . . . . :   *SYSOPR
Special authority  . . . . . . . . . . . . :   *JOBCTL
Group profile  . . . . . . . . . . . . . . :   QSYSOPR
Owner  . . . . . . . . . . . . . . . . . . :   *USRPRF
Group authority  . . . . . . . . . . . . . :   *NONE
Group authority type . . . . . . . . . . . :   *PRIVATE
Supplemental groups  . . . . . . . . . . . :   *NONE
Assistance level . . . . . . . . . . . . . :   *SYSVAL
```

Figure 172. The IBM Default User Profile QSVMSS

From the display of QSVMSS in Figure 172, you see that the user profile is disabled, so it cannot be used for sign on, but you are able to submit programs with this profile.

Tip

Specify the default user profile used for the change request activity if **no** distribution security program has been specified. The user profiles QSECOFR, QSPL, QDOC, QDBSHR, QRJE, QSYS, QLPAUTO, QLPINSTALL, QTSTRQS, and QDFTOWN are not valid entries for the DFTUSRPRF parameter in the CHGMGDSYSA command.

If you specify DFTUSRPRF(*NONE), that is, no default user profile is specified for processing requests, then a distribution security program **must** be specified and must indicate the name of the user profile to use if activities are to be processed.

QSVMSS User Profile Capabilities

The QSVMSS user profile has the user class of *SYSOPR but has less authority than a QSYSOPR. It has no *SAVSYS special authority.

There are certain tasks that require additional authority:

- To send an entire library requires *SAVSYS special authority.
- To install a product requires *USE authority to the RSTLICPGM command.
- To apply a PTF with the APYPTF command requires *ALLOBJ special authority.

QSVMSS is not enrolled in the distribution directory. Then, if distribution change requests contain programs with Restore Document Library Object (RSTDLO), they will fail. To be able to run RSTDLO, you need to have *ALLOBJ, *SAVSYS, or to be enrolled in the system distribution directory; QSVMSS has neither of these options as default.

There are many other commands and objects that we use for managing our systems that have public authority *EXCLUDE. Some examples are:

- Change System Value (CHGSYSVAL)
- Send Distribution Queue (SNDDSTQ)
- The history files in QSYS (QHST* objects)

Tip

An easy way to overcome the mentioned restrictions if you want to use QSVMSS as your default user profile is simply to change the QSVMSS profile and add QSYSOPR as group profile name. See Figure 166 on page 265 for an example of how to add QSYSOPR as the group profile of a user profile.

If you also want to use QSVMSS to run SNDNETMSG commands, you should add QSVMSS to the system distribution directory with the following command:

```
ADDDIRE USRID(QSVMSS cpname) USER(QSVMSS) +
        USRD('Directory entry for QSVMSS default user profile')
```

Security Program for Distributions

A security exit program is specified with the Change Managed System Attributes (CHGMGDSYSA) command. The specified program is run when a request is received to determine which requests are accepted.

```
                    Change Managed System Atr (CHGMGDSYSA)

 Type choices, press Enter.

 Accept received activities . . . ACCRCVCRQA     *YES
 Distribution security pgm  . . . SECPGM      >   MYSECPGM
   Library  . . . . . . . . . . .                  QGPL
 Default user profile . . . . . . DFTUSRPRF      QSVMSS
 Inactive user time-out . . . . . INACTITV       0
 Send intermediate responses  . . SNDINTRSP      *YES
 Global name prefix tokens  . . . PFXTOKEN       ITSCNET
                           + for more values     STANDARD
 Remote command security pgm  . . RMTSECPGM      QVARSUXT
   Library  . . . . . . . . . . .                  QSVMSS
 Maximum return data  . . . . . . MAXDTA         *NOMAX
 Delete spool file  . . . . . . . DLTSPLF        *SUCCESS
 Remote command key . . . . . . . KEY            MY SECRET KEY
```

Figure 173. Distribution Security Program in Change Managed System Attributes

The possible values for the distribution security program are:

- ***DFT** - The default distribution security program is used. This distribution security program allows PTFs and products to be received but not applied to the system. The program does not allow other objects to be manipulated. This is basically the same support as if Managed System Services/400 was not installed.

  The name of the *DFT program is QCQATDFT in library QSVMSS. You may want to audit changes to this program object to ensure that it is not replaced with a program that allows more functions to be performed.

- ***NONE** - No distribution security program is specified. All activities are accepted when ACCRCVACT(*YES) is specified. The default user profile is used to process the activity.

- **Program-name/library-name** - The name of the distribution security program and library that you are using.

As you see, the distribution security program is used to verify all incoming request activities other than remote commands (the remote command security program is used for that purpose). The program can then reject or accept the activity based on the input data provided to the security program, which is:

- The action type:

  ***APY** Apply program temporary fix (PTF).
  ***CNL** Cancel received activity.
  ***DLT** Delete object or PTF.
  ***INS** Install object (PTF or product).
  ***STR** Start system (initial program load).
  ***RMV** Remove a PTF.
  ***RTV** Retrieve object, PTF or product.
  ***RUN** Run program, batch input stream, or REXX procedure.
  ***SND** Send object or PTF.
  ***SNDAPY** Send and apply PTF.

***SNDINS** Send and install a product or an installable object.
***SNDRUN** Send and run program, batch input stream, or REXX procedure.

- The origin:
  - Network ID of the system that sent the activity.
  - Control point name of that system.
  - Agent (function name) on the system that sent the activity.
  - Requester user profile. **This is a new function with PTF SF24477 for V3R1M1 of Managed System Services/400**.
- The data object information (type):
  - *CVRLTR
  - *FILDEDATA
  - *FLR
  - *OBJ
  - *PTF
  - *SYS
  - *PRODUCT

If the distribution security program accepts the activity, it can provide a user profile name under which the activity is performed. With the functional enhancement supplied by PTF SF24477 (covered in detail in the next section), you now have the option to run the activity under the same user profile that requested the activity. If you use this option, you must ensure that the potential requester user profiles also are created on your system with the necessary authorities.

PTF SF24477: Functional Enhancement to Managed System Services/400

As mentioned earlier, a PTF has been released to enhance the sample distribution security program to include the *requester user profile* in the evaluations performed by the program. Before this PTF was released, you could not determine which user profile on the managing system sent the change request.

For your information, we have included the complete text of the PTF cover letter in Figure 174 on page 282. Please note that if you want to use the new function in your distribution security program, you have to change the length of parameter 5 (length of origin) from 24 to 34 (as explained in the cover letter) and recompile the program.

PTF SF24477 must be applied to both the central site system and the managed system.

The basic change that takes effect at the central site after the PTF is applied is that requests originated now contain the requester user profile. The way it works is:

- When a CRQ is submitted at the central site, before the activity is sent to its destination or destinations managed system or systems, an internal interface is called to assign a unique identifier for the activity.
- The identifier is defined by SNA architecture and is called ″Agent Correlator″ (also known as ″Unit of Work″). The interface called is QCQALCUW (Allocate Unit of Work) and is part of the Managed System Services/400 product.

- QCQALCUW was modified in the PTF to do a ″retrieve user profile″ to get the user profile of the job in which it is running.
- The retrieved user profile depends on how the change request description was defined. If CRQD was created specifying *SBM for USRPRF parameter, then the profile is for the submitter of the CRQ (user performing the SBMCRQ command), regardless of who created the CRQD. If the CRQD was created specifying USRPRF(*OWNER), then the retrieved user profile is always the owner of the CRQD (user who performed the CRTCRQD command), regardless of who submits the CRQ. This user profile is then added to the ″Agent correlator″ structure.
- The Agent correlator is used to associate responses received from a managed system to their corresponding request.

```
5763SS1 V3R1M0  940909                                                                                  RCHASM01  11/01/95  14:31:08
                                   Cover Letter
 PTF/FIX #: SF24477 - SYSTEMVIEW MANAGED SYSTEM SERVICES/400
 LICENSED PROGRAM: 5763MG1
 ---------------------------------------------------------------------------
 :  SYSTEM : MODELS  : RELEASE : RECOMPILE : LIBRARY  :  MRI   :  APAR     :
 :         :         :         :           :          : FEATURE:  FIXED    :
 :         :         :         :           :          :        :           :
 :  AS/400 :  *ALL   : V3R1M1  :     N     :  QSVMSS  :  NONE  :  SA44830  :
 ---------------------------------------------------------------------------
 PRE/CO-REQUISITE PTF/FIX LIST
 -----------------------------
    REQ   LICENSED  PTF/FIX
    TYPE  PROGRAM   NUMBER   LICENSED PROGRAM DESCRIPTION
    ----  --------  -------  ----------------------------------------------
    NONE
 DESCRIPTION OF PROBLEM FIXED FOR APAR SA44830 :
 -----------------------------------------------
    This provides a functional enhancement to the product:
    Managed System Services/400 includes the ability to define a
    distribution security program to evaluate if received activities
    should be accepted, and, if so, which user profile will be used
    to process them.
    Input data provided to the distribution security program
    contains, among other items, information about the system that
    sent the activity, passed to the program as parameter number 4
    (Origin).  Currently, this parameter includes the name (network
    ID and control point) of the originating system.
    The enhancement consists in adding the "requester user profile"
    value to the Origin parameter, so it can be considered in the
    evaluation performed by the distribution security program.
 CORRECTION FOR APAR SA44830 :
 -----------------------------
    After this PTF is applied, the new structure of the Origin
    parameter for the distribution security program will be:
      Origin   CHAR(*)
         - CHAR(8)  Network ID of the system that sent the activity.
         - CHAR(8)  Control point name of that system.
         - CHAR(8)  Agent (function name) on the system that sent
                    the activity.
         - CHAR(10) Requester user profile.
    Because of this new structure, the allowed value for parameter
    number 5 (Length of origin) is increased from 24 to 34.
    Existing security programs do not need to change, unless the
    requester user profile is to be considered in the decision
    making process of the program; if this is the case, the program
    must be updated and recompiled, to accept the new values for
    parameters 4 and 5.
 CIRCUMVENTION FOR APAR SA44830 :
 --------------------------------
    None.
 ACTIVATION INSTRUCTIONS :
 -------------------------
    None.
 SPECIAL INSTRUCTIONS :
 ----------------------
    If you choose to load/apply this PTF *IMMEDIATE then:
       1- End Managed System Services/400 by entering:
          ENDMGDSYS OPTION(*CNTRLD) DELAY(60)
       2- Load and apply the PTF
       3- Restart Managed System Services/400 by entering STRMGDSYS
 DEFAULT INSTRUCTIONS :
 ----------------------
    THIS PTF CAN BE APPLIED IMMEDIATE OR DELAYED.
 SUPERSEDES
 PTF/FIX NO(S).  APAR TITLE LINE
 --------------  ------------------------------------------------------------
      NONE
```

Figure 174. PTF SF24477 Cover Letter

Example Security Programs for Distributions

There are two sample distribution security programs provided with Managed System Services/400. They are in the file QACQSRC in library QSVMSS:

SECPGMCL Sample distribution security program written in CL.
SECPGMPL Sample distribution security program written in PL/I.

The sample programs must be modified to be used in a real environment. In this document, we only describe the CL version as PL/I is very rarely used on the AS/400 system.

To change the program, do the following:

- Copy the source member to a source file in a different library. **Do not** change the source in library QSVMSS.
- Tailor the copied source to fit your environment:
  - *Line 5900* to change the length from 24 to 34 in order to use the new function in PTF SF24477 (requester user profile).
  - *Line 7500* content of &OR_ALLOW, to allow other central sites.
  - *Line 14100* to allow more or less object types.
  - *Line 15100* to allow more or less action types.
  - *Line 17700* to use another user profile.
- Compile the program and place it in a library, which is always on the library list (such as QGPL).
- Use the Change Managed System Attributes (CHGMGDSYSA) command to specify the name of your new distribution security program and the library it is placed in.

```
/*********************************************************************/
/*                                                                   */
/* PROGRAM NAME: SECPGMCL                                            */
/*                                                                   */
/* PROGRAM DESC: EXAMPLE SECURITY EXIT PROGRAM                       */
/*                                                                   */
/* LANGUAGE:     CL                                                  */
/*                                                                   */
/* FUNCTION:     DETERMINES WHETHER OR NOT AN ACTIVITY RECEIVED FROM */
/*               A CENTRAL SITE SYSTEM SHOULD BE ACCEPTED FOR        */
/*               PROCESSING AND WHAT USER PROFILE SHOULD BE USED.    */
/*                                                                   */
/*               IN THIS EXAMPLE, ACTIVITIES THAT SEND, RETRIEVE,    */
/*               OR DELETE OBJECTS OR FILES ARE ACCEPTED. OTHER      */
/*               ACTIVITIES ARE REJECTED. ATTEMPTS TO REPLACE THIS   */
/*               PROGRAM WITH A PROGRAM RECEIVED FROM ANOTHER        */
/*               SYSTEM ARE NOT ALLOWED. A CHECK IS MADE TO ENSURE   */
/*               THAT THE REQUEST IS SENT FROM AN ALLOWABLE CENTRAL  */
/*               SITE SYSTEM. IF THE REQUEST IS ACCEPTED THE USER    */
/*               'QUSER' WILL BE USED TO PROCESS THE REQUEST.        */
/*                                                                   */
/* PARAMETERS:                                                       */
/*                                                                   */
/* 1 - INPUT  - TRANSPORT TYPE                                       */
/* 2 - INPUT  - ACTION                                               */
/* 3 - INPUT  - LENGTH OF ACTION                                     */
/* 4 - INPUT  - ORIGIN                                               */
/* 5 - INPUT  - LENGTH OF ORIGIN                                     */
/* 6 - INPUT  - DATA OBJECT INFORMATION                              */
/* 7 - INPUT  - LENGTH OF DATA OBJECT INFORMATION                    */
/* 8 - OUTPUT - ACTION ACCEPTANCE                                    */
/* 9 - OUTPUT - LENGTH OF ACTION ACCEPTANCE                          */
/*                                                                   */
/* FOR MORE INFORMATION ON THE SECURITY PROGRAM PARAMETERS, TYPE     */
/* "GO SVMSS" AND SELECT MENU ITEM 20.                               */
/*                                                                   */
/* TO USE THIS EXAMPLE:                                              */
/*                                                                   */
/* 1) COPY THIS SOURCE MEMBER TO A SOURCE PHYSICAL FILE MEMBER IN    */
/*    A DIFFERENT LIBRARY.                                           */
/* 2) MODIFY THE PROGRAM AS NEEDED TO ACCEPT OR REJECT ACTIVITIES    */
/*    FOR YOUR ENVIRONMENT. THE ALLOWED ORIGIN LIST MUST BE          */
/*    MODIFIED FOR YOUR ENVIRONMENT.                                 */
/* 3) COMPILE THE SOURCE USING THE CRTCLPGM COMMAND.                 */
/* 4) CHANGE THE MANAGED SYSTEM ATTRIBUTES USING THE CHGMGDSYSA      */
/*    COMMAND TO REFERENCE THE COMPILED PROGRAM.                     */
/*                                                                   */
/*********************************************************************/
 SECPGMCL:   PGM        PARM(&I_TRANSP &I_ACTION &L_ACTION &I_ORIGIN +
                          &L_ORIGIN &I_DATOBJ &L_DATOBJ &O_ACTACC +
                          &L_ACTACC)

/*-------------------------------------------------------------------*/
/* PARAMETER DECLARATION                                             */
/*-------------------------------------------------------------------*/
             DCL        VAR(&I_TRANSP) TYPE(*CHAR) LEN(4)
             DCL        VAR(&I_ACTION) TYPE(*CHAR) LEN(20)
             DCL        VAR(&L_ACTION) TYPE(*CHAR) LEN(4)
             DCL        VAR(&I_ORIGIN) TYPE(*CHAR) LEN(24)
             DCL        VAR(&L_ORIGIN) TYPE(*CHAR) LEN(4)
             DCL        VAR(&I_DATOBJ) TYPE(*CHAR) LEN(275)
             DCL        VAR(&L_DATOBJ) TYPE(*CHAR) LEN(4)
             DCL        VAR(&O_ACTACC) TYPE(*CHAR) LEN(30)
             DCL        VAR(&L_ACTACC) TYPE(*CHAR) LEN(4)
```

Figure 175 (Part 1 of 3). SECPGMCL Sample Distribution Security Program

```
/*-----------------------------------------------------------------*/
/* VARIABLE  DECLARATION                                           */
/*-----------------------------------------------------------------*/

/* THE VARIABLE OR_ALLOW CONTAINS A LIST OF CENTRAL SITE           */
/* SYSTEMS THAT MAY SEND ACTIVITIES. THE LIST IS CURRENTLY         */
/* SET TO HANDLE 2 CENTRAL SITE SYSTEMS. THIS LIST MUST BE         */
/* CHANGED TO INDICATE THE CENTRAL SITE SYSTEMS SUPPORTED.         */
/* (THE LENGTH SHOULD BE IN MULTIPLES OF 16)                       */
             DCL        VAR(&OR_ALLOW) TYPE(*CHAR) LEN(32) +
                          VALUE('NETID1  CPNAME1 NETID2  CPNAME2 ')
             DCL        VAR(&V_LEN) TYPE(*DEC) LEN(3) VALUE(32)

/* THE FOLLOWING VARIABLES WILL BE SUBSTRINGED FROM THE INPUT      */
/* PARAMETER STRUCTURES                                            */
             DCL        VAR(&V_ACT) TYPE(*CHAR) LEN(10)
             DCL        VAR(&V_ORIGIN) TYPE(*CHAR) LEN(16)
             DCL        VAR(&V_CAT) TYPE(*CHAR) LEN(10)
             DCL        VAR(&V_OBJTYP) TYPE(*CHAR) LEN(10)
             DCL        VAR(&V_NAME) TYPE(*CHAR) LEN(10)
             DCL        VAR(&V_STOR) TYPE(*CHAR) LEN(10)

/* THIS VARIABLE WILL CONTAIN AN ORIGIN FROM THE LIST              */
             DCL        VAR(&V_CMPORI) TYPE(*CHAR) LEN(16)

/* THIS IS AN INDEX TO THE LIST                                    */
             DCL        VAR(&POS) TYPE(*DEC) LEN(3)

/* DEC_TRANSP IS THE I_TRANSP VARIABLE CONVERTED TO DECIMAL        */
             DCL        VAR(&DEC_TRANSP) TYPE(*DEC) LEN(10 0)

/*-----------------------------------------------------------------*/
/* START OF PROGRAM                                                */
/*-----------------------------------------------------------------*/

/* INITIAL VARIABLE VALUES FROM THE PARAMETERS */
             CHGVAR     VAR(&DEC_TRANSP) VALUE(%BIN(&I_TRANSP))
             CHGVAR     VAR(&V_ACT) VALUE(%SST(&I_ACTION 1 10))
             CHGVAR     VAR(&V_ORIGIN) VALUE(%SST(&I_ORIGIN 1 16))
             CHGVAR     VAR(&V_CAT) VALUE(%SST(&I_DATOBJ 1 10))
             CHGVAR     VAR(&V_OBJTYP) VALUE(%SST(&I_DATOBJ 221 10))
             CHGVAR     VAR(&V_STOR) VALUE(%SST(&I_DATOBJ 11 10))

/*-----------------------------------------------------------------*/
/* VERIFY IF THE TRANSPORT TYPE IS VALID                           */
/* IF THE TRANSPORT IS NOT 1 (SVDS) THEN REJECT THE REQUEST        */
/*-----------------------------------------------------------------*/
             IF         COND(&DEC_TRANSP *NE 1) THEN(GOTO +
                          CMDLBL(REJECT))

/*-----------------------------------------------------------------*/
/* VALIDATE IF THE ORIGIN RECEIVED IS IN THE LIST OF ALLOWED ORIGINS */
/*-----------------------------------------------------------------*/
             CHGVAR     VAR(&POS) VALUE(1)

 ORGLOOP:    CHGVAR     VAR(&V_CMPORI) VALUE(%SST(&OR_ALLOW &POS 16))
             /* IF THE RECEIVED ORIGIN IS EQUAL TO THE ONE OBTAINED*/
             /* FROM THE LIST, GO ON, THE ORIGIN IS ACCEPTED       */
             IF         COND(&V_ORIGIN *EQ &V_CMPORI) THEN(GOTO +
                          CMDLBL(CATEG))
             ELSE       CMD(DO)
             /* GET ANOTHER ORIGIN FROM THE LIST                  */
             IF         COND((&V_CMPORI *EQ '        ') *OR ((&POS + +
                          16) *GE &V_LEN)) THEN(GOTO CMDLBL(REJECT))
             ELSE       CMD(DO)
             CHGVAR     VAR(&POS) VALUE(&POS + 16)
             GOTO       CMDLBL(ORGLOOP)
             ENDDO
             ENDDO
```

Figure 175 (Part 2 of 3). SECPGMCL Sample Distribution Security Program

```
/*-------------------------------------------------------------------*/
/* CHECK IF THE DATA CATEGORY IS VALID                               */
/* ONLY *OBJ (OBJECTS) AND *FILEDATA (FILE MEMBERS CONTAINING DATA   */
/* WITHOUT ATTRIBUTES) CATEGORIES ARE ACCEPTED                       */
/*-------------------------------------------------------------------*/
 CATEG:      IF         COND(&V_CAT *EQ '*OBJ      ') THEN(GOTO +
                          CMDLBL(ACTION))
             IF         COND(&V_CAT *EQ '*FILEDATA ') THEN(GOTO +
                          CMDLBL(ACTION))
             GOTO       CMDLBL(REJECT)

/*-------------------------------------------------------------------*/
/* CHECK IF THE ACTION RECEIVED IS VALID                             */
/* ONLY SEND, RETRIEVE, AND DELETE ACTIONS ARE ACCEPTED              */
/*-------------------------------------------------------------------*/
 ACTION:     IF         COND(&V_ACT *EQ '*SND      ') THEN(GOTO +
                          CMDLBL(PROC_SND))
             IF         COND(&V_ACT *EQ '*RTV      ') THEN(GOTO +
                          CMDLBL(ACCEPT))
             IF         COND(&V_ACT *EQ '*DLT      ') THEN(GOTO +
                          CMDLBL(ACCEPT))
             GOTO       CMDLBL(REJECT)

/*-------------------------------------------------------------------*/
/* WHEN THE *SND ACTION IS REQUESTED, THIS PROGRAM VALIDATES         */
/* THAT THE OBJECT THAT IS BEING SENT IS NOT THIS SECURITY           */
/* EXIT PROGRAM                                                      */
/*-------------------------------------------------------------------*/
 PROC_SND:   CHGVAR     VAR(&V_NAME) VALUE(%SST(&I_DATOBJ 201 10))
             IF         COND((&V_CAT *EQ '*OBJ      ') *AND +
                          (&V_OBJTYP *EQ '*PGM      ') *AND +
                          (&V_NAME *EQ 'SECPGMCL')) THEN(GOTO +
                          CMDLBL(REJECT))

/*-------------------------------------------------------------------*/
/* SET THE ACTION ACCEPTANCE OUTPUT VARIABLE TO INDICATE THAT THE    */
/* REQUEST IS TO BE ACCEPTED AND INDICATE THAT THE "QUSER" USER      */
/* PROFILE IS TO BE USED TO PROCESS IT. INDICATE THAT 20 CHARACTERS  */
/* OF ACCEPTANCE INFORMATION IS BEING RETURNED.                      */
/*-------------------------------------------------------------------*/
 ACCEPT:     CHGVAR     VAR(%SST(&O_ACTACC 1 10)) VALUE('*ACCEPT   ')
             CHGVAR     VAR(%SST(&O_ACTACC 11 10)) VALUE('QUSER    ')
             CHGVAR     VAR(%BIN(&L_ACTACC)) VALUE(20)
             GOTO       CMDLBL(END)

/*-------------------------------------------------------------------*/
/* SET THE ACTION ACCEPTANCE OUTPUT VARIABLE TO INDICATE THAT THE    */
/* REQUEST IS TO BE REJECTED. INDICATE THAT 10 CHARACTERS            */
/* OF ACCEPTANCE INFORMATION IS BEING RETURNED.                      */
/*-------------------------------------------------------------------*/
 REJECT:     CHGVAR     VAR(%SST(&O_ACTACC 1 10)) VALUE('*REJECT   ')
             CHGVAR     VAR(%BIN(&L_ACTACC)) VALUE(10)

/*-------------------------------------------------------------------*/
/* END OF PROGRAM                                                    */
/*-------------------------------------------------------------------*/
 END:        ENDPGM
```

Figure 175 (Part 3 of 3). SECPGMCL Sample Distribution Security Program

Object Ownership Changes on Managed System (PTF SF25305)

When an object is distributed electronically (Send or Retrieve activities), the user profile that processes the request at the target system becomes the owner of the object being created or replaced by the request.

This behavior is not consistent with manual distribution of objects; for example, if an object is saved (SAVOBJ command) and then restored in another system (RSTOBJ command), ownership of the object is preserved, regardless of the user profile performing the restore operation.

If you want the owner of the object to be preserved, you must install 5763-MG1 PTF SF25305 on the managed system. With this PTF installed the owner of the object on the managed system will be the same as the owner of the object in the

central site, unless the user profile doesn't exist on the managed system in which case QDFTOWN becomes the owner of the object.

If you are distributing an object that already exists on the managed system with *Replace *Yes* the ownership at the managed system is preserved if the owner at the central site is not the same as the owner of the existing object on the managed system.

Remote Command Security Considerations

The approach for remote command security is similar to distribution security. You may want to control:

- Which central system is allowed to send commands.
- Which user is allowed to send commands.
- Which commands you accept.
- Which user profile should an accepted command run under.

The RMTSECPGM parameter in the Change Managed System Attributes command (CHGMGDSYSA), see Figure 176, specifies the remote command security program to be used. The specified program is run when a request to run a command is received from a central site system. The program determines if the request is *accepted* and under which user profile it should be run. The possible values are:

- ***DFT** - The default remote command security program is used. This is the same as specifying QSVMSS/QVARSUXT. The QVARSUXT security program allows all of the commands to be received and run on the system if you do not change the table in source member QAVARSCF in QSVMSS/QACQSRC.
- **Program-name/library-name** - The name of the remote command security program and library that you are using.

```
                    Change Managed System Atr (CHGMGDSYSA)

Type choices, press Enter.

Accept received activities . . . ACCRCVCRQA     *YES
Distribution security pgm  . . . SECPGM         MYSECPGM
  Library  . . . . . . . . . . .                  QGPL
Default user profile . . . . . . DFTUSRPRF      QSVMSS
Inactive user time-out . . . . . INACTITV       0
Send intermediate responses  . . SNDINTRSP      *YES
Global name prefix tokens  . . . PFXTOKEN       ITSCNET
                          + for more values     STANDARD
Remote command security pgm  . . RMTSECPGM   >  QVARSUXT
Library  . . . . . . . . . . .                    QSVMSS
Maximum return data  . . . . . . MAXDTA         *NOMAX
Delete spool file  . . . . . . . DLTSPLF        *SUCCESS
Remote command key . . . . . . . KEY            MY SECRET KEY
```

Figure 176. RMTSECPGM Parameter used for Remote Command Security

The IBM supplied sample program QVARSUXT in library QSVMSS is ready to be used without changing or recompiling the program. The program is written in ILE C and it uses a table to filter the remote commands. You can customize which systems, users, or commands you allow on your system just by editing the table QAVARSCF in source file QSVMSS/QACQSRC.
The fields in the table are separated by blanks and are not column-sensitive.

Note: You should save the table if you modify it since installing a new version of Managed System Services/400 will override your changes.

```
 100 //*******************************************************************/
 200 //* START OF SPECIFICATIONS ******************************************/
 300 //*                                                                  */
 400 //* FILE NAME: QAVARSCF                                              */
 500 //*                                                                  */
 600 //* Description: Security table                                      */
 700 //*                                                                  */
 800 //* 5733-165 (C) COPYRIGHT IBM CORP. 1993                            */
 900 //* All Rights Reserved.                                             */
1000 //*                                                                  */
1100 //* This table is used by the sample remote command security program */
1200 //* QVARSUXT.  The program can be found in the QSVMSS library.       */
1300 //* To use this table:                                               */
1400 //*    1 - Remove the // from columns 1 and 2.                       */
1500 //*    2 - Change the table values for your security needs.          */
1600 //*    3 - Ensure that the security program QSVMSS/QVARSUXT is       */
1700 //*        is specified for the remote command security program      */
1800 //*        attribute found on the CHGMGDSYSA command.                */
1900 //*                                                                  */
2000 //* For example, the current table setup provides the following      */
2100 //* security:                                                        */
2200 //*                                                                  */
2300 //*     All requests received containing the CHGNETA command would   */
2400 //*     be rejected.                                                 */
2500 //*                                                                  */
2600 //*     All requests from USERA would be accepted.                   */
2700 //*     The command request will execute using the user profile      */
2800 //*     ERIC.                                                        */
2900 //*                                                                  */
3000 //*     All requests from system CNMO1 would be accepted.            */
3100 //*     The command request will execute using the destination       */
3200 //*     user profile specified on the request.  If no destination    */
3300 //*     user profile was specified, the command will run under the   */
3400 //*     QSVMSS user profile.                                         */
3500 //*                                                                  */
3600 //*     All other requests would be rejected.                        */
3700 //*                                                                  */
3800 //* END OF SPECIFICATIONS ********************************************/
3900 //*******************************************************************/
4000 //* Fields:                                                          */
4100 //*******************************************************************/
4200 // NETID  LU   APPL   SAPPL OPID     CMD     SAT  SBT   REPLY  Priority Profile
4300 // ----- ----- ----   ----- -----    ------- ---- ----  -----  -------- --------
4400 // *ANY  *ANY  *ANY   *ANY  *ANY     CHGNETA *ANY *ANY  *ANY   *ANY     *NONE
4500 // *ANY  *ANY  *ANY   *ANY  USERA    *ANY    *ANY *ANY  *ANY   *ANY     ERIC
4600 // *ANY  CNMO1 *ANY   *ANY  *ANY     *ANY    *ANY *ANY  *ANY   *ANY     *DFTUSER
4700 // *ANY  *ANY  *ANY   *ANY  *ANY     *ANY    *ANY *ANY  *ANY   *ANY     *NONE
```

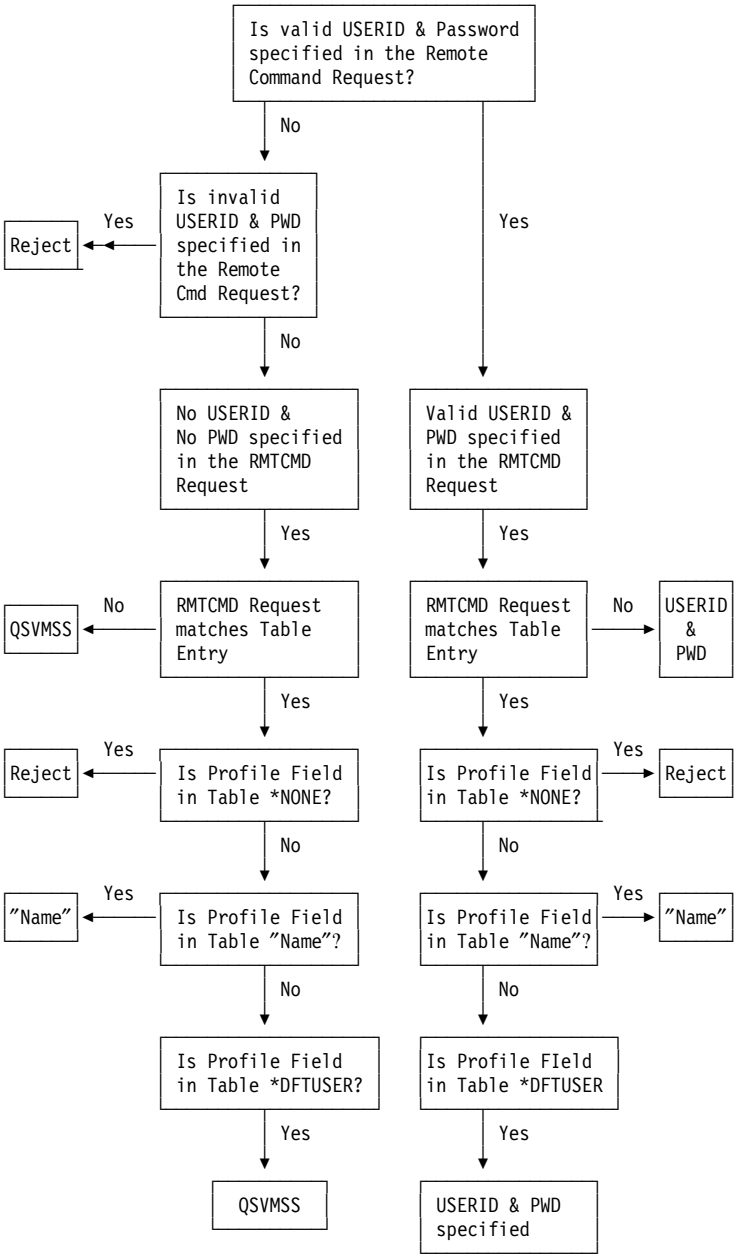
Figure 177. QAVARSCF Table Used By QVARSUXT Remote Security Program

```
//*******************************************************************/
//* Fields:      Description                   Value                */
//
// NETID       ] Network ID of the command   ] Name, generic name, *ANY
//             ] originator.                 ]
// ------------------------------------------------------------------
// LU          ] LU name of the command      ] Name, generic name, *ANY
//             ] originator.                 ]
// ------------------------------------------------------------------
// APPL        ] Application name of the     ] Name, generic name, *ANY
//             ] command originator.         ]
// ------------------------------------------------------------------
// Served      ] The served application name ] Name, generic name, *ANY,
// application ] of the command originator.  ] EP_OPS, FP_OPS
// name        ] (Ignored for AS/400 systems)]
// ------------------------------------------------------------------
// OPID        ] Operator ID of the command  ] Name, generic name, *ANY
//             ] originator.                 ]
//------------------------------------------------------------------
// CMD         ] Command string consisting   ] Name, generic name, *END,
//             ] of the command and       ] *ENDALL, *ANY
//             ] the parameters.             ]
//------------------------------------------------------------------
// Command     ] The command start after     ] *YES, *NONE, *ANY
// Start After ] time (YYMMDDhhmmss).        ]
// Time        ]                             ]
//------------------------------------------------------------------
// Command     ] The command start before    ] *YES, *NONE, *ANY
// Start       ] time (YYMMDDhhmmss).        ]
// Before Time ]                             ]
//------------------------------------------------------------------
// Reply       ] Reply type indicating which ] *NONE, *ALL, *ACCEPT,
//             ] messages are to be returned ] *SUCCESS, *STATUS,
//             ] to the command originator.  ] *FAILDATA, *LASTDATA
//------------------------------------------------------------------
// PRI         ] Priority level for          ] *HIGH, *MEDIUM, *LOW, *ANY
//             ] processing the request.     ]
//------------------------------------------------------------------
// Profile     ] User profile name for       ] Name, blanks, *DFTUSER,
// Name        ] processing the request.     ] *NONE
//             ] If this field is not        ]
//             ] specified, blank, or        ]
//             ] *DFTUSER, the default user  ]
//             ] profile QSVMSS is used.     ]
//------------------------------------------------------------------
//*******************************************************************/
```

Figure 178. The Meaning of Each of the Table Fields in QAVARSCF.

How to Determine Which User Profile Is Used to Run the Command

The following flowchart illustrates which user profile is used by the managed system to run a remote command request based on the distribution security values in CHGMGDSYSA and the table QAVARSCF.



How to Secure the Distribution Repository

The distribution repository is a staging area for sending and receiving objects and for program objects that are to be run. Using the distribution repository, you can send objects to a system without disturbing the system. They are copied into libraries or folders at a convenient time.

The distribution repository is kept in the library QSVDSTRPS and it is shipped with the public authority of *USE. The commands and APIs that operate on the distribution repository are shipped with the public authority of *EXCLUDE. In the

section, *How to control access to Managed System Services/400 Commands*, we discussed how you could manage this.

Objects in the distribution repository are secured by an authorization list QCQRPSAUTL, which is created when Managed System Services/400 is installed. The public authority to the objects on the list is *EXCLUDE. This means that you must add users to the list if they need to work with the objects in the repository.

```
                          Display Authorization List

Object . . . . . . . :   QCQRPSAUTL      Owner  . . . . . . . :   QSYS
  Library  . . . . . :     QSYS          Primary group  . . . :   *NONE

             Object    List
User        Authority  Mgt
QSYS        *ALL        X
*PUBLIC     *EXCLUDE
```

Figure 179. Default Content of Authorization List QCQRPSAUTL

You may use a different authorization list to secure a repository object received from another system by using the Add Distribution Catalog Entry (ADDDSTCLE) command and specify the list name with the AUTL parameter.

A distribution repository object received from another system is secured by one of the following (in the order shown):

1. The authorization list returned by the distribution security program (in bytes 21-30 of parameter 8, which is the action acceptance parameter).
2. The authorization list specified in the catalog entry for the object.
3. The default authorization list QCQRPSAUTL.

The Changed Managed System Attributes Command

Some times it is difficult to remember which parameters in the CHGMGDSYSA command applies to distribution activities and which ones apply to remote command activities.
The following table explains where the parameters apply:

Table 9. CHGMGDSYSA. The parameters used dependent of the activity.

CHGMGDSYSA parameter used in	Distribution Activity	Remote Command Activity
ACCRCVCRQA	Yes	No
SECPGM	Yes	No
DFTUSRPRF	Yes	No
INACTIV	Yes	Yes
SNDINTRSP	Yes	No
PFXTOKEN	Yes	No
RMTSECPGM	No	Yes
MAXDTA	No	Yes
DLTSPLF	No	Yes
KEY	No	Yes

Auditing Consideration

Auditing is more important to some companies and persons than others. Some companies have enforced strict auditing procedures while others have a more relaxed attitude to this area. Both, OS/400 and OCC/400 have the functions that allow you to implement even the most rigorous auditing functions; it is up to you to take advantage of all of the options available.

OS/400 Auditing

The OS/400 provides different levels of auditing and logging based on your requirements. These are the options:

- System wide
  - Action auditing
  - Object access auditing
- Specific objects
  - All users' access
  - Selected user's access
- Selected users
  - Additional action auditing
  - Audit of selected objects

The Managed System Services/400 environment is no different from any other application installed on your AS/400 system. Therefore, all of the OS/400 auditing and logging functions also apply to the user profiles performing OCC/400 functions and the objects they are performing the different requests on.

The only thing that you have to ensure is to create the OS/400 audit journal and to establish the auditing criteria for system values, user profiles, and objects.

The procedures for establishing the OS/400 auditing environment and the values you may consider for the system, users, and objects have already been discussed in much detail in the following publications:

- *AS/400 Advanced Series Security - Reference*, SC41-3302
- *An Implementation Guide for AS/400 Security and Auditing*, GG24-4200

You may want to refer to these publications when establishing your OS/400 auditing procedures.

Managed System Services/400 Auditing

Managed System Services/400 provides a journal QCQJMJRN in library QUSRSYS to record major events during the processing of system management functions such as:

- Activity received
- Activity processed
- Response sent
- Managed system attributes changed

The journal is not required for Managed System Services/400 functions to work, but if you want to be able to audit change requests, remote command requests, or perform problem analysis, you need the journal on your system. The different journal entries are documented in one of the appendixes in *Managed System Services/400 Use*. There are six entry types defined:

- Cleanup entry (CL)
- Configuration entry (CO)
- Error entry (EP)
- Normal entry (CS)
- Job control entry (ON)
- Remote commands (RO)

We have supplied you with the DDSs and created model physical files for some of the important entries. You are then able to do DSPJRN to an output file and run queries or similar programs against the data. The DDSs and model physical files are located in the library GG244372 found on the diskette included with this document.

```
                          Work with Members Using PDM

 File  . . . . . .   QDDSSRC
   Library . . . .     GG244372            Position to  . . . . .

 Type options, press Enter.
  2=Edit         3=Copy  4=Delete 5=Display       6=Print     7=Rename
  8=Display description  9=Save  13=Change text  14=Compile

 Opt  Member      Type        Text
      MSSJRNCO    PF          Configuration (CO) Journal Entry
      MSSJRNCS05  PF          Normal (CS-05) Journal Entry
      MSSJRNEP01  PF          Error (EP-01) Journal Entry
      MSSJRNRO    PF          Remote Command (RO) Journal Entry
```

Figure 180. DDSs Provided for Four of the Entry Types

Figure 180 shows the names of the four entry types. You may want to display them to see the descriptions.

From the DDSs, we created four model physical files:

```
                          Work with Objects Using PDM

 Library . . . . .   GG244372         Position to . . . . . . . .
                                      Position to type  . . . . .

 Type options, press Enter.
   2=Change       3=Copy        4=Delete      5=Display       7=Rename
   8=Display description        9=Save       10=Restore      11=Move ...

 Opt  Object      Type        Attribute   Text
      MSSJRNCO    *FILE       PF-DTA      Model PF to be used for DSPJRN
      MSSJRNCS05  *FILE       PF-DTA      Model PF to be used for DSPJRN
      MSSJRNEP01  *FILE       PF-DTA      Model PF to be used for DSPJRN
      MSSJRNRO    *FILE       PF-DTA      Model PF to be used for DSPJRN
```

Figure 181. Model Physical Files to be Used with the DSPJRN Command

To be able to use query on the data from the journal, you may want to follow these steps for converting all of the remote command journal entries:

Step 1: Create a duplicate of the physical file MSSJRNRO in library GG234372 in your auditing library (SECURITY) and give the duplicate a name which is meaningful to you.

```
CRTDUPOBJ OBJ(MSSJRNRO) FROMLIB(GG244372) OBJTYPE(*FILE)
          TOLIB(SECURITY) NEWOBJ(RMTCMDS)
```

Step 2: Use the DSPJRN command to move the detailed information from the remote command entries to the database file RMTCMDS:

```
DSPJRN JRN(QCQJMJRN/QUSRSYS) ENTTYP(RO) OUTPUT(*OUTFILE)
       OUTFILFMT(*TYPE2) OUTFILE(SECURITY/RMTCMDS)
```

Do not worry if you get a message ″Format of output file RMTCMDS in library SECURITY not valid, reason code 1.″ This is normal. The OUTFILFMT parameter allows either *TYPE1 or *TYPE2. You must use *TYPE2 to ensure that the converted entries contain the user profile field.

On the DSPJRN command, you may specify optional selection criteria, such as starting and ending date, and time to narrow your search.

Step 3: Run your query against the file RMTCMDS in library SECURITY.

You may use the same three steps to convert the other journal entries to database files that help in investigating problems or security loopholes in your managed system. You just have to use CRTDUPOBJ for the physical model you want to use (in Step 1) and select the entry type with the ENTTYP parameter on the DSPJRNCMD command (in Step 2).

We used the following for creating three additional database files for normal processing (CS) journal entries, error journal entries (EP), and configuration journal entries (CO):

CL Commands to Convert the CS Journal entries

```
CRTDUPOBJ OBJ(MSSJRNCS05) FROMLIB(GG244372) OBJTYPE(*FILE)
          TOLIB(SECURITY) NEWOBJ(CHGREQS)

DSPJRN JRN(QCQJMJRN/QUSRSYS) ENTTYP(CS) OUTPUT(*OUTFILE)
       OUTFILFMT(*TYPE2) OUTFILE(SECURITY/CHGREQS)
```

CL Commands to Convert the EP Journal entries

```
CRTDUPOBJ OBJ(MSSJRNEP01) FROMLIB(GG244372) OBJTYPE(*FILE)
          TOLIB(SECURITY) NEWOBJ(ERRORS)

DSPJRN JRN(QCQJMJRN/QUSRSYS) ENTTYP(EP) OUTPUT(*OUTFILE)
       OUTFILFMT(*TYPE2) OUTFILE(SECURITY/ERRORS)
```

CL Commands to Convert the CO Journal entries

```
CRTDUPOBJ OBJ(MSSJRNCO) FROMLIB(GG244372) OBJTYPE(*FILE)
          TOLIB(SECURITY) NEWOBJ(CONFIG)

DSPJRN JRN(QCQJMJRN/QUSRSYS) ENTTYP(CO) OUTPUT(*OUTFILE)
       OUTFILFMT(*TYPE2) OUTFILE(SECURITY/CONFIG)
```

Remote Command Query Example

The following shows an example of a query and report produced to audit remote command requests. The report shows:

Date The date of the remote command request.

Process Result Remote command request processing result.

LU Name The LU name of the request originator.

Requester The operator ID (user profile name) of the request originator.

Process User The user profile name for the request to run under.

Command The Command string (80 characters).

You may notice that for some of the entries shown in the query report in Figure 183 on page 297 the command string is unreadable. The reason for this is that the command was encoded using the KEY parameter in the Change Managed System Attributes (CHGMGDSYSA) command.

```
  Query . . . . . . . . . . . . . . . . . . RMTCMDS1
    Library . . . . . . . . . . . . . . . . SECURITY
  Query text  . . . . . . . . . . . . . . . RMTCMD Audit Journal
  Query CCSID . . . . . . . . . . . . . . .    37
  Query language id . . . . . . . . . . . . ENU
  Query country id  . . . . . . . . . . . . US
  Collating sequence  . . . . . . . . . . . Hexadecimal

  Processing options
    Use rounding  . . . . . . . . . . . . . Yes (default)
    Ignore decimal data errors  . . . . . . No (default)
    Ignore substitution warnings  . . . . . Yes
    Use collating for all compares  . . . . Yes
  Special conditions
    *** All records selected by default ***

Selected files
  ID     File           Library       Member        Record Format
  T01    RMTCMDS        SECURITY      *FIRST        QJORDJE2
Ordering of selected fields
  Field           Sort      Ascending/  Break  Field
  Name            Priority  Descending  Level  Text
  CQDATE          10        D                  Date of entry: Job date format
  PRCRSL                                       Processing Result
  LUNAME                                       LU Name
  RQSTR           20        A                  Requester operator
  PRCUSR                                       User profile to run under
  CMDSTG                                       Command string
Report column formatting and summary functions
  Summary functions:  1-Total, 2-Average, 3-Minimum, 4-Maximum, 5-Count          Overrides
  Field           Summary    Column                                Dec  Null       Dec  Numeric
  Name            Functions  Spacing  Column Headings         Len  Pos  Cap   Len  Pos  Editing
  CQDATE                     0        DATE                      6
  PRCRSL                     2        PROCESS                  10
                                      RESULT

Report column formatting and summary functions (continued)
  Summary functions:  1-Total, 2-Average, 3-Minimum, 4-Maximum, 5-Count          Overrides
  Field           Summary    Column                                Dec  Null       Dec  Numeric
  Name            Functions  Spacing  Column Headings         Len  Pos  Cap   Len  Pos  Editing
  LUNAME                     2        LU                        8
                                      NAME
  RQSTR                      2        REQUESTER                10
  PRCUSR                     2        PROCESS                  10
                                      USER
  CMDSTG                     2        COMMAND                  80
                                      STRING
```

Figure 182. Query Definition for RMTCMD Audit Report

```
11/07/95  12:03:07                                          RMTCMD Audit Journal
DATE    PROCESS     LU        REQUESTER   PROCESS     COMMAND
        RESULT      NAME                  USER        STRING
110695  *REJECTED   RCHASM01  ADAN        BENT        CRTLIB LIB(GG244372A)
110695  *REJECTED   RCHASM01  ADAN        ADAN        CRTUSRPRF USRPRF(BENT) PASSWORD() USRCLS(*PGMR) GRPPRF(QSYSOPR)
110695  *REJECTED   RCHASM01  ADAN        *DFTUSR     CRTUSRPRF USRPRF(BENT) PASSWORD() USRCLS(*PGMR) GRPPRF(QSYSOPR)
110695  *ACCEPTED   RCHASM01  ADAN        ADAN        CRTUSRPRF USRPRF(BENT) PASSWORD() USRCLS(*PGMR) GRPPRF(QSYSOPR)
110695  *COMPLETED  RCHASM01  ADAN        ADAN        CRTUSRPRF USRPRF(BENT) PASSWORD() USRCLS(*PGMR) GRPPRF(QSYSOPR)
110295  *REJECTED   RCHASM01  ADAN                    DSPAUTUSR
110295  *REJECTED   RCHASM01  ADAN                    DSPLIB
110195  *ACCEPTED   RCHASM01  ITSCID50   QSVMSS      QSVMSS/QCQUPRUP USRLIST(*ALL) USRSPC(QTEMP/QSVNUSPC)
110195  *COMPLETED  RCHASM01  ITSCID50   QSVMSS      QSVMSS/QCQUPRUP USRLIST(*ALL) USRSPC(QTEMP/QSVNUSPC)
102595  *REJECTED   RCHASM01  PETEUSER    QSECOFR     crtusrprf petesec passwor·Ÿppæi½o·'nz·nzŒvr——·r''ræŒi·r·xrr·Ÿ¼n¿¾nzprxŸz¼iz'xŸ½v
102595  *REJECTED   RCHASM01  PETEUSER    QSECOFR     crtusrprf petesec passwor·Ÿppæi½o·'nz·nzŒvr——·r''ræŒi·r·xrr·Ÿ¼n¿¾nzprxŸz¼iz'xŸ½v
102595  *ACCEPTED   RCHASM01  PETEUSER    PGSECOFR    crtusrprf petesec passwor·Ÿppæi½o·'nz·nzŒvr——·r''ræŒi·r·xrr·Ÿ¼n¿¾nzprxŸz¼iz'xŸ½v
102595  *COMPLETED  RCHASM01  PETEUSER    PGSECOFR    crtusrprf petesec passwor·Ÿppæi½o·'nz·nzŒvr——·r''ræŒi·r·xrr·Ÿ¼n¿¾nzprxŸz¼iz'xŸ½v
102495  *ACCEPTED   RCHASM01  WBL         SVDEMO      savobj svrcv0005 itscsvdemo dev(*savf) savr——·r''ræŒi·r·xrr·Ÿ¼n¿¾nzprxŸz¼iz'xŸ
102495  *COMPLETED  RCHASM01  WBL         SVDEMO      savobj svrcv0005 itscsvdemo dev(*savf) savr——·r''ræŒi·r·xrr·Ÿ¼n¿¾nzprxŸz¼iz'xŸ
102495  *ACCEPTED   RCHASM01  SMGUI95     SMGUI95     7óéXAÉ83&îKHN+A(SMGUI95/SMGUI95) TYPE(*CHAR) LEN(10) VALUE(EMPTü¢SÎAXë%|C fiÙè7T
102495  *COMPLETED  RCHASM01  SMGUI95     SMGUI95     7óéXAÉ83&îKHN+A(SMGUI95/SMGUI95) TYPE(*CHAR) LEN(10) VALUE(EMPTü¢SÎAXë%|C fiÙè7T
091295  *ACCEPTED   RCHASM01  SAKAI       SVDEMO      WRKSYSSTS OUTPUT(*PRINT)
091295  *ACCEPTED   RCHASM01  SAKAI       SVDEMO      ENDSBS SBS(SVINT) OPTION(*IMMED)
091295  *COMPLETED  RCHASM01  SAKAI       SVDEMO      WRKSYSSTS OUTPUT(*PRINT)
091295  *ERROR      RCHASM01  SAKAI       SVDEMO      ENDSBS SBS(SVINT) OPTION(*IMMED)
091295  *COMPLETED  RCHASM01  SAKAI       SVDEMO      ENDSBS SBS(SVINT) OPTION(*IMMED)
091295  *ACCEPTED   RCHASM01  SAKAI       SVDEMO      SAVOBJ OBJ(SVSMRY*) LIB(ITSCSVDEMO) DEV(*SAVF) OBJTYPE(*FILE) SAVF(ITSCSVDEMO/SU
091295  *COMPLETED  RCHASM01  SAKAI       SVDEMO      SAVOBJ OBJ(SVSMRY*) LIB(ITSCSVDEMO) DEV(*SAVF) OBJTYPE(*FILE) SAVF(ITSCSVDEMO/SU
091295  *ACCEPTED   RCHASM01  SAKAI       SVDEMO      STRSBS SBSD(ITSCSVDEMO/SVINT)
091295  *COMPLETED  RCHASM01  SAKAI       SVDEMO      STRSBS SBSD(ITSCSVDEMO/SVINT)
090795  *ACCEPTED   RCHASM01  ITSCID55    ITSCID55    CALL PGM(QSYSUPWD) PARM(X'000007D0000007D0C9E3E2C3C9C4F5F5404044CC186739B1261583
090795  *COMPLETED  RCHASM01  ITSCID55    ITSCID55    CALL PGM(QSYSUPWD) PARM(X'000007D0000007D0C9E3E2C3C9C4F5F5404044CC186739B1261583
090195  *ACCEPTED   RCHASM01  ITSCID55    ITSCID55    dspautusr
090195  *COMPLETED  RCHASM01  ITSCID55    ITSCID55    dspautusr
090195  *ACCEPTED   RCHASM01  ITSCID55    QSVMSS      chgusrprf itscid55 usrcls(*secofr)
090195  *ERROR      RCHASM01  ITSCID55    QSVMSS      chgusrprf itscid55 usrcls(*secofr)
090195  *COMPLETED  RCHASM01  ITSCID55    QSVMSS      chgusrprf itscid55 usrcls(*secofr)
090195  *ACCEPTED   RCHASM01  ITSCID55    ITSCID55    chgusrprf itscid55 usrcls(*secofr)
090195  *COMPLETED  RCHASM01  ITSCID55    ITSCID55    chgusrprf itscid55 usrcls(*secofr)
090195  *ACCEPTED   RCHASM01  ITSCID55    QSVMSS      chgusrprf itscid55 usrcls(*secofr)
090195  *ERROR      RCHASM01  ITSCID55    QSVMSS      chgusrprf itscid55 usrcls(*secofr)
090195  *COMPLETED  RCHASM01  ITSCID55    QSVMSS      chgusrprf itscid55 usrcls(*secofr)
090195  *ACCEPTED   RCHASM01  ITSCID55    ITSCID55    chgusrprf itscid55 usrcls(*secofr)
090195  *COMPLETED  RCHASM01  ITSCID55    ITSCID55    chgusrprf itscid55 usrcls(*secofr)
090195  *ACCEPTED   RCHASM01  ITSCID55    ITSCID55    dspautusr
090195  *COMPLETED  RCHASM01  ITSCID55    ITSCID55    dspautusr
083095  *ACCEPTED   RCHASM01  ITSCID55    ITSCID55    DSPSYSVAL SYSVAL(QMODEL)
083095  *COMPLETED  RCHASM01  ITSCID55    ITSCID55    DSPSYSVAL SYSVAL(QMODEL)
083095  *ACCEPTED   RCHASM01  ITSCID55    ITSCID55    CALL PGM(QSYSUPWD) PARM(X'000007D0000007D0D7E6C4C3C8C5C3D2F1404410232510B55EC1E0
083095  *COMPLETED  RCHASM01  ITSCID55    ITSCID55    CALL PGM(QSYSUPWD) PARM(X'000007D0000007D0D7E6C4C3C8C5C3D2F1404410232510B55EC1E0
082895  *ACCEPTED   RCHASM01  ITSCID55    ITSCID55    sbmjob cmd(dspautusr)
082895  *COMPLETED  RCHASM01  ITSCID55    ITSCID55    sbmjob cmd(dspautusr)
082695  *ACCEPTED   RCHASM01  ADAN        SVDEMO      SAVOBJ OBJ(SVSMRY*) LIB(ITSCSVDEMO) DEV(*SAVF) OBJTYPE(*FILE) SAVF(ITSCSVDEMO/SU
082695  *COMPLETED  RCHASM01  ADAN        SVDEMO      SAVOBJ OBJ(SVSMRY*) LIB(ITSCSVDEMO) DEV(*SAVF) OBJTYPE(*FILE) SAVF(ITSCSVDEMO/SU
082695  *ACCEPTED   RCHASM01  WBL         SVDEMO      CHGJRN JRN(ITSCSVJRN/SVJOURN) JRNRCV(*GEN)
082695  *ERROR      RCHASM01  WBL         SVDEMO      CHGJRN JRN(ITSCSVJRN/SVJOURN) JRNRCV(*GEN)
082695  *COMPLETED  RCHASM01  WBL         SVDEMO      CHGJRN JRN(ITSCSVJRN/SVJOURN) JRNRCV(*GEN)
082695  *ACCEPTED   RCHASM01  WBL         SVDEMO      CHGJRN JRN(ITSCSVdemo/SVJOURN) JRNRCV(*GEN)
082695  *COMPLETED  RCHASM01  WBL         SVDEMO      CHGJRN JRN(ITSCSVdemo/SVJOURN) JRNRCV(*GEN)
082695  *ACCEPTED   RCHASM01  WBL         SVDEMO      SAVOBJ OBJ(SVRCV0005) LIB(ITSCSVDEMO) DEV(*SAVF) SAVF(ITSCSVDEMO/ITSCSVDEMO) CLE
082695  *COMPLETED  RCHASM01  WBL         SVDEMO      SAVOBJ OBJ(SVRCV0005) LIB(ITSCSVDEMO) DEV(*SAVF) SAVF(ITSCSVDEMO/ITSCSVDEMO) CLE
082695  *ACCEPTED   RCHASM01  WBL         SVDEMO      QSVMSS/QCQUPCHG USRPRF(SALES20) FORMAT(USRI0100) PASSWORD() PWDEXP(*NO)
082695  *COMPLETED  RCHASM01  WBL         SVDEMO      QSVMSS/QCQUPCHG USRPRF(SALES20) FORMAT(USRI0100) PASSWORD() PWDEXP(*NO)
082495  *ACCEPTED   RCHASM01  SMGUI95     SMGUI95     CRTDTAARA DTAARA(SMGUI95/SMGUI95) TYPE(*CHAR) LEN(10) VALUE(EMPTY) TEXT('Lab4 -T
082495  *COMPLETED  RCHASM01  SMGUI95     SMGUI95     CRTDTAARA DTAARA(SMGUI95/SMGUI95) TYPE(*CHAR) LEN(10) VALUE(EMPTY) TEXT('Lab4 -T
082395  *ACCEPTED   RCHASM01  MURPHY      SVDEMO      SNDMSG MSG('Interactive subsystem will be ended immediately') TOUSR(SVDEMO)
082395  *COMPLETED  RCHASM01  MURPHY      SVDEMO      SNDMSG MSG('Interactive subsystem will be ended immediately') TOUSR(SVDEMO)
082395  *ACCEPTED   RCHASM01  MURPHY      SVDEMO      WRKSYSSTS OUTPUT(*PRINT)
082395  *ACCEPTED   RCHASM01  MURPHY      SVDEMO      ENDSBS SBS(SVINT) OPTION(*IMMED)
082395  *COMPLETED  RCHASM01  MURPHY      SVDEMO      ENDSBS SBS(SVINT) OPTION(*IMMED)
082395  *COMPLETED  RCHASM01  MURPHY      SVDEMO      WRKSYSSTS OUTPUT(*PRINT)
082395  *ACCEPTED   RCHASM01  MURPHY      SVDEMO      SAVOBJ OBJ(SVSMRY*) LIB(ITSCSVDEMO) DEV(*SAVF) OBJTYPE(*FILE) SAVF(ITSCSVDEMO/SU
082395  *COMPLETED  RCHASM01  MURPHY      SVDEMO      SAVOBJ OBJ(SVSMRY*) LIB(ITSCSVDEMO) DEV(*SAVF) OBJTYPE(*FILE) SAVF(ITSCSVDEMO/SU
* * *  E N D   O F   R E P O R T   * * *
```

Figure 183. Query Report Showing Remote Command Activity

Distribution Query Example

The following shows an example of a query and report produced to show the actions performed by a distribution.

Tip

Even if the DDS supplied in library GG244372 and the model physical file created from this DDS is based on the *CS function 05* type entry, it can also be used for the *CS function 04* type entries, which is the retrieving, storing, and deleting object entries.

In our query example, we looked at the 04 functions for auditing who was performing that type of activities on our system.

```
  Query . . . . . . . . . . . . . . . . . CHGREQS1
    Library . . . . . . . . . . . . . . . SECURITY
  Query text  . . . . . . . . . . . . . . Change Request (Function 04) Audit Report
  Query CCSID . . . . . . . . . . . . . .    37
  Query language id . . . . . . . . . . . ENU
  Query country id  . . . . . . . . . . . US
  Collating sequence  . . . . . . . . . . Hexadecimal

  Processing options
    Use rounding  . . . . . . . . . . . . Yes (default)
    Ignore decimal data errors  . . . . . No (default)
    Ignore substitution warnings  . . . . Yes
    Use collating for all compares  . . . Yes

Selected files
  ID     File           Library       Member        Record Format
  T01    CHGREQS        SECURITY      *FIRST        QJORDJE2
Select record tests
  AND/OR   Field             Test     Value (Field, Numbers, or 'Characters')
           FUNCTION          EQ       '04'
Ordering of selected fields
  Field           Sort      Ascending/  Break  Field
  Name            Priority  Descending  Level  Text
  FUNCTION                                     Function
  CQDATE          10        D                  Date of entry: Job date format
  CPNAME                                       CP Name
  RQSTR                                        Requester user
  CQUSER                                       Name of User
  ACTION                                       Action
  ADDINFO                                      Additional data

Report column formatting and summary functions
  Summary functions:  1-Total, 2-Average, 3-Minimum, 4-Maximum, 5-Count          Overrides
  Field           Summary    Column                                Dec  Null       Dec  Numeric
  Name            Functions  Spacing  Column Headings         Len  Pos  Cap   Len  Pos  Editing
  FUNCTION                   0        FUNCTION                  2
  CQDATE                     2        DATE                      6
  CPNAME                     2        CP                        8
                                      NAME
  RQSTR                      2        REQUESTER                10
  CQUSER                     2        USER                     10
                                      NAME
  ACTION                     2        ACTION                    2
  ADDINFO                    2        ADDITIONAL              368
                                      DATA
```

Figure 184. Query Definition for Normal Processing (Change Requests)

```
11/08/95  16:03:37  Normal Processing Function Type 04 (Retrieve, Store, or Delete Object)            PAGE    1
FUNCTION  DATE    CP        REQUESTER   USER        ACTION   ADDITIONAL
                  NAME                  NAME                 DATA

   04     110895  RCHASM01  BENT        BENT          CT     ITSCNET STANDARD OBJ GG244372A CHGMAXSIGN PGM
   04     110895  RCHASM01  BENT        BENT          CT     ITSCNET STANDARD OBJ GG244372A CHGMAXSIGN PGM
   04     110895  RCHASM01  ADAN        ADAN          CT     ITSCNET STANDARD OBJ GG244372A CHGMAXSIGN PGM
   04     110895  RCHASM01  ADAN        ADAN          CT     ITSCNET STANDARD OBJ GG244372A CHGMAXSIGN PGM
   04     110895  RCHASM01  ADAN        ADAN          DL     ITSCNET STANDARD OBJ GG244372A RMTCMDS FILE
   04     110895  RCHASM01  ADAN        ADAN          CC     ITSCNET STANDARD OBJ QGPL SECPGMCL03 PGM
   04     110895  RCHASM01  ADAN        ADAN          CC     ITSCNET STANDARD OBJ QGPL SECPGMCL03 PGM
   04     110895  RCHASM01  ADAN        ADAN          CC     ITSCNET STANDARD OBJ QGPL SECPGMCL03 PGM
   04     110895  RCHASM01  ADAN        ADAN          FT     ITSCNET STANDARD OBJ SECURITY RMTCMDS FILE
   04     110895  RCHASM01  BENT        ADAN          CC     I3IBM1 AS400 9AOCC01 V1ROM0 BASE ALL ALL REF 001 V3R1M0
   04     110695  RCHASM01  ADAN        QSVMSS        CT     ITSCNET STANDARD LIB SMGUI
   04     110695  RCHASM01  ADAN        QSVMSS        CT     ITSCNET STANDARD OBJ QGPL SECPGMCL03 PGM
   04     110695  RCHASM01  ADAN        ADAN          CC     ITSCNET STANDARD LIB SMGUI
   04     110695  RCHASM01  ADAN        ADAN          CC     ITSCNET STANDARD OBJ QGPL SECPGMCL03 PGM
* * *  E N D  O F  R E P O R T  * * *
```

Figure 185. Query Report for Normal Processing Audit

The query report we have displayed in Figure 185 shows normal change requests that were performed on the managed system. The function 04 entries we queried are related to the type of activities that you might be interested in for security and auditing reasons.

The following is an explanation for the different fields we selected for our audit report:

Function Normal processing journal entries have seven different function types:

- 01 Distribution arrived
- 02 Notification of arrival
- 03 Receiving distribution
- 04 Retrieving, storing, or deleting object
- 05 Performing action
- 06 Sending response or request
- 09 Activity cleanup

Date The date the request was performed.

CP name The name of the managing system (central site system).

Requester The user profile name of the person that initiated the change request at the central site system.

Note: This field will be blank unless PTF SF24477 is installed on the central site system. Refer to “PTF SF24477: Functional Enhancement to Managed System Services/400” on page 280.

User name The user profile name that was used to run the change request at the managed system (based on the values in the distribution security program and/or the DFTUSRPRF parameter in the managed system attributes).

Action Operation to be performed:

- CC Create or replace an object
- CR Replace an object
- CT Create new object
- DC Delete object to create or replace
- DL Delete
- DR Delete object to replace
- FT Retrieve

Additional data Shows more details about the object that was managed such as library name, object name, and type.

Error Occurrences Query Example

The following shows an example of a query and report produced to show the errors for arriving distributions (function 01).

```
  Query . . . . . . . . . . . . . . . . . ERRORS1
    Library . . . . . . . . . . . . . . . SECURITY
  Query text  . . . . . . . . . . . . . . Query Program to Display Errors (EP-function 01)
  Query CCSID . . . . . . . . . . . . . .    37
  Query language id . . . . . . . . . . . ENU
  Query country id  . . . . . . . . . . . US
  Collating sequence  . . . . . . . . . . Hexadecimal

  Processing options
    Use rounding  . . . . . . . . . . . . Yes (default)
    Ignore decimal data errors  . . . . . No (default)
    Ignore substitution warnings  . . . . Yes
    Use collating for all compares  . . . Yes

Selected files
  ID     File           Library       Member        Record Format
  T01    ERRORS         SECURITY      *FIRST        QJORDJE2
Select record tests
  AND/OR   Field            Test     Value (Field, Numbers, or 'Characters')
           FUNCTION         EQ       '01'
Ordering of selected fields
  Field           Sort      Ascending/  Break  Field
  Name            Priority  Descending  Level  Text
  CQDATE                                       Date of entry: Job date format
  HOUR                                         Hour
  MINUTE                                       Minute
  CPNAME                                       CP Name
  RQSTR                                        Requester user
  CQUSPF                                       User Profile
  FUNCTION                                     Function
  ERRTYP                                       Error type
  SECPGM                                       Distribution security program
  SECLIB                                       Security program Library
  PGMOUT                                       Security program output

Report column formatting and summary functions
  Summary functions:  1-Total, 2-Average, 3-Minimum, 4-Maximum, 5-Count          Overrides
  Field           Summary    Column                                Dec  Null       Dec  Numeric
  Name            Functions  Spacing  Column Headings         Len  Pos  Cap   Len  Pos  Editing
  CQDATE                     0        DATE                      6
  HOUR                       2        HOUR                      5    0
  MINUTE                     2        MINUTE                    5    0
  CPNAME                     2        CP                        8
                                      NAME
  RQSTR                      2        REQUESTER                10
  CQUSPF                     2        USER                     10
                                      PROFILE
  FUNCTION                   2        FUNCTION                  2
  ERRTYP                     2        ERROR                     2
                                      TYPE
  SECPGM                     2        SECURITY                 10
                                      PROGRAM
  SECLIB                     2        SEC-PGM                  10
                                      LIBRARY
  PGMOUT                     2        PROGRAM                  30
                                      OUTPUT
```

Figure 186. Query Definition for Errors Report

```
11/07/95  15:51:24                        Error (EP) Journal Entries for Function Type 01                          PAGE    1
DATE      HOUR   MINUTE   CP        REQUESTER   USER        FUNCTION  ERROR  SECURITY    SEC-PGM     PROGRAM
                          NAME                  PROFILE               TYPE   PROGRAM     LIBRARY     OUTPUT
061995      11       21   RCHASM03              QSVMSS         01      02                          PER
061995      15       52   CCSERV03              QSVMSS         01      06                          1
110695  *******  *******                        QSVMSS         01      07    SECPGMCL    QSVMSS      *REJECT
* * *  E N D  O F  R E P O R T  * * *
```

Figure 187. Query Report Showing Errors for Arriving Distributions

The error query report shown in Figure 187 shows different error types for arriving distributions:

Error Type 02 Activity information not valid

Error Type 06 Unexpected data received

Error Type 07 Security program failed or rejected activity

The complete list of all of the error types is found in Appendix F of the *Managed System Services/400 Use* book.

Change Managed System Attributes Audit

The following shows an example of a query and report produced to document the user profile and the changes that were made to the managed system attributes using the CHGMGDSYSA command.

```
  Query . . . . . . . . . . . . . . . . . CONFIG1
    Library . . . . . . . . . . . . . . . SECURITY
  Query text  . . . . . . . . . . . . . . CHGMGDSYSA Query Report
  Query CCSID . . . . . . . . . . . . . .    37
  Query language id . . . . . . . . . . . ENU
  Query country id  . . . . . . . . . . . US
  Collating sequence  . . . . . . . . . . Hexadecimal

  Processing options
    Use rounding  . . . . . . . . . . . . Yes (default)
    Ignore decimal data errors  . . . . . No (default)
    Ignore substitution warnings  . . . . Yes
    Use collating for all compares  . . . Yes
  Special conditions
    *** All records selected by default ***

Selected files
  ID     File          Library       Member        Record Format
  T01    CONFIG        SECURITY      *FIRST        QJORDJE2
Ordering of selected fields
  Field           Sort      Ascending/  Break  Field
  Name            Priority  Descending  Level  Text
  CQDATE                                       Date of entry: Job date format
  USRPRF                                       User profile
  DSECPO                                       Distribution security pgm name. Old value
  DSECLO                                       Distribution security pgm lib. Old value
  DSECPN                                       Distribution security pgm name. New value
  DSECLN                                       Distribution security pgm lib. New value
  DFTUSO                                       Default user profile. Old value
  DFTUSN                                       Default user profile. New value
  RSECPO                                       Remote cmd security pgm name. Old value
  RSECLO                                       Remote cmd security pgm lib. Old value
  RSECPN                                       Remote cmd security pgm name. New value
  RSECLN                                       Remote cmd security pgm lib. New value

Report column formatting and summary functions
  Summary functions:  1-Total, 2-Average, 3-Minimum, 4-Maximum, 5-Count          Overrides
  Field           Summary    Column                                  Dec  Null       Dec  Numeric
  Name            Functions  Spacing  Column Headings         Len  Pos  Cap   Len  Pos  Editing
  CQDATE                     0        DATE                      6
  USRPRF                     2        USER                     10
                                      PROFILE
  DSECPO                     2        DSTPGM                   10
                                      BEFORE
  DSECLO                     2        DSTLIB                   10
                                      BEFORE
  DSECPN                     2        DSTPGM                   10
                                      AFTER
  DSECLN                     2        DSTLIB                   10
                                      AFTER
  DFTUSO                     2        DFTUSR                   10
                                      BEFORE
  DFTUSN                     2        DFTUSR                   10
                                      AFTER
  RSECPO                     2        RMTPGM                   10
                                      BEFORE
  RSECLO                     2        RMTLIB                   10
                                      BEFORE
  RSECPN                     2        RMTPGM                   10
                                      AFTER
  RSECLN                     2        RMTLIB                   10
                                      AFTER
```

Figure 188. Query Definition for CHGMGDSYSA Audit Report

```
11/07/95  17:34:17                          Changed Managed Systems Attributes Audit Report                                PAGE    1
DATE    USER        DSTPGM      DSTLIB      DSTPGM      DSTLIB      DFTUSR      DFTUSR      RMTPGM      RMTLIB      RMTPGM      RMTLIB
        PROFILE     BEFORE      BEFORE      AFTER       AFTER       BEFORE      AFTER       BEFORE      BEFORE      AFTER       AFTER
080595  ADAN        *NONE                   *NONE                   OCCDFTUSR   SMGUI       *DFT                    *DFT
082495  ADAN        *NONE                   *NONE                   SMGUI       SMGUI       *DFT                    *DFT
082495  ADAN        *NONE                   *NONE                   SMGUI       SMGUI       *DFT                    *DFT
082495  ADAN        *NONE                   *NONE                   SMGUI       SMGUI       *DFT                    *DFT
082895  ITSCID55    *NONE                   *NONE                   SMGUI       SMGUI       *DFT                    QVARSUXT    QSVMSS
090195  ITSCID55    *NONE                   *NONE                   SMGUI       QSVMSS      QVARSUXT    QSVMSS      QVARSUXT    QSVMSS
090795  ADAN        *NONE                   *NONE                   QSVMSS      OCCDFTUSR   QVARSUXT    QSVMSS      QVARSUXT    QSVMSS
110195  ITSCID55    *NONE                   *NONE                   OCCDFTUSR   QSVMSS      QVARSUXT    QSVMSS      QVARSUXT    QSVMSS
110295  ADAN        *NONE                   *NONE                   QSVMSS      QSVMSS      QVARSUXT    QSVMSS      *DFT
110695  ADAN        *NONE                   SECPGMCL    QSVMSS      QSVMSS      QSVMSS      *DFT                    *DFT
110695  ADAN        SECPGMCL    QSVMSS      *NONE                   QSVMSS      QSVMSS      *DFT                    *DFT
110695  ADAN        *NONE                   SECPGMCL03  QGPL        QSVMSS      QSVMSS      *DFT                    *DFT
110695  ADAN        SECPGMCL03  QGPL        *NONE                   QSVMSS      ADAN        *DFT                    *DFT
110695  ADAN        *NONE                   SECPGMCL03  QGPL        ADAN        QSVMSS      *DFT                    *DFT
* * *  E N D  O F  R E P O R T  * * *
```

Figure 189. CHGMGDSYSA Audit Report

Chapter 7. Using the Graphical User Interface

The System Manager/400 Graphical User Interface (GUI) provides the network operator with a graphical interface for monitoring and controlling AS/400 systems and clients in a single system or network environment. The network operator uses a personal computer to provide graphical views of the network resources being managed.

The GUI allows users at the central site system to:

- Receive alert and problem notifications.
- Manage user profiles.
- Send commands to managed systems and clients.

This chapter shows how to use the System Manager/400 GUI, describes some examples of common tasks, and provides some tips on how you can use the GUI more effectively. For installation and configuration information, refer to Appendix A, “System Manager/400 GUI Configuration Checklist” on page 449.

What Does the Graphical User Interface Provide?

The System Manager/400 GUI is a graphical interface for the network systems administrators or operators to the central site system. It is a client/server application of which the client part runs on the administrator’s workstation under OS/2 and the server on the central site AS/400 system. Communication support between client and server is provided by Communications Manager/2 or Communications Manager/400. There is no direct connection the administrator’s workstation to the managed systems.

When the System Manager/400 GUI is first invoked from the OS/2 Desktop, the default System Manager/400 Work Area shown in Figure 190 appears.

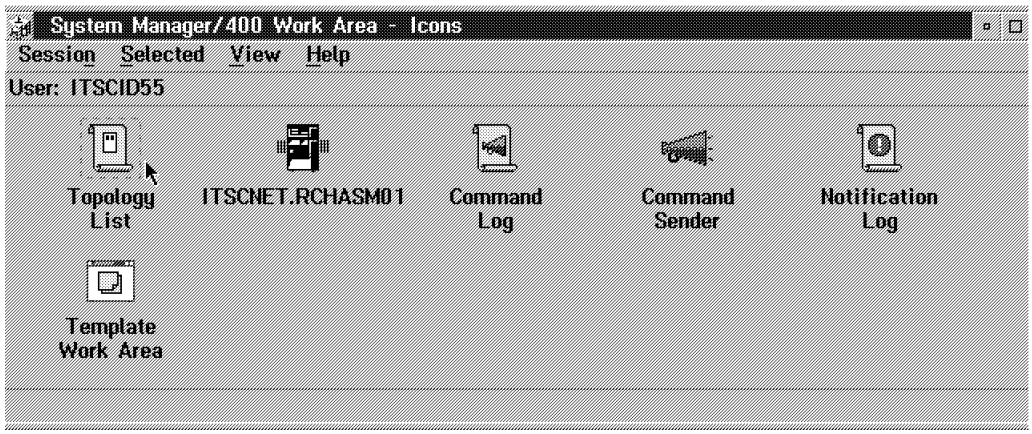


Figure 190. System Manager/400 Default Main Work Area

The icon shown as ”ITSCNET.RCHASM01” shows the network ID and control point of your central site system. We shall refer to this generally as the **Central Site System** icon.

We shall see later in this chapter that you can customize the work area to meet your own requirements.

The functions available through the System Manager/400 GUI fall into the following areas:

- Topology management
- Notifications
- Remote commands
- User profile management

This section briefly outlines these functional areas, relates the System Manager/400 Work Area icons to them, and shows how to start the GUI. The remainder of the chapter then looks at the functions in each area in detail.

Topology Management

Topology information is collected for APPN nodes and clients in your network. The information is gathered using SNMP and is stored on the central site. Any APPN node can be discovered by the topology manager; so can clients that are able to send SNMP traps to their managing AS/400 system and support MIB II. Topology information is discovered periodically.

You can use the **Central Site System** icon to define and control the discovery process and the **Topology List** icon to display all or part of the resultant topology information.

Notification

Notification is the process of informing the operator when an alert or problem record has been received at the central site. Notification reports alerts from clients as well as AS/400 systems.

Use session settings to specify the alert and/or problem filters that will control what notifications are received.

The **Notification Log** icon gives a list of alerts and problems and the status of the items received in the session. You can reply to alertable inquiry messages and take problem resolution action directly from the list, and you can change the status of an item to reflect this.

Remote Commands

The System Manager/400 GUI simplifies the process of submitting remote commands to AS/400 systems. You can send commands using the **Command Sender** icon, the **Central Site System** icon, or from within other facilities such as the Notification Log referred to previously. The **Command Log** icon provides a list of commands that were previously issued and their status.

User Profile Management

User profile information for all of the AS/400 nodes in the network is gathered and stored on the central site system. The System Manager/400 GUI provides facilities to inquire on the current information and to add, copy, change, and delete user profiles.

The icons to perform user profile administration do not appear on the default Main Work Area but you can obtain them for work area customization through the **Template Work Area** icon.

Previous Release Compatibility

The full functions previously discussed are provided with System Manager/400 and Managed System Services/400 at V3R1M1 running on both the central site AS/400 system and on managed systems. However, some functions are provided if a previous release of Managed System Services/400 is installed on the managed systems. This is shown in Table 10. Topology management functions are only available if the central site AS/400 system is on V3R1M1.

Table 10. Functions Available with Managed System Services/400 on Managed Systems Prior to V3R1M1

Functions available with Managed Systems running previous to V3R1M1		
	V2R3/V3R0M5	**V3R1M0**
Notification		
Alert/Problem notification	Yes	Yes
Reply to messages	Yes (1)	Yes
User Profiles		
All functions	No	No
Run Commands		
All functions	Yes (2)	Yes
Topology		
Discover AS/400 nodes	Yes (3)	Yes
Discover downstream PCs as client icons	No (4)	Yes (4) (5)

Notes:
(1) OS/400 PTF SF27580 and Remote Operations Agent are required.
(2) Requires NetView Remote Operations Agent.
(3) Only as a cube, not an AS/400 system, therefore limited information is available. Must either be in same network and defined as a network node, or an end node attached to a V3R1 (or later) network node.
(4) If attached to an AS/400 system that is a network node, it shows as a cube icon. No details such as contact information are shown.
(5) If the PC is configured to send a trap to its local managing AS/400 system (network node or end node), it shows as a client icon.

Note:

SNMP discovery requires OS/400 V3R1 or later. If a client is connected to an AS/400 system and is sending a trap to that system as its managing system, it is registered in the client administration database on its managing AS/400 system. Once the client is registered in the client administration database in its managing AS/400 system, topology manager discovers it as long as the AS/400 system acting as its managing system is an end node or network node.

Without SNMP discovery, the topology manager only discovers a PC through its APPN means (that is, end node discovery) if it is attached to an AS/400 network node. In this case however, it does not know it is a client but only knows it as just an end node attached to a network node.

System Manager/400 GUI Setup Checklist

The purpose of this section is to provide an overview of the steps that you must follow to set up System Manager/400 GUI. Refer to Chapter 2, “Configuring Operations Control Center/400 for Distribution and Remote Operations” on page 41 and to Appendix A, “System Manager/400 GUI Configuration Checklist” on page 449 for more information.

Central Site System Setup Checklist

At the central site system, you must:

1. Follow the checklist in Chapter 2, “Configuring Operations Control Center/400 for Distribution and Remote Operations” on page 41 to set up the central site system for distribution and remote operations.
2. Install the most recent PTFs (see Appendix A, “System Manager/400 GUI Configuration Checklist” on page 449).
3. Configure AnyNet, TCP/IP and SNMP on central site system (see Appendix A, “System Manager/400 GUI Configuration Checklist” on page 449).
4. Install System Manager/400 GUI on the managing workstation.

Manage Systems Setup Checklist

1. Follow the checklist in Chapter 2, “Configuring Operations Control Center/400 for Distribution and Remote Operations” on page 41 to set up the central site system for distribution and remote operations.
2. Install the most recent PTFs (see Appendix A, “System Manager/400 GUI Configuration Checklist” on page 449).
3. Configure AnyNet, TCP/IP and SNMP on managed system (see Appendix A, “System Manager/400 GUI Configuration Checklist” on page 449).

Client Checklist

If you are managing Client Access/400 Optimized for OS/2 clients, use the following steps:

1. Configure SNMP on the client PC (see Appendix A, “System Manager/400 GUI Configuration Checklist” on page 449).
2. Change the PC system name (see Appendix A, “System Manager/400 GUI Configuration Checklist” on page 449).
3. Configure the PC communications definitions (see Appendix A, “System Manager/400 GUI Configuration Checklist” on page 449).

Signing on to System Manager/400 GUI

This is done by double-clicking the *Connection icon* that represents your central site AS/400 system in the System Manager/400 - Icon View folder. This runs the command SM400.EXE from the directory SM400OS2 (or other if you changed this at installation time). There are a number of parameters with this command that are set at installation time. You can change these parameters in the *Settings* for the icon.

If you chose the automatic Signon option, (which is the default), then the USERID and password used when you signed on through Communications Manager/2 is used. If multiple users can sign on at the same PC, then you should not use automatic Signon unless you want each user to use the same customization data. Customization data is saved on the central site AS/400 system with the user profile.

To ensure GUI users have their own customization data, you can use the manual Signon which prompts for the USERID and password at each Signon. Alternatively, you can specify the USERID on the startup parameters, in which

case the user is only prompted for a password. Manual sign on is set when the product is installed or you can put `/M` to the settings for the icon to have manual sign on.

Tip

Customization data is saved with user profile information. Operators can sign on from any managing workstation attached to the central site system and retrieve the personalized customization data. Deleting a user profile deletes the System Manager/400 GUI customization data associated with it.

You can create multiple Connection icons by right-clicking on the icon and choosing *Copy*. You can also change the title of the icon by selecting *Settings* to make each icon more distinguishable.

Signon Problems?

If you use the Automatic Signon option, this uses the USERID and password that was first used when you signed on to Communications Manager/2. If this password is not eight characters in length, your Signon to the GUI may fail with the following messages:

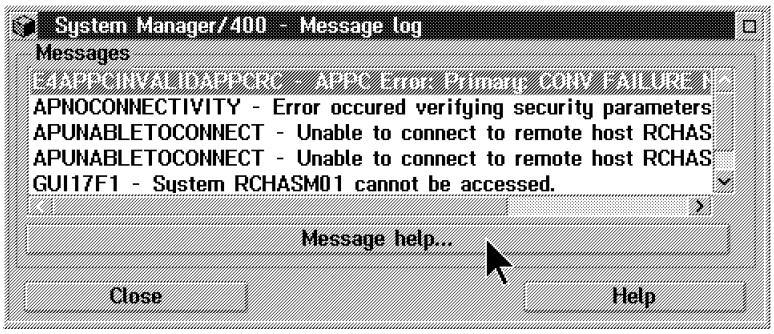


Figure 191. System Manager/400 - Message log

To avoid this, either ensure your password is *exactly* eight characters in length, or use the manual Signon method. Manual Signon accepts any valid OS/400 password. This problem is not specific to System Manager/400 GUI but is more general to other CM/2 connected products, also.

Trouble-Shooting System Manager/400 GUI Problems

In Appendix A, “System Manager/400 GUI Configuration Checklist” on page 449, we discuss some specific problem determination procedures relevant to the Topology Manager. If you have other more general problems that cannot easily be resolved, you can change the GUI Signon so that data that may assist with problem resolution is captured on the PC. To do this, add the following to the list of parameters for the Connection icon:

```
/ek
```

This causes a file called mmddhhmm.ss to be created in the SM400OS2SERVICEsystem sub-directory (where “system” is your AS/400 system name and “mmddhhmm.ss” represents the date and time of the problem. This file contains much useful information that can be used for debugging purposes.

Topology Management

In this section, we look at the facilities provided in Managed System Services/400 for collecting topology information and those in System Manager/400 for displaying and using it.

Topology Overview

Enterprise management is easier if you can “see” the systems in the enterprise. Dynamically tracking of what is attached to the network is the basis for getting a picture of your enterprise. Topology Management is the process of gathering information about managed systems and clients.

Collecting and maintaining topology information is an important first step in managing your network of systems. The inventory of topology information is called the **topology database**, and it is actually a set of database files that creates the foundation for managing applications. System Manager/400 uses the topology database to enable GUI users at the central site to manage user profiles and send remote commands to managed systems. However, the topology manager is independent of System Manager/400 GUI and the information collected by the topology manager can be used by applications other than System Manager/400 GUI.

The topology manager uses SNMP to learn about systems in the network. Since SNMP is an IP application it is necessary to use AnyNet support to allow the SNMP requests to flow over IP for SNA if you are not running TCP/IP in your network. As topology management also gathers APPN information, SNA communications must be defined between your AS/400 systems. This is also true for Notification (see “Notifications” on page 329) as alerts can only flow over SNA connections.

Topology Objects

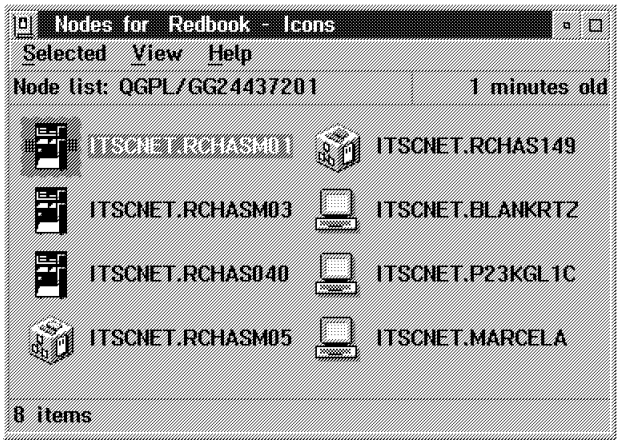


Figure 192. Topology List Showing Three Types of Node Objects

Topology information is accessed through the **Topology List** icon. Three types of a topology objects may appear in the topology list, as shown in Figure 192. This list shows only those nodes defined in **node list** QGPL/GG24437201. There may be many more systems identified by the topology manager that do not appear in this view. We will see later how to select the items to display.

This icon is used to identify the AS/400 systems running Version 3 Release 1 Modification 0 level or later of OS/400. The topology manager was able to retrieve the system description information using SNMP, and using this information, the topology manager determined the operating system and release level.

The central site system is distinguished by three vertical bars on each side of the icon.

This icon identifies a node that has been found in the client management database. The topology manager retrieves the clients contained in the client management database from each AS/400 system in the network and that information is stored in the topology database.

For example, a PC running Client Access/400 Optimized for OS/2 or an RS/6000 can send a trap to its central site system. This updates the client management database on that AS/400 system and so is displayed as a Client icon.

This system block icon is used to identify a discovered node that cannot be contacted using SNMP to obtain system description information. Either the system does not support SNMP or SNMP is not active. An AS/400 system running a release of OS/400 earlier than V3R1M0 or APPN connected PCs which do not support SNMP (or SNMP is not active) are identified by this icon.

If you suspect that a system shown as a cube should really be represented as a “black-box” or a client icon, then you should check your configuration definitions. See “Debugging Topology Manager Function” on page 458 for further information on topology discovery trouble-shooting. An AS/400 system running V3R1M0 may also be identified as a system block icon if the system has not been configured to use SNMP with either TCP/IP or AnyNet support.

If you right-click on any of these icons, you are shown a list of the functions available. These differ, depending on the type of icon selected. For example, you can only perform user profile tasks to an AS/400 system and you can only recover alerts from the central site system.

Topology Discovery and the Topology Manager

Network topology is discovered by the Topology Manager. When the topology manager is started, initially it gathers APPN information from the central site.

Tip

We advise that topology manager should run on a network node as it uses the underlying support for the DSPAPPNINF command to discover APPN nodes in its local network. If topology manager was running on an end node, then the scope of the APPN information is limited and less discovery is possible.

Discovering Nodes

The information in DSPAPPNINF is topology manager's starting point for collecting topology data about your network. The topology manager uses this information to learn about the local Network Node and End Node systems. The topology manager sends SNMP requests to each known system to obtain additional information and to learn about more systems in the network.

Topology manager gathers information from three Management Information Bases:

MIB II This is an industry "Standard RFC" MIB describing those objects that are implemented by managed nodes that run the Internet suite of protocols. AS/400 support for MIB II is provided by the QTMSNMP job that runs in QSYSWRK. For example, system names, system contacts, system descriptions, and system location information displayed by the GUI are provided by MIBII.

APPN MIB This is an "IBM enterprise" MIB that provides global information about APPN end nodes and network nodes.

Client MIB This is also an "IBM enterprise" MIB. It provides global information about the client, its connectivity, and its capabilities. The AS/400 system is currently the only IBM system that supports the Client MIB. This support is provided for Client Access/400 Optimized for OS/2 clients.

If there are multiple SNA networks (that is, you have different network IDs for parts of your network), then you have to discover the network topology for the other networks by starting discovery for a *point-of-presence* in the other network. This point-of-presence system must be a network node in order for it to discover the other nodes in the sub-network. Further information on point-of-presence is found in "Point-of-Presence Links to Other Networks" on page 313.

Following this, topology information for clients, links, and end nodes is gathered. Link information is not displayed or used with the GUI, but can be collected by topology manager and used by other applications. By default, link information polling interval is set to 0 minutes (no polling).

You can specify a *polling interval* in the GUI that defines when you want updates to the topology database to be collected. As not all of the nodes in your network may be as critical as others, you can specify a different collection period for network nodes, end nodes, clients, links, and system information. The shorter the polling interval, the more frequently nodes are polled and hence the more this affects the performance of the system. Because link information is not used by the GUI, the default is not to gather it.

Tip

If you do not want to use the status information of topology management, you can stop topology discovery from the GUI. Any previously discovered nodes are still displayed so you can use the icons for running commands, user profile lists, and so on, but you do not incur any performance overhead due to the polling.

Point-of-Presence Links to Other Networks

A *point-of-presence* is a system that is used to obtain additional APPN topology information. It is used to discover adjacent networks connected to the network that the topology manager is running in. You can define one or more of the managed systems as being a point-of-presence.

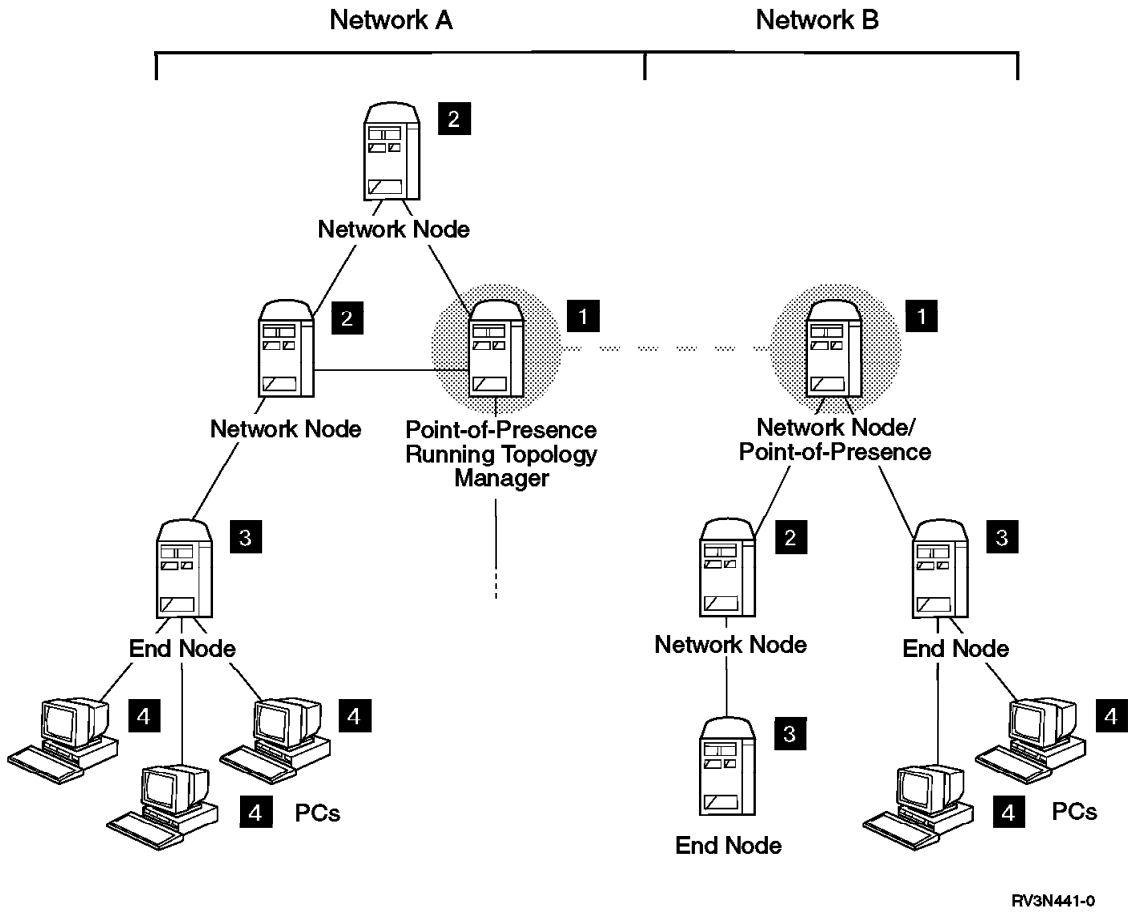


Figure 193. Network Topology Showing Point-of-Presence Systems

By default, the system running the topology manager (**1** in Network A in Figure 193) is a point-of-presence. In the previous discussion about discovery, only the systems with the same network ID as the system running the topology manager are discovered. To discover those in another network (for example, network B in Figure 193), you must first discover the point-of-presence system **1** in network B.

You can define a system as a point-of-presence by changing the settings for the system, or you can use *Discover a point-of-presence* from the central site system's discovery options.

Discovering Clients

System Manager/400 uses the Client MIB on managed AS/400 systems to discover clients in the network. The Client Management MIB is a set of information that is gathered from the supported clients. This is then stored in database files on the AS/400 system that is the "local" managing system for the client. These files are documented in detail in *Network and Systems*

Management, SC41-3409 (V3R1M1), and *Simple Network Management Protocol (SNMP) Support*, SC41-4412 (V3R6).

The clients shown as **4** in Figure 193 on page 313 are locally managed by the AS/400 end nodes shown as **3** (these can also be network nodes). By "locally managed," we mean that these nodes maintain information about their attached clients in the Client Management Database. The attached clients must be able to send SNMP traps to their local AS/400 system. The traps convey information about the client to the local AS/400 system. The Trap Manager handles traps from a new client immediately and those from existing clients based on a refresh interval. That is, it disregards any information in a trap from an existing client unless the interval has expired. The default for the interval is 30 days. If you need to change the interval, you must create a data area that contains your new refresh interval value. For example, the following command causes the client management database to be updated if the client information in the database is older than seven days:

```
CRTDTAARA DTAARA(QUSRSYS/QZCAREFI)
  TYPE(*DEC) LEN(2 0) VALUE(07)
  TEXT('Refresh Interval')
```

Note

Although we generally talk about Client Access/400 Optimized for OS/2 clients as being able to populate the Client Management Database, this is true for any client (for example, RS/6000) that is able to send a trap to its local managing AS/400 system. These appear on the GUI's topology management displays as a client icon.

Not all of the client information stored in the client's local AS/400 system is subsequently gathered by the topology manager. As the GUI only accesses the data in the topology database, not all this information is available through the GUI. If you want to see the other information, you can access the client management database directly using QUERY, SQL, or any other database access tool.

Starting Topology Management Jobs QVATTMGR and QTRPMGR

The topology manager job QVATTMGR runs in subsystem QSYSWRK. **This job only needs to run on the central site system**. Normally, you do not need to do anything with this. It may be necessary occasionally to look at the joblog to assist with problem determination. Topology manager is started with the following Managed System Services/400 command:

```
STRMGRSRV SERVICE(*TOPOLOGY)
```

If you are managing downstream clients, then you must also **start the Trap Manager job on each AS/400 system that has downstream clients**. To do this, use the command:

```
STRTRPMGR
```

This has one parameter (FWDTRP) that determines if received traps are forwarded to another managing system in the network. This is normally used only if you have a central managing system that provides full SNMP management functions such as IBM's NetView for OS/2 or NetView for AIX.

Topology Database

The database of topology information is held on the central site AS/400 system. This database is where the topology manger stores information about all of the discovered nodes. As previously discussed, the information held does not cover all of the information available from each system, but only a subset. The information is stored in four database files in library QUSRSYS:

QAVATSYSP This is the system information file. It includes system description, contact information, and location details for each node discovered.

QAVATANDP APPN information

QAVATALNP Link information

QAVATCLNP The client information file includes additional details for each client discovered.

Further details of the logical database files over these physical files are documented in Appendix E of the Managed System Services/400 Use book, (SC41-3323-00 with TNL SN41-3382 for V3R1M1 and SC41-4323-00 for V3R6).

The GUI uses SQL queries to provide views of this database. The detailed views from the GUI are most useful when you are doing problem determination for a node. In particular, they allow you to view useful contact and status information. The following information is available for a node:

- Control Point Name
- Network Identifier
- Contact
- System Name
- Location
- Description
- Last discovered
- First discovered
- Last polled
- Polling interval
- Up time
- SNMP agent status
- APPN node type
- IP address
- Community name
- Point of presence

Remember

The information gathered by the topology manager is only as good as that entered on the nodes. If you plan to make use of the detailed contact information, make sure you enter it correctly on each node. This is done with the `CHGSNMPA` command on each AS/400 system (see "AS/400 SNMP Configuration" on page 320) and during SNMP setup of Client Access/400 Optimized for OS/2 clients (see Figure 201 on page 324).

Icon views of nodes are used for "drag-and-drop" activities or other operations on multiple nodes. For example:

- You can run a command on one or more systems by dragging a group of system icons onto the Command Sender.
- You may want to find all occurrences of a user profile on a group of systems.

The database is also available for other AS/400 applications to query also, allowing you to create hardcopy listings as well as the System Manager/400 GUI inquiries. The inquiries can show details from the database or simply a subset of the icons. These subsetted views are useful to group your systems together for running common commands or user profile activities. Customizing these

views is discussed in detail in “Defining Your Own Views of the Topology Database” on page 327.

Cleaning Up the Topology Database

If you suspect that the status of the nodes shown on topology lists in the GUI is not what you expect, perhaps due to inconsistencies in your initial setup, then you can clear the four topology database files by stopping the topology manager, running the initialize program, and restarting the topology manager:

```
ENDMGRSRV SERVICE(*TOPOLOGY)
CALL QSVMSS/QVATINZ
STRMGRSRV SERVICE(*TOPOLOGY)
```

This initializes the files, and restarts the topology manager, causing the discovery process to re-populate the database with the latest information from the MIBs. Restarting the topology manager can take several minutes. Before all of the nodes have been contacted, you may see some appear as *cube icons* on top of the systems list due to the topology manager not having retrieved SNMP data yet. These should change to AS/400 systems or client icons in due time.

Note: You should ensure that no one is using the System Manager/400 GUI when you clear the files; otherwise you receive message MSS0748 *Topology database initialization error occurred*. If you do get this message, rerun the program after all of the users have logged off of the GUI.

Alternatively, changing the topology manager cleanup period to a short interval (for example, one or two days) causes any entries older than that interval to be removed from the topology database. The cleanup period is set in the *Discovery - Settings* of System Manager/400 GUI. The topology manager cleanup interval can be set up through the GUI (right-click on the central site system, click on *Discovery*, click on *Settings*). You can select the length of time that a node remains in the topology database if it has not been successfully polled. The default for this is 15 days, which is the same as the default for the APPN topology database cleanup interval. We recommend that you keep both of these intervals the same.

Tip

The underlying OS/400 APPN topology cleanup interval is 15 days and cannot be changed by the user. Therefore, if you set the topology manager cleanup interval to less than 15 days, the nodes are re-discovered from the APPN topology database.

Configuring AnyNet and SNMP Support

Note

For a quick list of steps to configure AnyNet and SNMP, refer to Appendix A, “System Manager/400 GUI Configuration Checklist” on page 449.

Topology management is based on information gathered from SNMP Management Information Bases (MIBs). SNMP applications run over TCP/IP networks. Because topology manager discovers an APPN network but it is an SNMP application itself, you need to configure support for AnyNet to allow *IP over SNA* to carry the SNMP requests over the SNA network, unless you are also running TCP/IP between your AS/400 systems.

Notes:

1. In a dual protocol network (TCP/IP and SNA) all that is required is to associate the managed system's IP address with the corresponding SNA location. This is so that the topology manager can issue the SNMP requests to the APPN nodes. In this case, AnyNet does not need to be enabled.
2. You must have SNA communications defined between your AS/400 systems because topology discovery uses APPN topology information as the starting point to discover your network. The software distribution and installation functions of System Manager/400 can run on pure TCP/IP networks using AnyNet.

To activate AnyNet support on the AS/400 systems, you must change the network attributes:

```
CHGNETA ALWANYNET(*YES)
```

This change takes effect immediately.

Clients, such as PCs running Client Access/400 Optimized for OS/2, must be configured to support AnyNet if they usually communicate to the AS/400 system over SNA (as is usual with Client Access/400 Optimized for OS/2 clients). They must also be defined on the local AS/400 system to run IP over SNA just the same way as the AS/400 systems. This is covered in Figure 201 on page 324.

Configuring AnyNet on Your AS/400 Systems

The CFGIPS command takes you to the ***Configure IPS Over SNA*** menu. From there, you can do all of the necessary TCP/IP configuration definitions to support System Manager/400 GUI. This is shown in Figure 194.

```
CFGIPS                      Configure IP over SNA
                                                          System:  SYSNM001
Select one of the following:

     1. Work with IP over SNA interfaces
     2. Work with IP over SNA routes
     3. Work with IP over SNA locations
     4. Work with IP over SNA type of service

    20. Convert IP address into location name
    21. Convert location name into IP address
```

Figure 194. Configure IPS Over SNA

Work with IP Over SNA Interfaces: An interface in TCP/IP is an *Internet Protocol (IP)* address by which the local host is known on the SNA transport. IP over SNA interfaces are logical interfaces. They are not physical interfaces and they are not associated with any line description or network interface. There can be multiple IP over SNA logical interfaces defined on a host, but only a maximum of eight are active at one time.

To configure the IP over SNA interface, choose option 1 from the CFGIPS menu. Here, you specify the IP internet address (INETADDR) associated with your central site system's APPN address (netid.cpname).

```
                        Work with IP over SNA Interfaces
                                                                System:   SYSNM001
Type options, press Enter.
  1=Add   2=Change   4=Remove   9=Start   10=End

        Internet            Subnet              Interface
Opt     Address             Mask                Status

__      ______________
__      100.1.1.100         255.255.255.0       Active
```

Figure 195. Work with IP Over SNA Interfaces

In Figure 195, we are defining the IP over SNA Interface for the central site AS/400 system SYSNM001. You may also use the ADDIPSIFC command to define this information.

Tip

If you are configuring AnyNet rather than using "real" IP addresses, you can use any IP address. For example, you may decide to follow a simple convention such as:

100.1.1.100 for your central site AS/400 system

100.1.1.1 for your first managed system

100.1.1.2 for your second managed system

100.1.1.n .....and so on

The **Subnet Mask** field is a mask that defines the partitioning of the network to which this interface attaches. The mask is a 32-bit combination. A logical AND operation is performed on the mask and the Internet address to determine a particular subnetwork. The bits of the mask that are set to 1 determine the network and subnetwork portion of the address. The bits that are set to 0 determine the host portion of the address. In our example, "100.1.1" refers to the network and subnetwork, and the final ".100" represents the host AS/400 system.

Work with IP over SNA Locations: An *IP over SNA Location* entry consists of a remote destination (Internet address of a remote network, subnetwork, or host), the name of a remote SNA network, and the remote SNA location name. Location entries define the SNA location (remote SNA network or remote SNA location name) for each IP address (remote destination) that can be reached on an SNA transport.

Figure 196 on page 319 results from selecting option 3 from the CFGIPS menu. On the central site system RCHASM01, you must define both the central site and all of the managed systems, including clients if you intend to manage them as well. On the managed systems, you must define both the managed system itself, the central managing system, and any local client you intend to manage. You do not need to define the managed systems to each other. You may also use the ADDIPSLOC command to define this information.

```
                        Work with IP over SNA Locations
                                                                  System:   RCHASM01
Type options, press Enter.
  1=Add   2=Change   4=Remove

                                                  Remote
        Remote                Subnet              Network      Location
Opt     Destination           Mask                ID           Template
_       _______________       _________________
_     2 100.1.1.1             *HOST               ITSCNET      RCHAS040
_     2 100.1.1.2             *HOST               ITSCNET      RCHASM03
_     3 100.1.1.97            *HOST               ITSCNET      PREACHJ
_     3 100.1.1.98            *HOST               ITSCNET      MARCELA
_     3 100.1.1.99            *HOST               ITSCNET      BLANKRTZ
_     1 100.1.1.100           *HOST               ITSCNET      RCHASM01
```

Figure 196. Work with IP Over SNA Locations

In Figure 196, the central managing system is RCHASM01 **1**. The two managed AS/400 systems are RCHAS040 and RCHASM03 **2**. PREACHJ, MARCELA, and BLANKRTZ **3** are clients that are locally managed by RCHASM01. Clients that are locally managed by another AS/400 system should be defined on that system. They should not be defined on the central managing system as they are identified to their local managing system using SNMP traps. The central managing system discovers them from there. For example, in Figure 197 on page 320, the PC known as P23KGL1C is locally managed by RCHAS040, so there is no definition on RCHASM01 for it, but there is on RCHAS040.

The subnet mask value of *HOST is calculated to be 255.255.255.255. As the Internet address value specified for the remote destination field is a host address, (that is, it is a *system* as opposed to a *network*), you must specify a value of *HOST for the subnet mask field. “System” in this case, implies ***any*** system, (for example, a PC) and not just an AS/400 system.

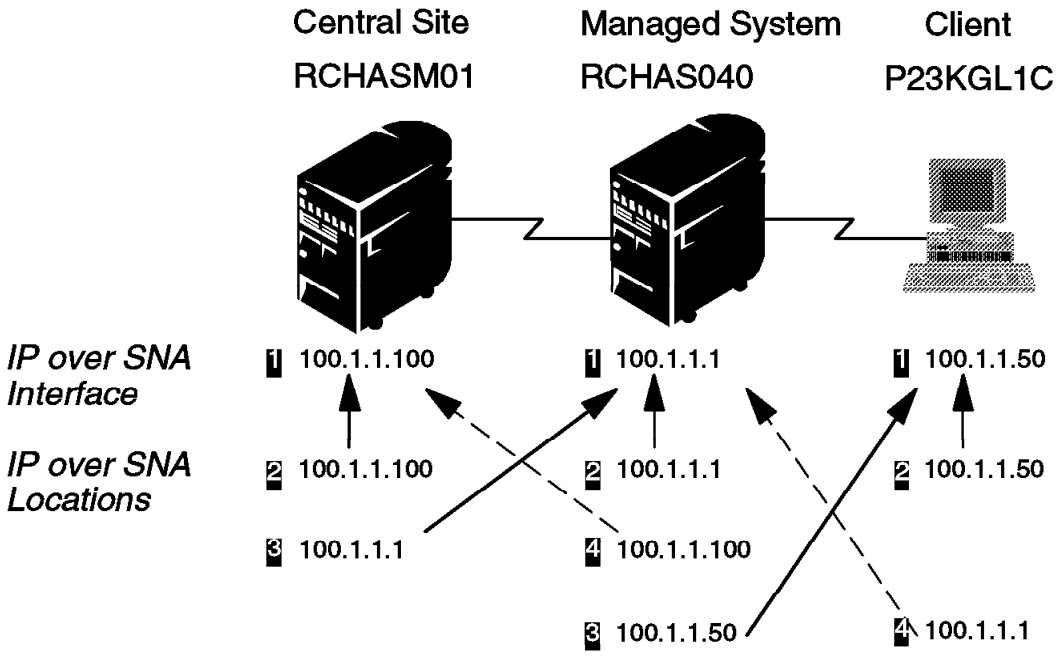


Figure 197. Relationship Between IP Over SNA Interfaces and Locations

Figure 197 shows the relationship between the *IP over SNA Interface* and *Locations*. You must define an Interface **1** and a Location **2** on each system in order to define that system to AnyNet. You must then define a route for each manager to get to its managed system (**3** to **1**) and a return route from the managed system back to its manager (**4** to **1**). Remember, when a client is "locally" managed by an intermediary system, then only that local AS/400 system needs to know about the client and the client only needs to know about its local manager.

Check Your IP Configurations with PRTIPSCFG: The PRTIPSCFG command gives you a printout of the IP over SNA definitions. It only shows the configuration on the system running the command. This command can be run on all the systems using RUNSMGCMD and is an excellent one to run from the GUI to get a consolidated report.

AS/400 SNMP Configuration

SNMP configuration is a task that can be done from the CFGTCPSNMP menu. You can also use the underlying commands CHGSNMPA, ADDCOMSNMP, and CHGCOMSNMP, if you want to, but you probably find the menu interface easier to work with.

```
                          Configure TCP/IP for SNMP
                                                          System:  RCHASM01
Select one of the following:

     1. Change SNMP attributes
     2. Work with communities for SNMP
```

Figure 198. Configure SNMP

Change SNMP Attributes: There are three important SNMP attributes that you should set before you use SNMP with the System Manager/400 GUI. These are:

- System contact:

  You should configure the SNMP contact information so that it can be displayed by the GUI. This is done by selecting option 1 from the *Configure TCP/IP for SNMP* menu that runs the command CHGSNMPA in prompt mode. Rather than explicitly name the contact information, you can choose *CNTINF, which uses the contact name and telephone number from the OS/400 *Work with Contact Information (WRKCNTINF)* command and therefore, maintains consistency between both sets of information. However, changing the contact information later with the `WRKCNTINF` command does not reflect in the SNMP contact information unless you re-run CHGSNMPA or re-select option 1 from the CFGTCPSNMP menu.

- System location:

  This is similar to system contact information and is used to identify the physical location of the managed system. The value entered here is displayed in the GUI. Again, you can use *CNTINF to refer to the location in the WRKCNTINF definition.

- Automatic start:

  If you want SNMP agent to start automatically when you start TCP/IP, you must change the default for AUTOSTART to `*YES`. Otherwise, to start SNMP agent, you must issue a separate `STRTCPSVR SERVER(*SNMP)` or `STRTCPSVR SERVER(*ALL)` command. We recommend that you change the default to start SNMP agent automatically. The STRTCPSVR command is most likely used to restart individual TCP/IP application servers that have been stopped by the ENDTCPSVR command.

The other SNMP attributes are not used by System Manager/400 GUI and should not be changed.

Work with Community Names for SNMP: Community names are the same as passwords. The community name sent with the SNMP request from a managing system must be identical to the one configured with the SNMP agent. If these do not match, the agent rejects the manager's request and the conversation fails. The topology manager uses the default community name `public`. Normally you should not need to change this if you are only using the System Manager/400 GUI, although if you are running in a wider TCP/IP network, then you may want to change the community name to match those used in other SNMP applications.

Tip

If you are using a community name different from PUBLIC, you must change the community name that the GUI uses in the GUI discovery settings.

Use option 2 from CFGTCPSNMP to check the community name.

Starting TCP/IP: The Start TCP/IP command initializes and activates TCP/IP processing, starts the TCP/IP interfaces, and starts the TCP/IP server jobs. You must issue the command:

```
STRTCP
```

before any TCP/IP processing is performed on the AS/400 system. This includes SNMP agent processing. There are no parameters for this command.

Note

For topology manager to collect information from the managed systems, SNMP must be started on those managed systems. If you want to collect topology information as soon as you start the topology manager, you should ensure that the SNMP agent jobs are started on each managed system before starting topology manager on the central site system. If an agent job is started after the topology manager, then you must wait until the next polling interval before the topology information is collected for that node.

SNMP Jobs Running in QSYSWRK

The SNMP jobs run in the QSYSWRK subsystem. There are three jobs associated with SNMP:

QTMSNMP This is the SNMP agent job that implements MIB II.

QSNMPSA This is the subagent that implements the Client and APPN MIBs.

QTMSNMPRCV This job waits for SNMP requests and passes them on to the agent or sub-agent jobs.

Normally, you should not need to be concerned with these jobs. However, if you are having problems, you may want to look at the joblogs for these jobs while they are running. You should look for any error messages that may help with problem diagnosis.

For more information available through the Client MIB (which is stored in AS/400 physical files), see *PTF Documentation for SNMP Support*, SC41-0592-00 for V3R1, or *Simple Network Management Protocol (SNMP) Support*, SC41-4412-00 for V3R6.

AnyNet and SNMP with Client Access/400 Optimized for OS/2

The examples in this section relate to the simple network shown in Figure 197 on page 320. Here, we are supplying the parameter values to support AnyNet and SNMP on the PC client P23KGL1C with intermediate local management being provided by the AS/400 system RCHAS040 while RCHASM01 is still providing the overall management of our network. We do not need to provide any information for RCHASM01 on the managed client in this case, although we would for any clients directly attached to RCHASM01.

Software configuration in Client Access/400 Optimized for OS/2 is done using the *Software Products Registry* function. To access this, double-click on the *Software Products* from the main *AS/400 Workstation - Icon View* window, then double-click on *Client Access/400 Products Registry*. This shows you a list of installed Client Access/400 Optimized for OS/2 components, and provides a central place for selective install, removal, and update of component general settings. For example, communications configuration can be performed from the registry through the general settings for the communications components. For further information on Client Access/400 Optimized for OS/2, please refer to the Redbook *Client Access/400 Optimized for OS/2*, SG24-2587.

From the *Client Access/400 - Products Registry*, you should select *SNMP Support* and open *General settings* and then proceed to *Configure AnyNet...* when prompted. This shows a display similar to Figure 199 on page 323 where you must enter the IP details for your PC.

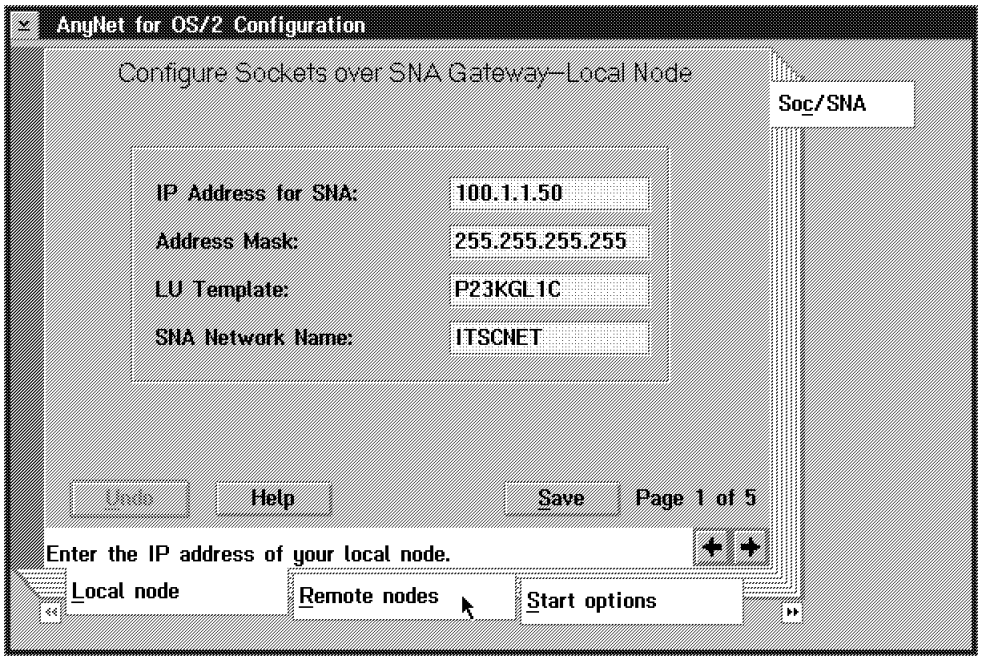


Figure 199. AnyNet for OS/2 Configuration - Local Node

IP Address for SNA: This is the IP address of your PC. It must match the value specified when you defined the *IP over SNA Location* on the PC's local AS/400 system.

Address Mask: We recommend that you use 255.255.255.255 in the *Address Mask* field. This is similar to the use of *HOST for AS/400 configuration shown in Figure 196 on page 319. Basically, it means that we have a one-to-one relationship between the IP address and the LU Template name.

LU Template: When used for IP over SNA, the *LU Template* must define a specific ***LU Name*** and is not used as a template. This is used in conjunction with the *Address Mask* to define this field as an LU name rather than a template. Enter the LU name of the PC in this field.

SNA Network Name: Specify your SNA network name here as previously defined on the AS/400 system.

When you have completed all four fields, click on the *Remote nodes* tab to get a display similar to Figure 200 on page 324 where you must complete the IP information for the AS/400 system that is providing local management for the PC (in our case, RCHAS040 with IP address 100.1.1.1).

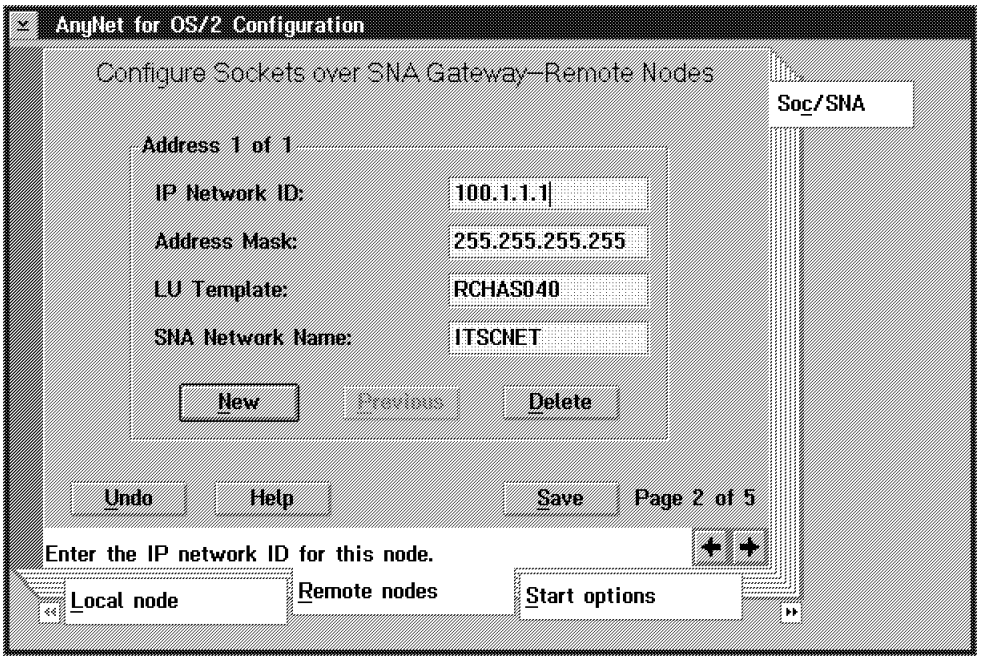


Figure 200. AnyNet for OS/2 Configuration - Remote Nodes

The field values here refer to the IP details for the local managing AS/400 system. Remember, *LU Template* is the **LU name** of the local managing AS/400 system.

When you have completed the entries for the local managing system, press the *Save* button to save your AnyNet definitions. This takes you back to the *Client Access/400 Communications - General Settings* display where you should click on the *SNMP* tab. This then shows a display similar to Figure 201 where you can enter location, contact, and notification details.

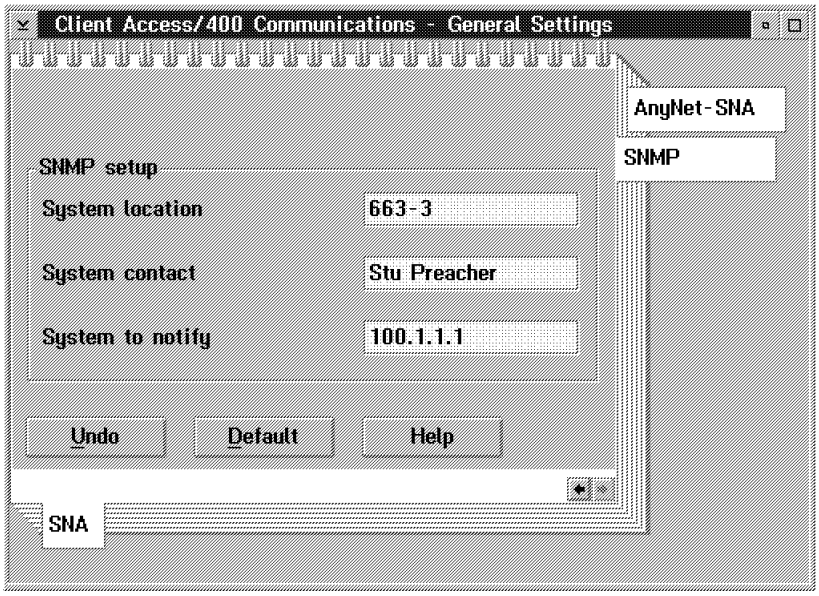


Figure 201. Client Access/400 Optimized for OS/2 SNMP Setup Details

Tip

There is much more space available in the location and contact fields than there appears to be. You can enter up to 255 characters to provide a meaningful description. Remember, this information is most likely to be used when problems occur on the PC. The more accurate the descriptions are, the better the data is for the problem solver.

When this information is viewed on the System Manager/400 GUI, the columns are normally reduced, although the viewer can expand them to show the entire field. Therefore, you should ensure the most useful part of your description is in the first part of the fields (for example, the first 20 characters).

When you have finished the AnyNet and SNMP definitions, you should close the notebook and exit from Client Access/400 Products Registry. You need to restart Client Access/400 Optimized for OS/2 for your changes to take effect.

Using the Topology Manager with System Manager/400 GUI

The primary benefit of topology discovery is that it enables you to manage from a central site system more efficiently. Topology manager is a function that provides topology services that can be used by other applications by accessing the information in the topology manager databases directly using, for example, Structure Query Language (SQL) statements. The GUI provided by System Manager/400 is an example of such an application. The GUI can manage nodes that are discovered using topology manager.

Topology Discovery

As well as starting the topology manager with the `STRMGRSRV SERVICE(*TOPOLOGY)` command as discussed in “Starting Topology Management Jobs QVATTMGR and QTRPMGR” on page 314, you can also start the topology manager using the GUI. This is done by selecting the central site system icon and choosing *Discovery*. This starts the topology manager on the central site system if it is not already started. If topology manager was already started, you receive a message on the bottom of the main System Manager/400 Work Area and no further action results.

The topology manager can also be stopped from the central site system icon. This is an alternative to using the `ENDMGRSRV *TOPOLOGY` command.

There are other discovery functions that you can perform from the central site system icon:

- Change discovery settings:
  - Polling intervals (network nodes, end nodes, clients, links, and system information)
  - Community name
  - Cleanup interval
- Discover a specific node.
- Discover a *point-of-presence*.

These are covered in detail in the *System Manager/400 Use* book.

Creating a Work Area for Topology Lists

Figure 192 on page 310 shows a sample topology list. The topology list icon on the main *System Manager/400 Work Area - Icons* display shows all of the systems that have been discovered. This may be too extensive for many of your requirements so we recommend that you create additional views of the topology database to match your requirements. For instance, in a large or diverse network such as that shown in Figure 193 on page 313, you may want to have a view of the systems in Network A and another for those in Network B. Rather than create these views as icons on the main work area, you can create a new work area purely for topology tasks.

To create a topology work area:

- Use the **Template Work Area** icon to open the Template Work Area window as shown in Figure 202.

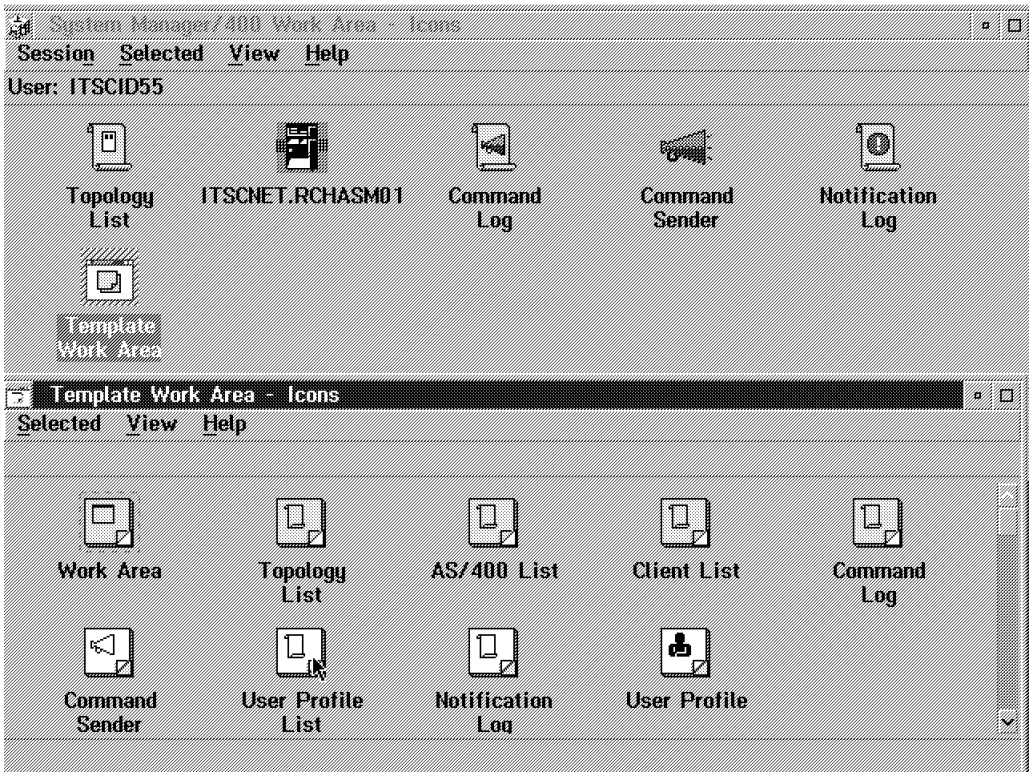


Figure 202. Main Work Area and Template Work Area

- Drag the **Work Area** icon from the Template Work Area and drop it on the main work area. This creates a copy in the main work area.
- Open the newly created **Work Area** as settings.
- Rename the icon **Topology Work Area**.
- Click on **Save** to save the icon in the main work area.

It is then up to you which views of the topology database to create. Three views are provided as templates with the GUI:

- All systems
- All AS/400 systems
- All client systems

You can see in Figure 203 on page 327 that we have dragged these into our Topology Work Area, and that each has a slightly different icon. They are shown as *Topology List (all nodes)*, *AS/400 List*, and *Client List*.

Defining Your Own Views of the Topology Database

You can create as many views of the topology database as you want. In Figure 203, we have created six views of the topology database; the three templates as previously discussed, plus three more:

- Our Systems - icons view
- Our Systems - detailed view
- Nodes for Redbook

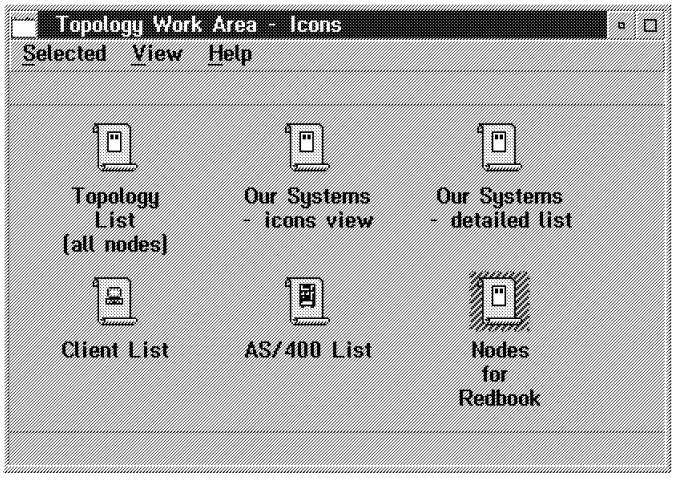


Figure 203. User-defined Topology Work Area

To create the new icons for these views, you can either drag the appropriate icon from the Template Work Area to your Topology Work Area or you can right-click on an exiting icon and choose *Create another....* If you choose to create another, a display similar to Figure 204 is shown.

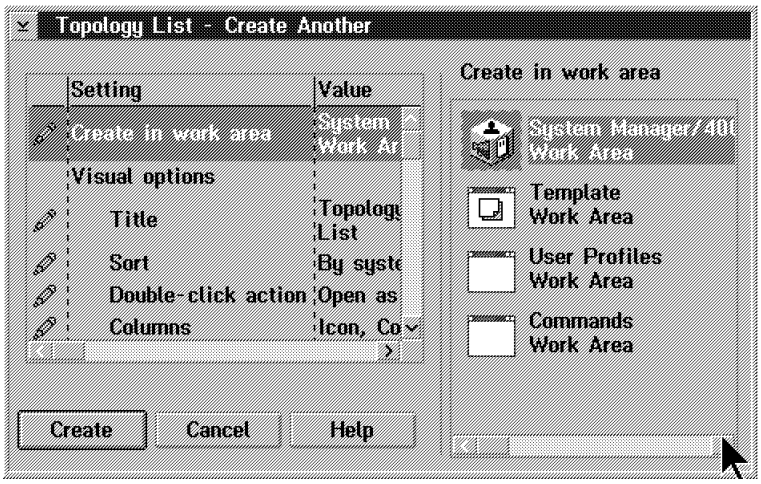


Figure 204. Creating Another Topology List

Here you can specify which work area to create the new icon in, and you can specify the selection criteria for your new view. You can also change the visual options such as:

- Title
- Sort sequence (node type or network ID)
- Double-click action (open as Settings, Icons, or Details)
- Columns to show in a detailed view (but not order)

If you had dragged the template from the Template Work Area into your Topology Work Area, you need to *Open as settings* on your new icon to change the selection criteria. Either way, you should change the selections to reflect your requirements. The selection (*Include*) choices available to you are:

- Node list
- System node type
- APPN node type
- Control point name
- Network identifier
- System name

Note: *System node type* is only available on the *Topology List*. It defaults to the AS/400 system and client for those list types.

Displaying Detailed Views of the Topology Database

Occasionally, it may be necessary to view the detailed information gathered from a node. Rather than open the node as a setting, it is more convenient to display the details as soon as you click on the list icon in your work area. The easiest way to do this is to create another icon (right-click original, *Create another...* as in "Defining Your Own Views of the Topology Database" on page 327), and change the *Double-click action* to *Open as details*. Then choose the columns you want to display (to select non-consecutive columns, hold down the *Ctl* key when you click on a column). The selection criteria can be specified as before when creating an icon view. Figure 205 shows an example of a detailed view.

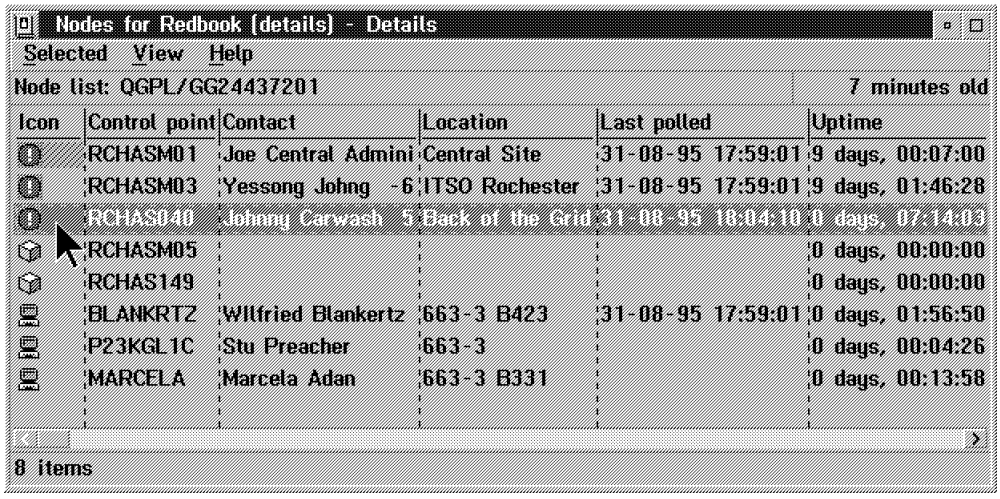


Figure 205. Topology List Showing a Detailed View

You use the detailed topology views most frequently when trying to resolve problems. For example, suppose we had been notified in the GUI that a tape was not mounted on AS/400 system RCHAS040 in one of our remote sites. We can select the detailed view shown in Figure 205 and this shows us that the

contact there is Johnny Carwash, his location, and the time RCHAS040 was last polled for this information. Also available to us (although not shown as we have narrowed down the Contact column) is the telephone number where we can contact Johnny. We can contact him, ask him to mount the tape, and then reply to the outstanding message (see “Replying to an Inquiry Message” on page 342) when the tape is mounted.

Notifications

As the complexity of a computer installation increases, the job of keeping on top of things becomes more and more difficult. With personal computers being used more frequently as terminals and with networks themselves increasing in size, this only adds to the operator′s difficulty in recognizing critical situations that need action.

In this section, we look at how System Manager/400 GUI can help the operations staff to be notified of critical messages and problems while not being overrun by trivial console messages.

Notifications Overview

Notification in System Manager/400 GUI provides facilities to view alerts and problems from all of the systems in your network on one display, and to be able to take actions to resolve them. This is particularly useful when the remote systems are AS/400 systems as AS/400 inquiry messages can be sent to the central site system as alerts, and the GUI provides the ability to reply to any inquiry messages generated by the managed system.

You can enable notification for one or more nodes in the network. In this way, you can control which systems you want to be notified of.

Messages, Problems, and Alerts

Messages, problems, and alerts are standard OS/400 functions that are used to varying degrees in most customer installations. System Manager/400 provides a better way of managing these than is available solely with OS/400.

Messages

Without the GUI, there is no easy way for a message on a remote system to be routed to a central site system to be handled. The important thing to ensure is that critical messages requiring action or reply get notified to the appropriate place and that a facility exists to take action easily.

System Manager/400 GUI provides these functions, such as running commands or inquiring on contact and status information. This allows you to centralize all of the required messages onto one single PC, and to reply to network-wide messages or to run remote commands in response to a message.

The mechanism used to do this is to define the messages to be routed as alertable. Because messages are defined as (or changed to) alertable, these are displayed on the GUI′s Notification Log. If the message is an inquiry message (and therefore requires a reply), you can reply to the message from the GUI. System Manager/400 GUI then routes your reply back through the network to the originating system. In this way, you can have a central point (or points) of control for all your network-wide messages.

Problems

Problem records are usually generated for hardware or system software. They can also be generated by an operator using ANZPRB as a response to a message and they can be added by programs using the APIs.

Notifications, by default, shows you all of the problem records that were added to the central site system's problem log. From here, you can do the same problem determination activities as previously described for messages (except reply).

Alerts

Alerts are routed to the alert focal point. The central site system acts as the focal point and manages its *Sphere of Control* that defines the systems being managed by it. This is done with the `WRKSOC` command.

Note: See "Switched Line Considerations" on page 336 for considerations when using switched lines between your managed AS/400 systems.

As previously mentioned, OS/400 alert support is used to route messages to the central site GUI; the `SNDRPY` command is used to route message replies to their originating system. This is straightforward if all the messages generated by a managed system are to be routed to the central site. However, you may have a local operations staff that can handle some messages and other interventions, or you may have some local automation to handle or ignore the simple messages. In this case, you do not want all alerts to be automatically routed to the managing system.

You can change which messages you want to be alertable, or you can use alert filters to allow only those alerts (and hence messages) that require further action to be routed to the central site. The local operators of the managed system can also decide to create an alert to be forwarded to the central site system if they are unable to resolve the problem locally.

Preparing for Notification

Because notification warns of alerts and problems, you must have your systems set up to use alerts, and you must ensure that all of the messages you want to be notified of are alertable.

Many OS/400 messages are already defined as alertable. A full list of OS/400 alertable messages is provided in the books *Network and Systems Management* (V3R1), and *Alerts Support* (V3R6). These messages are shipped with their *ALROPT* as either *IMMED, *DEFER, or *UNATTEND.

For those messages that are not *IMMED, you may need to change the message description to ALROPT(*IMMED), or you may want to change the network attributes of the managed system to *ALRSTS (*UNATTEND)*, depending on the number of messages you want to have routed to the central site. You should be careful, however, that the maintenance overhead of these changes does not become too much as every new release of OS/400 over-rides your own changes to the *ALROPT* parameter. For this reason, it may be better to leave the defaults as shipped by IBM and to use *Alert filters* to manage which alerts are forwarded.

Attended and Unattended Operations

You can set the alert status *ALRSTS* for a managed system to one of three values:

***OFF**: This specifies that no alerts are generated by the system. You should not use this if you want messages to be forwarded to the central site system.

***ON**: The managed system generates alerts for all alertable conditions except for messages that are defined as *ALROPT (*UNATTEND)*, *(*DEFER)*, or *(*NO)*.

***UNATTEND**: The managed system generates alerts for all alertable conditions including those that are defined as *ALROPT (*IMMED), (*UNATTEND)*, and *(*DEFER)*.

In this way, you can change the status of the managed system depending on whether there is a local operator to handle messages or not. As an example, to automate the switch-over between attended and unattended status, you can schedule this with a job scheduler, or you can submit a change request from the central site to make the change. However, if your main reason for using alerts is to centralize message management functions, then it is best to set *ALRSTS (*UNATTEND)*.

You can also define your own messages as alertable. For these, you need to create an alert description to correspond to the message. OS/400 messages that are defined as alertable when shipped have these descriptions created already.

Making Messages Alertable

If you want to make your own application messages alertable, you must create an alert description that corresponds to the message.

1. Create an alert table:

   This must have the same name as the message file containing the message.

2. Add an alert description to the alert table, specifying:

   - Message identifier:

     This provides the message text to be included in the alert. It is not translatable once the alert has been created.

   - Alert type code point
   - Alert description code point
   - Up to 99 probable cause code points
   - Cause
   - Action

The code points referred to in the preceding list are either predefined or user-defined. Pre-defined code points are documented in the *SNA Formats* book.

More detailed information for setting up alerts on AS/400 systems is documented in the *Network and Systems Management* book for V3R1 and the *Alerts Support* book for V3R6.

Using Alert Filters

There are two levels of alert filtering that are used with System Manager/400 GUI:

- OS/400 system filter
- System Manager/400 GUI filters

OS/400 System Filter

The first point of filtering is provided by the OS/400 system filter on each AS/400 system. This is set in the system's network attributes using the command:

```
CHGNETA ALRFTR(libname/filtername)
```

When you use a system filter, all alerts generated on that system are passed to the filter. They are then tested against a *Selection Entry* and assigned to a group that links it to an *Action Entry*.

Selection Entries: The attributes that are contained in the selection entries describe what the system looks for in the alert.

The attributes you can test for are:

- Alert origin (local or remote)
- Resource name
- Resource type
- Hierarchy name
- Hierarchy type
- Message ID
- Message severity
- Alert ID
- Alert type
- Alert description code point
- Probable cause code point
- User cause code point
- First failure cause code point
- Failing hardware type/model/serial number
- Sending hardware type/model/serial number
- Failing software identifier/ver/rel/mod
- Sending software identifier/ver/rel/mod

Each selection entry includes a logical expression that relates the alert attribute to a given value.

- *EQ
- *GT
- *LT
- *CT (contains)
- *NE
- *GE
- *LE

You can combine multiple tests with *AND, *OR, and *IF. *ANY is used as a "catch all" to assign the remaining items to a group. Selections are tested in the order specified in the filter. Once an alert has satisfied a selection entry, it is assigned to a group and no further tests are made.

Action Entries: Once an alert has been assigned to a group by a selection entry, the action entry specifies how alerts in the group are handled. Options available are:

- Log the alert.
- Assign the alert to a user ID.
- Send the alert to another system.

- Send an alert notification to a data queue.

For message routing, all of the messages to be routed to the central site system must not be blocked by the local system filter. Conversely, to reduce the network traffic due to alerts, you should filter out any messages that do not need to be sent to the central site.

Performance Considerations: Passing all of the messages through a filter causes a greater overhead on the AS/400 system due to the messages having to be tested by the filter. However, the alternative of specifying on each individual message description whether the message is alertable or not, creates a more difficult maintenance problem. On balance, it is easier to allow the filters to decide whether an alert should be forwarded to the central site rather than having to change individual message descriptions, particularly as your changes are over-ridden with the next release of OS/400.

You should also consider the number of alerts that are received by the central operator. Clearly, with many systems potentially sending many messages to the central site AS/400 system, this may become too much for one operator to manage. However, you can use additional filtering on the central site AS/400 system to route the alerts to different operators and support staff. For example, application messages may be better handled by a member of the application development team than by an operator. Equally, networking messages may be handled by a different operator than device hardware errors.

System Manager/400 GUI Notification Filters

Control over what is notified in the GUI is also provided by using filters. These are not the same as the filtering provided by the OS/400 system filter. Rather, they are *registered filters*. When OS/400 handles alerts, they are first passed to the system filter and appropriate action is taken as discussed in “OS/400 System Filter” on page 332. Then, *irrespective* of the action taken by the system filter, the alert is passed to the registered filters. A registered filter can only place an entry on a data queue.

The registered filters used specifically in System Manager/400 GUI are to filter only those alerts or problems that are required for each GUI session. All alerts and problems to be displayed by the GUI must be assigned to the group QZSSNOTIF. The GUI session receives the data queue entries from the GUI filter that was specified in that session’s settings and displays the alerts or problems that created the data queue entries.

Two alert filters and one problem filter are shipped with System Manager/400 GUI.

- Filter QSVNFALP in QGPL library sends to the GUI a copy of all the messages that normally go to the QSYSMSG queue. Messages that go to the QSYSMSG queue are severe problems (“Death and Destruction”). This is the default filter used with the GUI. You may want to add more messages to your copy of this filter than are included as a default.

Tip.

Not all of the messages sent to the QSYSMSG message queue are alertable. You need to determine which messages sent to QSYSMSG you want to forward to the central site, and verify that those messages are alertable. For a list of all of the messages sent to QSYSMSG, refer to AS/400 CL Reference, SC41-3722. If the message that you are interested in is not alertable, you need to make it alertable. For information on how to make a message alertable, refer to Network and System Management, SC41-3409.

When installing a new release of OS/400, you may need to customize the messages that QSVNFALP filters on. The QSVNFALP shipped with the GUI is updated at a new release, but it is not replaced in QGPL during the install if it is already there from a previous version, and therefore the updates are not reflected.

- Filter QSVNFALN in QGPL library sends to the GUI a copy of all the alerts except for the operator intervention alerts. The operator intervention alerts are alerts that cannot be handled from the central site system. If you use this filter, you may want to add other messages that are not to be passed to the GUI.
- Filter QSVNFTRP in QGPL library sends to the GUI a copy of all of the problem records created or received at the central site system.

Create or Modify a Filter

As previously noted, the filters provided with System Manager/400 GUI may not be absolutely suited to your environment, although they can form a good basis to build on. The GUI filters are shipped in library QSMU, and are copied into library QGPL. If you want to modify the provided filters, only modify those in QGPL so that you have a standard copy in QSMU in case you need to return to the shipped version. Alternatively, you can copy those to create your own.

```
                        Work with Filter Selection Entries
                                                              System:   RCHASM01
Filter  . . . . . . . . :   GUIFILTER
  Library . . . . . . . :     QGPL
  Type  . . . . . . . . :     *ALR

Type options, press Enter.
  1=Add   2=Change   3=Copy   4=Remove   5=Display   7=Move

     Sequence
Opt   Number   Group       Selection Data
 _    _____
 _    0005     QZSSNOTIF   *IF *MSGID *EQ CPA4086 *OR *MSGID *EQ CPA4058 *O...
 _    0010     QZSSNOTIF   *IF *MSGID *EQ CPF0907 *OR *MSGID *EQ CPF1269 *O...
 _    0020     QZSSNOTIF   *IF *MSGID *EQ CPI0950 *OR *MSGID *EQ CPI0953 *O...
 _    0030     QZSSNOTIF   *IF *MSGID *EQ CPI0966 *OR *MSGID *EQ CPI0970 *O...
 _    0040     QZSSNOTIF   *IF *MSGID *EQ CPI1138 *OR *MSGID *EQ CPI1139 *O...
 _    0050     QZSSNOTIF   *IF *MSGID *EQ CPI94A0 *OR *MSGID *EQ CPI94CE *O...
 _    0060     QZSSNOTIF   *IF *MSGID *EQ CPP0DDF *OR *MSGID *EQ CPP951B *O...
 _    0070     QZSSNOTIF   *IF *MSGID *EQ CPP961F *OR *MSGID *EQ CPP9620 *O...
```

Figure 206. Creating Your Own Alert Filter. These selection entries show the QZSSNOTIF group specification.

Figure 206 shows a **new** alert filter which is a copy of the default with additional entries added. Our example shows that we selected specific messages. Those shown here are grouped under the group name QZSSNOTIF.

Tip

If you want to have *all* of the received alerts displayed by the GUI, add a selection entry with group QZSSNOTIF and selection data *ANY.

Because we are using this filter primarily for message routing, we are only testing for message IDs, unlike the system filter that is used for many different types of tests. If we wanted to do further filtering of the alerts, we could test the other attributes also.

```
Opt     Group          Actions
 _      _________
 _      QZSSNOTIF      LOG(*NETATR) ASNUSER(*NONE) SEND(*FOCALPT) SNDDTAQ(Q...
 _      *DEFAULT       LOG(*NETATR) ASNUSER(*NONE) SEND(*FOCALPT) SNDDTAQ(*...
```

Figure 207. Creating Your Own Alert Filter. These action entries show actions for group QZSSNOTIF.

When a selection entry is created for group QZSSNOTIF, the actions initially assigned to it are as shown in Figure 208.

```
                         Display Filter Action Entry
                                                                System:   RCHASM01
Filter  . . . . . . . . :   GUIFILTER
  Library . . . . . . . :     QGPL
  Type  . . . . . . . . :     *ALR
Group . . . . . . . . . :   QZSSNOTIF

Type options, press Enter.
  5=Display

Opt     Action         Parameters
 _      LOG            *NETATR
 _      ASNUSER        *NONE
 _      SEND           *FOCALPT
 _      SNDDTAQ        *NONE
```

Figure 208. Action Entry Before Starting Notification

When notification is started, these are dynamically changed to send the alert to the data queue QZSSNTMGR in library QUSRSYS as shown in Figure 209.

```
Type options, press Enter.
  5=Display

Opt     Action         Parameters
 _      LOG            *NETATR
 _      ASNUSER        *NONE
 _      SEND           *FOCALPT
 _      SNDDTAQ        QUSRSYS/QZSSNTMGR *NONE
```

Figure 209. Action Entry After Starting Notification

The supplied filter QSVNFALN in QGPL uses QZSSNOLOG as a group name. Any selections controlled by this group do not get passed to the GUI and the remainder that do not go to QZSSNOLOG are passed to group QZSSNOTIF.

Specifying Your GUI Filter

On the GUI, you need to specify the filter to be used for notification for each session. You can only change the filter during a session if notification is not active at the time. This is done on the *Session - Settings* display for the central site system as shown in Figure 210.

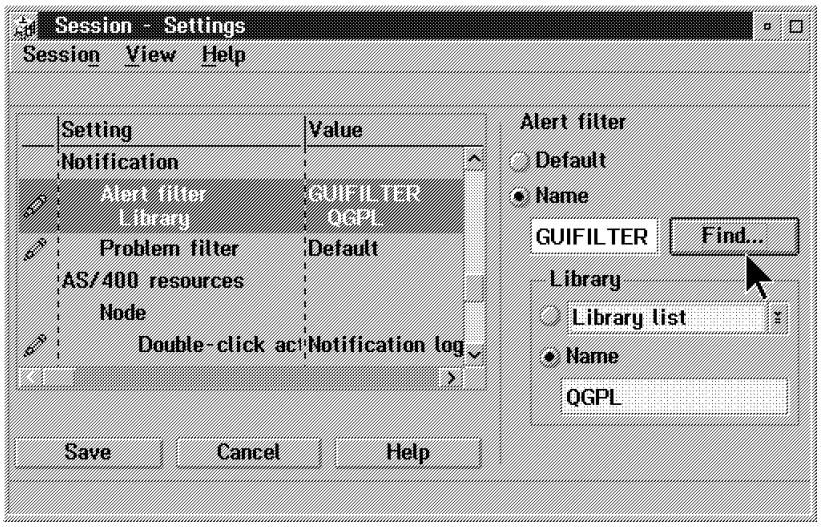


Figure 210. Session - Settings. This shows where to set the filter for use with the GUI.

Switched Line Considerations

Because of the nature of messages, problems, and alerts being randomly generated, routing them for notification to a central site system is most effective if a permanent link is available. The same holds true for the remote command function of the GUI, which enables the central site operator to quickly respond to unplanned events or messages reported by the remote systems.

SNA management services transport functions are used to support the sending and receiving of management services data between systems in a SNA network. The notifications and remote command functions of the GUI are applications that use SNA management service transport functions.

Management services transport requires APPN support. The controller, therefore, must be defined as APPN capable. Within APPN, the CPSVCMG reserved mode session is used for APPN updates between end node and its serving network. This session is active at all times. In order to have a switched environment, this CPSVCMG session needs to be removed. This is done by defining the controllers to not have CP sessions. (*APPN CP session support, CPSSN(*NO)*) in the controller description. As far as MS Transport goes, default routing (used by the remote command support) uses the CPSVCMG session from an End Node to its Network Node Server. This eliminates a switched environment using NN's and EN's (unless you are willing to vary on and vary off the controllers by hand!).

MS Transport between two NN's uses the SNASVCMG reserved session. This works in a switched environment with the following caveats.

- The CPSVCMG session needs to be brought up at least once.
  Without the CPSVCMG session, the APPN topology does not get updated and MS Transport does not, therefore, recognize the remote system.
- The controllers need to remain at 'Vary On Pending'.
  APPN performs cleanup on systems that it has not received an update from in the last 14 days. If no update has been received in 14 days and there is no active controller, that remote system is removed from APPN's topology. If there is an active controller (vary on pending is considered active for APPN usage), then the entry is not removed. If the entry does get removed, then the connection has to be established with CPSVCMG session once again to re-create the entry.

SNA Management Services and Alert Controller Sessions

Normally, alerts flow over an SNA Management Services session, although they can also use an SNA Alert Controller session. Alert Controller sessions are usually used with systems that do not support SNA Management Services, such as S/36, and S/38.

Alert support on a switched line is dependent on the way APPN uses switched lines.

Using Alert Controller Sessions

On the managed AS/400 system that communicates over a switched line, you must specify an *Alert Controller Description* and the *Alert Hold Count* in its network attributes:

```
CHGNETA ALRCTLD(controller description)
        ALRHLDCNT(number of alerts)
```

Alert Controller Description: In order for the alert controller session to start, the controller must be varied on. (If you have IBM OMEGAMON/400 and IBM Automated Facilities installed, you can monitor the status of the controller and ensure it is always varied on).

The controller description can be an existing description. Alert support tries to use the first APPC device that is varied on for that controller. If successful, it establishes the switched connection. The APPC device is not used for the APPC conversation that transmits the alert. It is only used to establish the connection. Once established, the alert or alerts are sent, but the connection does not drop automatically when the alerts have been sent. The only way to drop the connection is by using the SWTDSC(*YES) and DSCTMR(*number of seconds*) on the controller description.

Alert Hold Count: This specifies the maximum number of alerts that are created before being sent. Alerts have a "held" status until this maximum is reached. If the value 0 is specified, alerts are sent as soon as they are created. Valid values range from 0 through 32767.

Note

You must ensure that the value specified in the DSCTMR parameter on the controller description is large enough to allow the number of alerts that are held to be sent when the switched connection is established. Any unsent alerts are held until the alert hold count again exceeds the threshold value.

Restricting the Number of Alerts

It soon can become obvious that the number of alerts flowing across your network can put a strain on both the network itself and the central site support staff if this number is not controlled. This is probably even more so with switched lines as the additional overhead of establishing the sessions can put more load on the AS/400 systems themselves, and can require permanent connections rather than switched ones.

Determine Which Messages Should Be Blocked

You should assess your environment and decide which system messages and events need to be notified to the central site and which ones can be blocked. It is better to start off monitoring all of the messages being generated than to decide immediately that you do not want certain ones. This is not a trivial task, and there is no right answer for everyone. However, as an example, consider the following, and then use a similar approach in your own situation.

1. Monitor a “typical” system and then decide which messages do not need to be sent to the central site.
2. Create an alert filter that does not allow these messages to be sent to the focal point.
3. Repeat steps 1 and 2 until you have a manageable (and scalable) number of messages.
4. Distribute this filter to your managed systems.
5. Re-appraise periodically (for example, quarterly).

At this stage, assuming that you have your AS/400 systems set up to send and receive alerts, only those messages from the remote systems that pass the filter send an alert to the central site AS/400 system. You can then use appropriate GUI filters to route the alerts to specific operators for notification. You should ensure that all of the messages you want to be notified of are allocated to the group QZSSNOTIF in the GUI filter.

Note

There is no facility in System Manager/400 GUI to automatically assign a priority to notifications so you are not able to create a “Red, Amber, Green” series of entries to warn the operators of varying severities. However, once viewed, the operator can use the options “Being Handled” and “Handled” to allocate a status to the notifications. The log can be displayed in this status sequence.

Starting and Stopping Notification

You must start notification before any alerts or problems are notified to the GUI. This is done from any *Topology List - Icons* window (or the main *System Manager/400 Work Area - Icons* for the central site AS/400 system). Simply select one or more systems to start notification, right-click (or choose *Selected* from the menu bar) and select **Start Notification**. You are given the choice to start notification for alerts, problems, or all. The default is all. After a short while, the icons change to a blue background when notification is started. If you choose only one notification type, you can always start notification for the other type later.

Tip

Notifications should be started for the central site system in addition to the remote systems you want to receive notifications from.

System Manager/400 GUI uses alert notification for managing messages from AS/400 systems. You must start *alert* notification if you want to manage messages with the GUI. Problem notification is independent of alert notification.

Stopping notification is also done from a *Topology List - Icons* window in a similar way to starting notification. When stopping, you cannot choose to stop only alerts or problems. You have to stop both.

Tip

To change the active filter for your GUI session, notifications must be stopped for *all* of the systems where it was started.

Recovering Old Alerts

When you start alert notification, you are notified of any *new* alerts that occur and are not filtered out. If you want to see alerts (and hence messages) from earlier, you can choose *Recover Alerts* from any or all systems. This is done by right-clicking on the **Central Site System** icon and choosing to recover alerts. You can recover alerts that were created since the beginning of the session, or you can specify to recover alerts from up to twelve hours ago.

Note

When specifying the time for recovering alerts, the PC time is used. This can be different from the central site AS/400 system time, especially if your PC is remote from the central site and in a different time zone.

Notification Log

When an alert or problem notification is received, the Notification Log can interrupt any other activities running on the PC. It can also send an audible alarm to warn the operator. These are customization options on the *Notification Log - Settings* display. In this way, operators can perform other tasks, (for example, other PC applications or AS/400 functions), and be sure that messages requiring action are brought to their attention as soon as possible.

You can see the log at other times by double-clicking the **Notification Log** icon on the *System Manager/400 Work Area* window, by selecting one or more system icons in a topology list, then right-clicking to display the choice to show the log, or double-clicking the **Central Site System** icon.

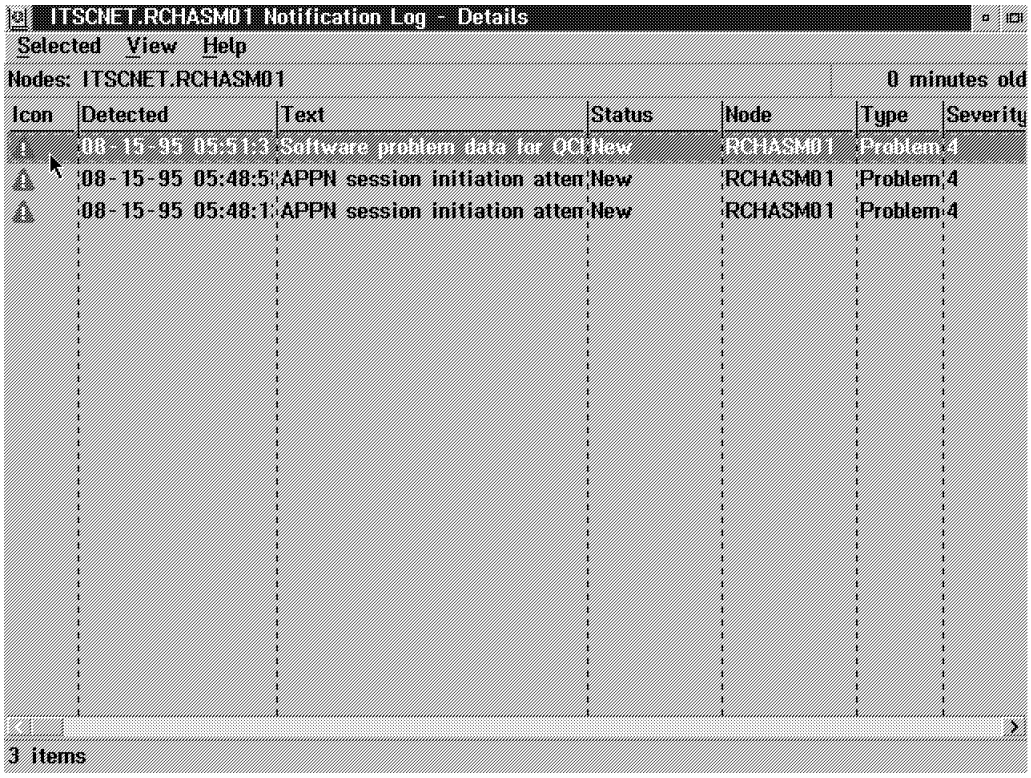


Figure 211. Notification Log for Problems

The notification icon shows problems and alerts for all of the systems you have started notifications for. If you go to a topology list or central site icon, you will only see the notifications for *that* system.

The Notification Log is used to show both problems and alerts, depending on how you started notification for each system. Problems are displayed as a red warning triangle with a triangle. Figure 211 shows three problem notifications for AS/400 system RCHASM01. You can select an entry to view in detail, as shown in Figure 212 on page 341, prior to taking appropriate action.

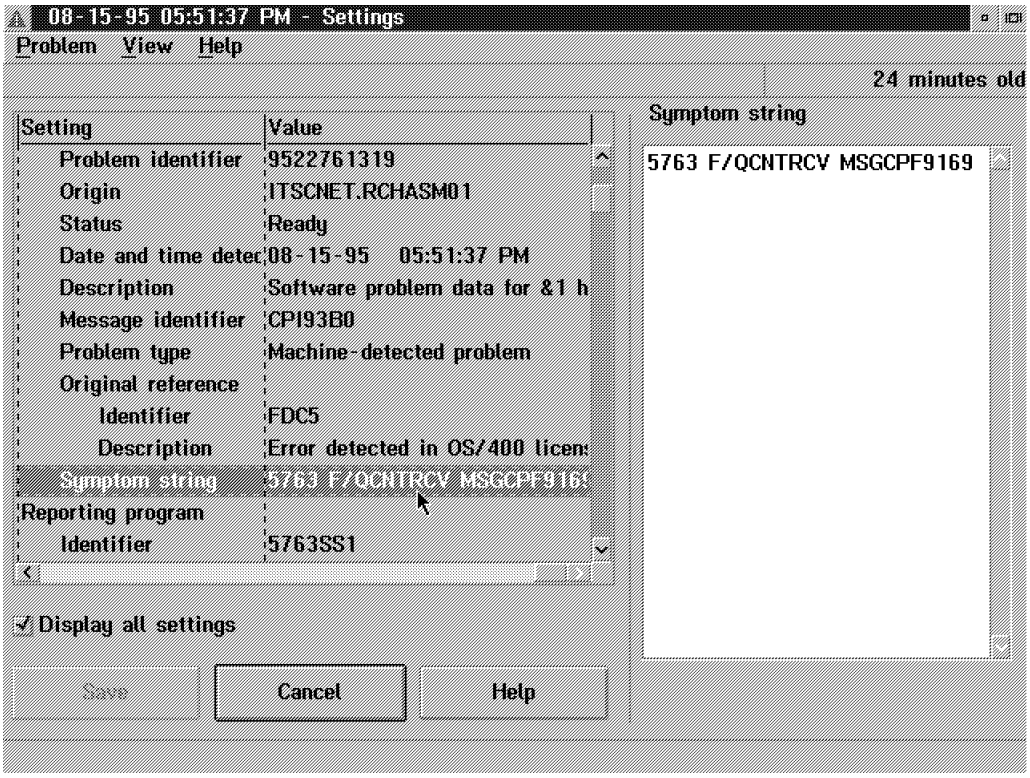


Figure 212. Notified Problem Details Display

The Notification Log also shows an exclamation mark icon against each alert received, but this time with a “speech bubble” rather than an exclamation mark as shown in Figure 213.

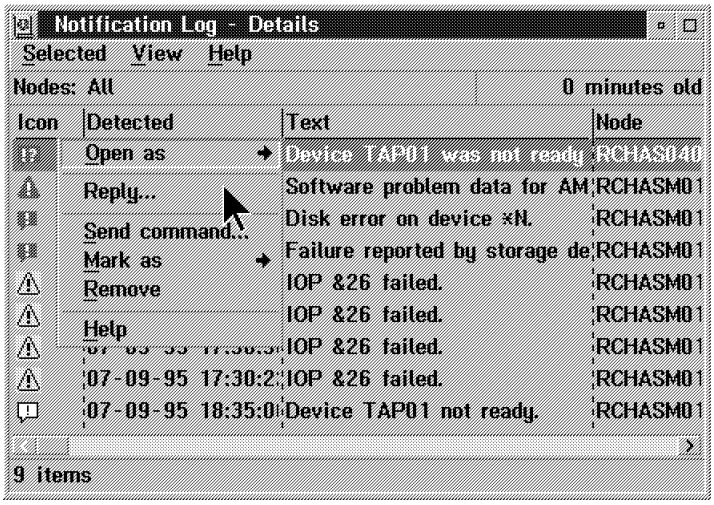


Figure 213. Notification Log for Alerts and Messages

Handling Notifications

Inquiry messages are shown not only with the exclamation mark icon, but also a question mark to signify that the message requires a reply. Right-clicking on an entry displays a pull-down menu of possible actions. These include replying to a message and running a command from the log to the system that initiated the message. In this way, you can also take some investigative or corrective actions before replying to the message.

Notifications can be marked as *New*, *Being handled*, or *Handled*. These cause the icons to turn red, yellow, and white respectively. This can provide the operator an easy-to-see action list of things to do and a log of what has been done in this session. Finally, the operator can choose to remove the entry from the log completely.

Tip

When notification is stopped and restarted, or if the session is stopped and another started, actions already taken are not updated on the log and any removed entries reappear.

Replying to an Inquiry Message

To reply to an inquiry message, simply right-click on the message in the notification log, as shown in Figure 213 on page 341 and select *Reply*. This then shows a *Host Notification - Reply* display where you can view the message details in the *Messages to reply to* window in the top part of the display and enter your reply in the reply window. This is shown in Figure 214.

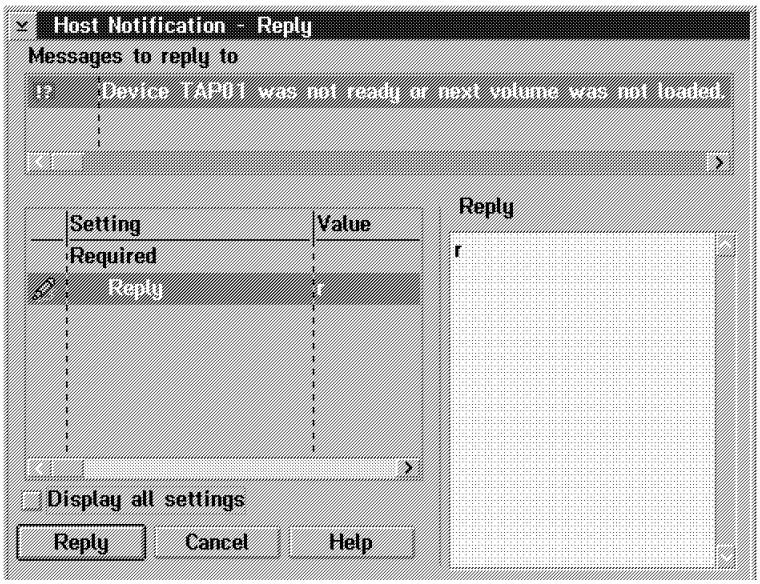


Figure 214. Replying to an Inquiry Message

If you select more than one message for reply from the notification log, you can select which one to reply to in the *Messages to reply to* window.

Important

This is a very powerful function. Make sure you want the **same** reply to all of the selected messages before you reply. Otherwise, you may reply “C” to a job you did not intend to cancel.

Other Ways of Being Notified

The default settings for the Notification Log cause it to interrupt whatever is displayed on the PC that is running the GUI whenever a new alert or problem is received. This can be changed if necessary. If you choose not to be interrupted, you can still have a visual warning of any outstanding notifications. On any window showing a system icon that has notification started (AS/400 system, client, or other system), those systems that have an alert or problem notification show an exclamation mark in a red disk. In addition to this, topology icons views show the number of notifications for each system. Double-clicking on an icon takes you to the notifications for that system.

Remote Commands

Using System Manager/400 GUI, you can run commands on managed systems. This section describes the remote command function of the GUI and provides examples and tips to use it more efficiently.

Remote Command Overview

The ability to run commands on remote systems is enhanced with the GUI. The underlying function provided with V3R1 of System Manager/400 is used by the GUI. Sending a command from the GUI to another AS/400 system uses the SNDSMGCMD fast path command to submit a change request. However, the GUI adds the ability to prompt for and find system names on which to run the command from the topology information held on the central site system. You can also save regularly run commands for subsequent use.

You can use the **Command Sender** icon to run a remote command. The interface is similar whether you are sending to AS/400 systems or to clients. This makes running commands on clients much easier.

You can also run a command from the **Notification Log**. This is particularly useful for problem determination or resolution as the remote system information is already provided for you in the command setup.

The **Command Log** shows all of the commands submitted from the GUI, whether to AS/400 systems or to clients. You can access the returned printed output from the command log as well as re-submit the command.

Output from the remote command is returned to the central site AS/400 system. It is consolidated into a single report if the command was run on more than one system. With the GUI, you can view this report straight from the command log. You can also change the font and size of the displayed output as you choose. You can hold, release, or cancel the spool file, and you can use the `SNDNETSPLF` command or change the output queue.

In many instances, there are commands you want to run regularly on one or more systems in your network. You can easily set these up as icons in your work area with the command and location already filled in. You can also leave

the system name or names blank and ″drag-and-drop″ your command icon onto the system icon to save you typing the system name or names. The same is true the other way round; you can drop a system icon (or group of icons) onto a command.

The central site system must be able to run remote commands. To do this, you need to start manager services on the central site system. Use either STRMGRSRV *RMTCMD to start support specifically for remote commands or use the *ALL option which also starts the topology manager. *ALL is the default.

Remote Command Security

This section gives a brief summary of remote command security. For more information, refer to Chapter 6, “Security and Auditing Considerations” on page 255.

User Profile and Password to Be Used

When submitting a command to another AS/400 system, OS/400 security is obeyed. Submitted commands have an associated user profile to run under on the target node. If you do not specify a user profile for the target system, a default profile is used. This is defined in the target node′s Managed System Attributes and is typically QSVMSS. The default profile does not normally have much authority. Therefore, you probably will want to use your own user profile for your commands..

You must also specify a password to run under. The choices are:

No password Passwords are not checked. This should only be used if no user profile is sent because you are using the security program and table to check for authority.

Same as user profile The password is the same as the user profile name. This is not recommended!

With command You can specify the password on the Command Sender at the same time as you specify the command and target nodes. This is useful when you are running the command immediately. However, if you save the command for repeated use, or re-run it from the command log, the password is not retained and you are prompted to enter it.

Specify when sent The GUI user is prompted for a password each time a command is sent to a managed system. This provides the highest level of security if not using the security table but is very tedious if any significant number of commands are submitted.

When submitting a command to multiple AS/400 systems, any specified user profile that runs the command must exist on all of the target systems. If a password is specified, it must be the same on all of the target systems. Using the security table avoids the requirement for identical passwords.

Encoding the Command

The **Encode** option enables you to request that the command be encoded. This prevents passwords being "visible" through a communications trace. If you do encode the command, you cannot see the command or parameters through the GUI later if you want to re-submit it. A matching *key* must be specified on the source and target systems. This is done with the CHGMGDSYSA KEY(keyname) on both systems.

Running Commands Once

Running an AS/400 Command

The **Command Sender** icon appears in the System Manager/400 main work area. You can use it to run a remote command on AS/400 systems as follows:

- Double-click on the **Command Sender** icon. You are presented with the *Command Sender - Send* window shown in Figure 215.

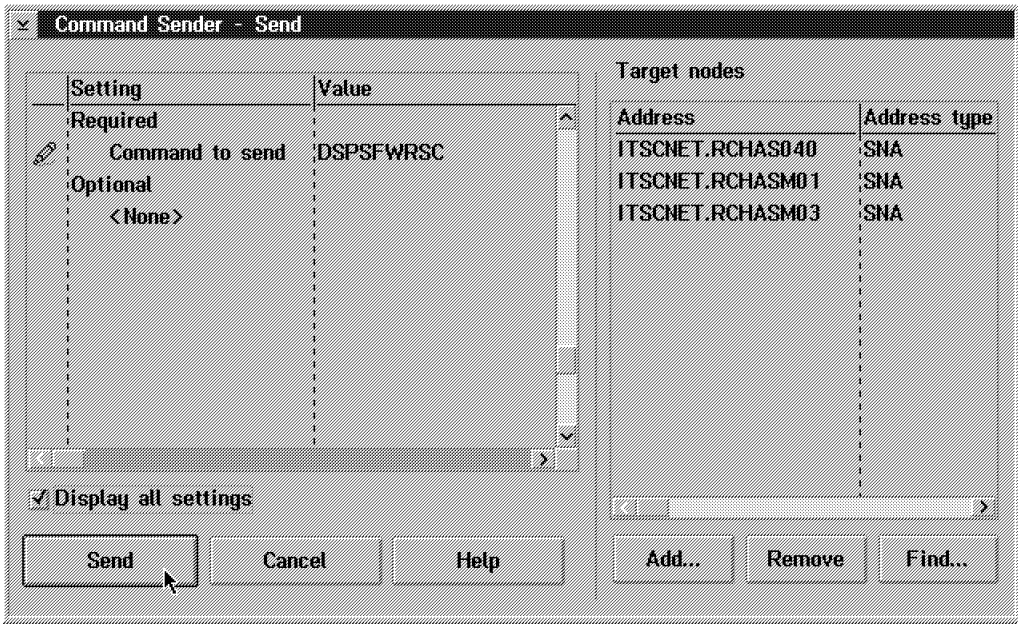


Figure 215. Using Command Sender to Run a Remote Command

- Specify the command. Click on **Prompt** if you want to prompt for parameters.
- Specify the target systems on which the command is to be run.

> **Tip**
>
> You can click on **Find** to obtain a list of nodes from which to select the ones you want or, for each system you want to include, you can click on **Add** and enter the node name of that system. A useful third possibility is to click on **Add** and enter a generic name, such as RCHAS* which adds all resultant nodes. You can then CTRL-click any you do not want and click on **Remove** to remove them from the list. This may be quicker and easier in some cases.

- Specify any security information and any other Command Sender parameters you want to set.

Tip

The window in which you specify the command and associated information offers the opportunity to enter a user profile, password, and request encoding of your command but you see these options only if you click **Display all settings**.

- Click on **Send**.

The command is submitted to be run. One temporary change request description is created and a single change request activity is added to the change request no matter how many AS/400 systems the command is to be run on. The change request is submitted on the central site system and it in turn submits the change request *activity* to each target node.

You can track the progress and success of the request through the Command Log discussed later in the section ″Using the Command Log″.

Running a Client Command

The interface for running a command on a client is similar to that for running a command on AS/400 systems. However, the underlying actions are a little different.

- Double-click on the **Command Sender** icon. You are presented with the *Command Sender - Send* window shown in Figure 215 on page 345, as before.
- Specify the command, as you would enter it on the client system.
- Specify the target clients on which the command is to be run.
- Specify any AS/400 security information.
- Specify a user ID to run under on the client if required.
- Specify any other Command Sender parameters you want to set.
- Click on **Send**.

A temporary change request description is created. This has a change request activity to run a RUNRMTCMD command that embodies your client command. A separate RUNRMTCMD command is run for each client. The change request *activity* is submitted to the AS/400 system that is the local manager for the client. Authority to use the RUNRMTCMD command is checked on that AS/400 system. In addition, as previously referred to, you can specify a user ID to run under on the client if required.

You can track the progress and success of your request through the Command Log, which is discussed later. If you do not encode the command to be run, you see `CMD` (`command`) `RMTLOCNAME` (`clientname`) on the returned printer output.

Set Up the Personal Computer for the RUNRMTCMD

In order to enable the Run Remote Command (RUNRMTCMD) command to be used in the PC, you have to add the CWBARRRC.EXE file to the Transaction Program page on the General Setting of the Client Access/400 Optimized for OS/2 product. Refer to “Set Up CA/400 Optimized for OS/2 to be a Managed Client” on page 455 for a checklist of the configuration steps.

Technical

A transaction program (TP) is a program that uses the Advanced Program-to-Program Communications (APPC) system to communicate with a partner application program in the same node.

The top layer of the Systems Network Architecture (SNA) is the transaction service layer. A transaction involves an exchange of messages that accomplishes a specific task.

Here it is what you have to do:

1. From the software products panel, double-click on the  Product Registry icon.

   You see a listing of all the Client Access/400 components listed under the main product, Client Access/400 Optimized for OS/2.

2. From the Products Registry, highlight the Client Access/400 Optimized for OS/2 product in the list.

3. Click on the right hand button of the mouse (alternatively, you can choose Selected from the menu bar). Select **Open** and then **General Settings**.

4. You are now presented with the General Settings notebook.

5. Select the **TPs** page.

6. You use this page if you want to select attributes for transaction programs, for example, RUNRMTCMD.

7. Select the **Add** button.

8. The default is to use D:CAOS2CWBARRRC.EXE, which is the one we want for the RUNRMTCMD command.

9. Choose the **Advanced options** button.

   In this panel, you can change the TP presentation and operation type. Presentation type is the method Attach Manager uses to show the TP on the display. Operation type is the method used to start and load the TP. Operation type also determines if several copies of a remotely started TP can run at the same time. The TP options are:

   Allow commands from all users
   Use this radio button to indicate that all users are authorized to send commands to this personal computer. A remote command sent from the AS/400 system to the PC does not have the User ID and the password checked through UPM (User Profile Management Services). If you selected this radio button, all users have authority to commands submitted from the AS/400 system.

   If the Allow commands sent from the AS/400 system check box is not checked, this radio button is not enabled.

   Allow commands from authorized users
   Use this radio button to indicate that you allow authorized users to run commands on this personal computer. A remote command sent from the AS/400 system to the PC has the User ID and password checked through UPM.

Authorize users (UPM)
Use this push button to access UPM. UPM enables you to authorize users to run commands on this personal computer,

Background Use this radio button to indicate whether you want the transaction program (TP) to run in the background.

Full screen Use this radio button to indicate whether you want the transaction program (TP) to run in an OS/2 full-screen session.

Presentation Manager
Use this radio button to indicate whether you want the transaction program (TP) to run under OS/2 Presentation Manager.

VIO-Windowable
Use this radio button to indicate whether you want the transaction program (TP) to run under OS/2 Presentation Manager in an OS/2 window session.

Non-queued, Attach Manager started
Use this radio button to indicate whether you want the transaction program (TP) to use the non-queued, Attach Manager started operation method. If you select this radio button, several copies of the program can run at the same time, and each is started by Attach Manager.

All TP definitions for a given program must have the same operation type.

Queued, Attach Manager started
Use this radio button to indicate whether you want the transaction program (TP) to use the queued, Attach Manager started operation method. If you select this radio button, one version of the program is run at a time, and the program is started by Attach Manager. Subsequent attach requests that arrive while the program is active are queued.

Queued, operator started
Use this radio button to indicate whether you want the transaction program (TP) to use the queued, operator started method. If you select this radio button, one version of the program is run at a time. If an attach request arrives and the program has not been started, a message is issued to you requesting that you start the specified program. Subsequent attach requests that arrive while program is active are queued.

Queued, Operator Preloaded
Use this radio button to indicate whether you want the transaction program (TP) to use the queued, operator-started method. If you select this radio button, one version of the program is run at a time. If an attach request arrives and the program has not been started, the attach request is rejected. Subsequent attach requests that arrive while the program is active are queued.

10. Select **OK**.
11. Select **Add**.

You now should have this command listed as a Transaction Program.

12. Close the Settings notebook by double-clicking on the top left-hand corner of the notebook.

To check the configuration, from the command line on an AS/400 session, you can type:

```
RUNRMTCMD CMD('dir d:\ /s') RMTLOCNAME(xxxxxx)
```

Where xxxxxx is your PC name.

The RUNRMTCMD did a directory listing of the D: drive as a batch command while the PC was being used interactively.

If this command is executed successfully, it means that now you can send a remote command to this client from the System Manager/400 GUI at the central site.

Running Commands Repeatedly

Creating a Work Area for Repeatedly Used Commands

In the previous subsection, we specified and sent a command for execution once. If you are going to send certain commands repeatedly, you can define and save them for future execution. In that case, we recommend that you create a **Remote Commands** work area on the main work area and then place your command icons in the Remote Commands Work Area.

To create the Remote Commands Work Area:

- Use the **Template Work Area** icon to open the Template Work Area window, as in Figure 216 on page 350.

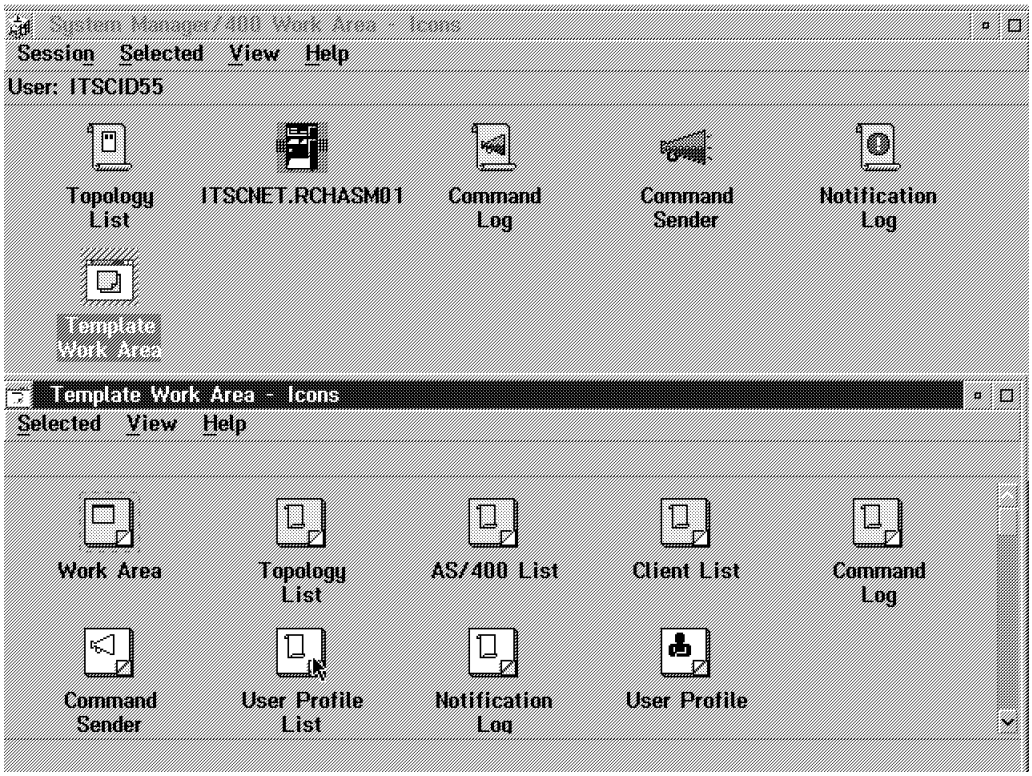


Figure 216. Main Work Area and Template Work Area

- Drag the **Work Area** icon from the Template Work Area and drop it on the main work area. This creates a copy in the main work area.
- Open the newly-created **Work Area** as settings.
- Rename the icon **Remote Commands**.
- Click on **Save** to save the icon in the main work area.

Your main work area should now look the same as Figure 217.

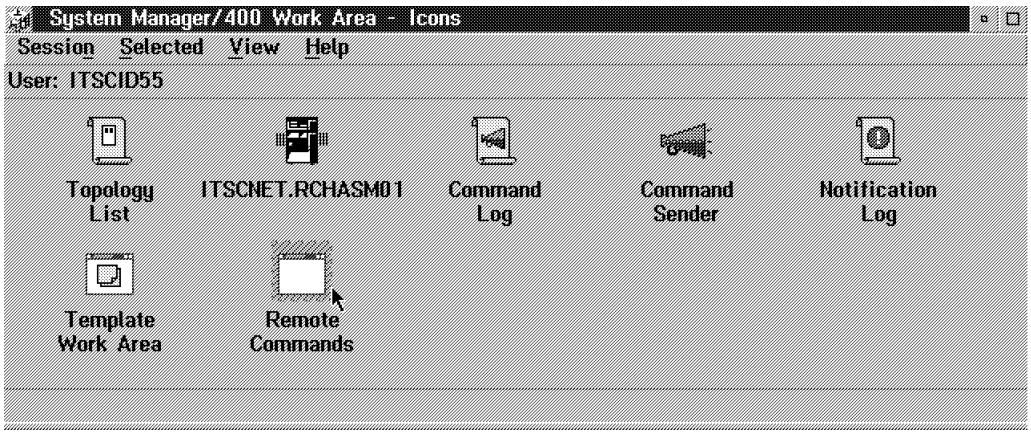


Figure 217. Main Work Area with Remote Commands Icon Added

Saving a Command Sender Icon for Repeated Use

Having created the Remote Commands Work Area, you can now create and save Command Sender icons in it. To create a Command Sender icon for a command you intend to use repeatedly:

- Use the newly-created **Remote Commands** icon to open the Remote Commands work area window.
- CTRL-drag the **Command Sender** icon from the main work area and drop it on the Remote Commands work area. This creates a copy in the Remote Commands work area.
- Open the newly-created **Command Sender** icon as settings. You are presented with a window into which to enter the command and related information.
- Specify a title for the icon that reflects the command to be run.
- Specify the command. Click on **Prompt** if it is an AS/400 command and you want to prompt for parameters.
- Specify the target nodes on which the command is to be run.
- Specify any security information and any other Command Sender parameters you want to set.
- Click on **Save** to save the icon in the Remote Commands work area.

This is illustrated in Figure 218.

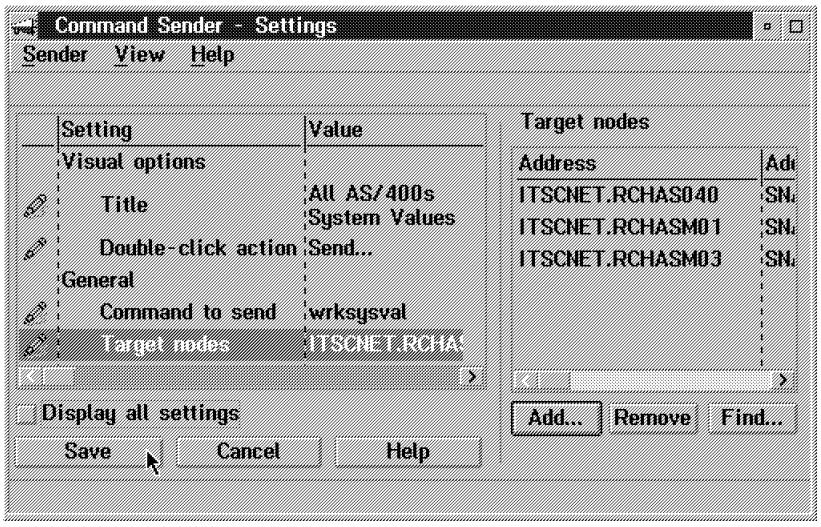


Figure 218. Creating a Command Sender Icon for Repeated Use

You can repeat the process for as many commands as you want to define. On completion, your Remote Commands window looks similar to the one in Figure 219 on page 352.

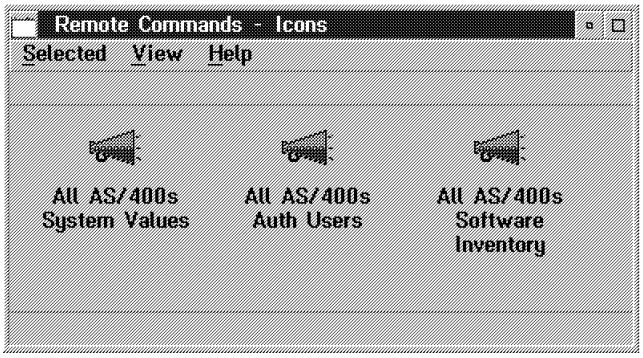


Figure 219. Remote Commands Window Example

Using a Saved Command Sender Icon to Run a Command

You can use a saved **Command Sender** icon in the Remote Commands work area to run a remote command on AS/400 systems as follows:

1. If you are certain that no changes are needed for this invocation:
   - Right-click on the appropriate **Command Sender** icon.
   - Click on **Send now**.
2. If changes are needed for this invocation:
   - Double-click on the appropriate **Command Sender** icon. You are presented with a *(Command name) - Send* window showing the command and other settings you have previously defined.
   - Make any changes necessary.
   - Click on **Send**.

The command is submitted to be run. You can track the progress and success of the request through the Command Log discussed in the next section.

Using the Command Log

Tip

We recommend that you create a copy of the **Command Log** icon in the Remote Commands Work Area. All remote commands submitted create a change request and it saves you time and effort if you can view your change request without leaving this window. Simply open the Remote Commands window, then CTRL-drag-and-drop the **Command Log** icon from the main work area to the Remote Commands Work Area.

Tracking the Execution of a Remote Command

You can use the **Command Log** icon in the System Manager/400 main work area or in your Remote Commands Work Area to track the progress of a remote command as follows:

- Double-click on the **Command Log** icon. You are presented with a list of commands as illustrated in Figure 220 on page 353.

Command Log - Details

Selected View Help

Sent since: 01-16-95 04:48:35 AM Node: All Sent by: ITSCID* 0 minutes old

Command	Overall status	Highest	Total nodes	Sent
TAATOOL/DSPSECRVW	Ended	00	2	08-23-95 02:46:37 PM
DSPSECRVW	Ended	20	2	08-23-95 02:39:41 PM
DSPSFWRSC	Ended	00	3	08-23-95 12:03:44 PM
DSPAUTUSR	Ended	00	3	08-23-95 12:03:10 PM
WRKSYSVAL	Ended	00	3	08-23-95 12:02:37 PM
DSPSFWRSC	Ended	39	3	08-22-95 06:06:05 PM
DSPSYSVAL	Ended	00	3	08-22-95 05:28:08 PM
RUNQRY	Ended	20	1	08-22-95 05:02:40 PM
Change profile for SMGUIOPR98	Ended	10	1	08-22-95 04:40:48 PM
Change profile for SMGUIOPR98	Ended	10	1	08-22-95 04:40:39 PM

54 items

Figure 220. Command Log Details List

- Double-click on the line representing the relevant change request. You then see the status of the request on each target node.
- When the target nodes have all ended:
  - If one or more nodes ended with a non-zero end code, click the line representing that node, click the **Selected** tab, and click on **Messages** to establish the reason.
  - If all of the nodes ended with an end code 00, close the *Target Nodes* window to return to the Command Log list.

Tip

Depending on your choice of columns (see the following), your command log entries may display some times, which may be in 24-hour or 12-hour clock format. There is nothing in the System Manager/400 GUI that allows you to customize this. If you find that the times are displayed in the wrong format for you, you can change it through the OS/2 **Country Settings** icon.

Note that remote command change requests created through the GUI are always called QSVNGRC, so they can easily be identified should you choose to use the "green-screen" *WRKSBMCRQ* command on the AS/400 system to track them instead.

Include Options

You can control the quantity of information presented in the Command Log by setting a number of *Include* options. To do this, click on **View**, then click on **Include**. The *Command Log - Include* display is shown in Figure 221 on page 354.

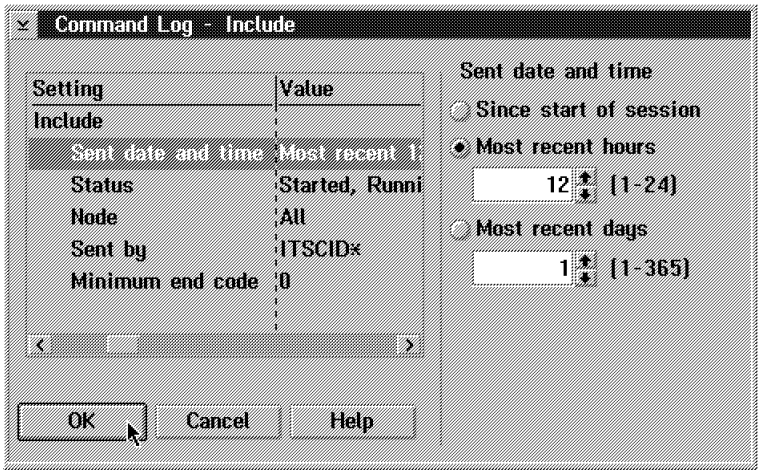


Figure 221. Command Log - Include Display

Options available are:

Sent date and time Commands sent this session, most recent 1-24 hours or most recent 1-365 days.

Status Any combination of started, running, ending, ended, held, not started, scheduled, and ready. The first four cover commands that are being or have been performed; the last four cover commands yet to be performed. Often you would include all eight, the default.

Node All nodes or one specified node; there is no option to name several.

Sent by All users, current user, full, or generic user name. You can click on **Find** to obtain a list of users if you want. However, you can then only select a single user name from the list.

Minimum end code All end codes or specified numeric code 00-99.

To set your choices, click on each option in turn and then select or enter your desired value or values as appropriate. When you have completed your selections, click on **OK**. The Command Log is re-displayed in accordance with your selections. Your choices are retained when you close the window.

Column Options

You can control the content of information presented in the Command Log by specifying which *Columns* or attributes you want to be displayed. To do this, click on **View**, then click on **Columns**. The *Command Log - Columns* display is shown in Figure 222 on page 355.

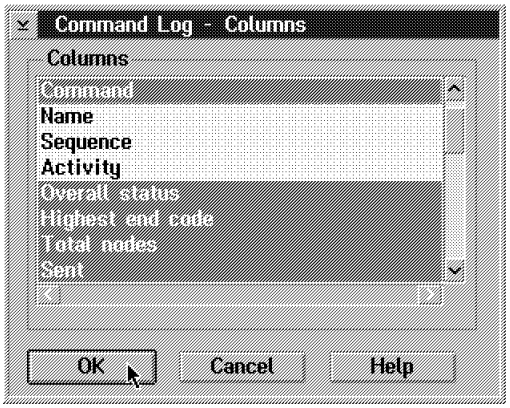


Figure 222. Command Log - Columns Display

You can select any combination of the following command attributes:

Icon	The *Command Sender* icon.
Command	Issued CL command or description of activity.
Name	Name of the submitted change request.
Sequence	Sequence number of the submitted change request.
Activity	Name of the change request activity.
Overall status	Started, running, ended, and so on.
Highest end code	00-99.
Total nodes	Number of nodes to which change request activity is submitted and run.
Sent	Date and time at which change request is sent.
Started	Date and time at which change request is started.
Ended	Date and time at which change request is ended.
Sent by	User profile name under which change request is sent.
Run under	User profile name under which change request is to be run.
(Status) nodes	Eight columns showing the number of nodes on which the change request is started, running, ending, ended, held, not started, scheduled, and ready.
Return printer output	Yes or no.
Encoded	Yes or no.

For most purposes, a reasonable selection is *command, overall status, highest end code, total nodes*, and *sent*. You might add *sent by* and possibly *run under* if your list includes more than *current user*.

To set your choices, hold CTRL and click on each column you want to include, scrolling the list of columns as necessary. When you have completed your selections, click on **OK**. The Command Log is re-displayed in accordance with your selections. Your choices are retained when you close the window.

Sort Options

You can control the order in which information is presented in the Command Log by specifying a *Sort Order*. To do this, click on **View**, then click on **Sort**. The *Command Log - Sort* display is shown in Figure 223.

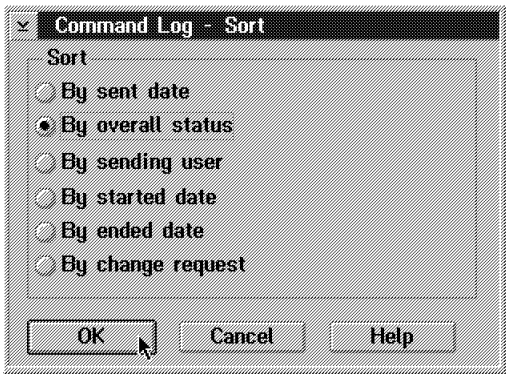


Figure 223. Command Log - Sort Display

You can select **one** of the following sort criteria:

Sent date	Date (and time) at which change request is sent, most recent first.
Overall status	Started, running, ended, and so on, in "order of progress" sequence.
Sending user	User profile name under which change request is sent, ascending order.
Started date	Date (and time) at which change request is started, most recent first.
Ended date	Date (and time) at which change request is ended, most recent first.
Change request	Name (and sequence number) of the submitted change request, in ascending order.

It is not possible to select multiple, major-to-minor, sort criteria.

Click on the criterion of your choice, then click on **OK**. The Command Log is re-displayed in accordance with your selections. Your choices are retained when you close the window.

Returned Printer Output

The output from each system can optionally be returned and consolidated at the central site system and viewed from the Command Log. To view the output from the *Command Log - Details* list:

- Click on the line representing the relevant change request.
- Click the **Selected** tab.
- Click on **Returned printer output**.

The printer output is then displayed to you as illustrated in Figure 224 on page 357.

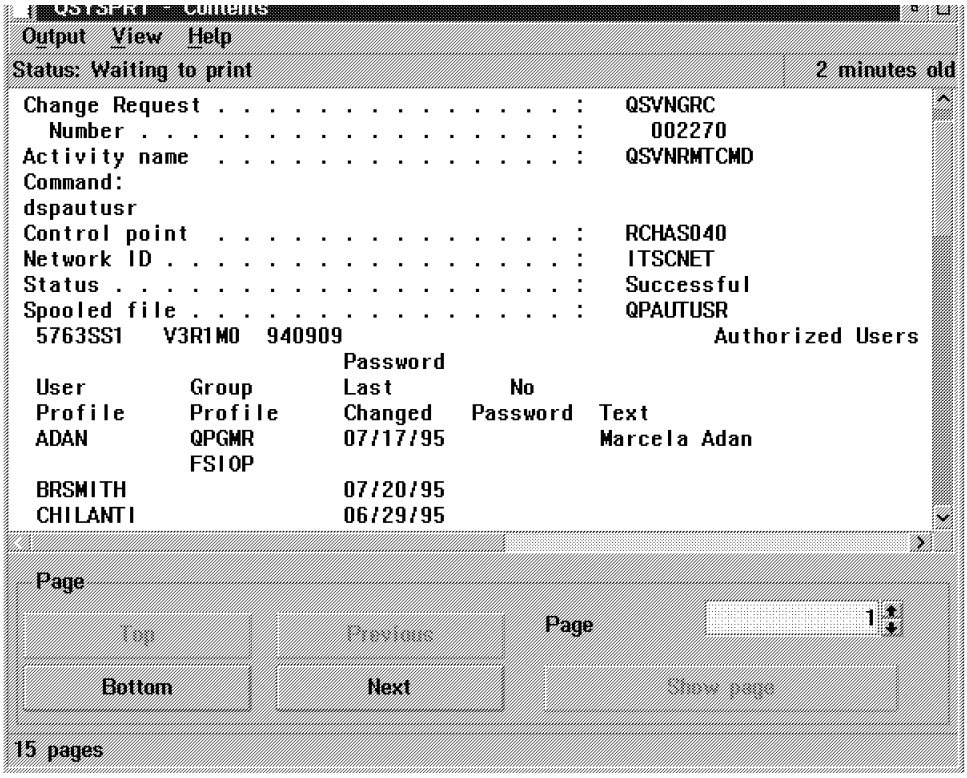


Figure 224. Returned Printer Output

Important

Be aware that if your command is CRTUSRPRF or it is CHGUSRPRF with a password specified, and you do not request encoding, the command, including the password, is shown on the returned spool file.

Tip

When a remote command fails, the SNA sense code returned provides helpful information about the error. Once you find the sense code returned by the failed remote command in the command log, follow this steps:

1. Click on *Help*.
2. Select *Help Index*.
3. Select *Services*.
4. Select *Search*.
5. Search for *Sense Code Tips* in the index section.
6. Double-click on *Sense code Tips*.
7. Double-click on the sense code that you received from the failed remote command to get to its description.

User Profile Management

The User Profile Management facilities provided with System Manager/400 GUI are intended for use by an AS/400 system administrator, that is, someone who is responsible for *managing* user profiles across the AS/400 network. These facilities have the ability to interrogate the user profile database on the central site system and the ability to add, change, delete, and copy user profiles.

The GUI does not provide facilities to maintain common user profile information across the network for any changes made outside the GUI. It can, however, replicate changes across the network that were initiated by the GUI. A user profile change on one system using a ″green-screen″ is not propagated around the network to other systems. Nor does it *dynamically* update the central database. This updated information does, however, get captured and recorded in the database the next time user profile discovery (see the following) is run.

User profile information for the central site system and managed systems is stored in the physical file QUSRSYS/QASVNUPP on the central managing system. Passwords are not stored on the database. The user profile database is usually accessed by a logical file, QUSRSYS/QASVNUP. This file is documented in Appendix I of the *System Manager Use*, SC41-3321-01.

Discovery

Discovery is the process of gathering the user profile information. A change request is provided with System Manager/400 to collect this information. This change request (QGPL/QSVNUPDS) uses a node list QGPL/QSVNUPDS that is also provided. You can change this node list to reflect the systems for which you want to collect user profile information.

Normally, you run this change request when you install the GUI. You may want to schedule it to run periodically afterwards so that any changes to user profiles that were not done with the GUI can update the database.

Inquiry

The user profile database held on the central site AS/400 system provides a good source for many user profile inquiries. The GUI can view this database in many ways, for example, by:

- User profile name
- Node
- User class
- Special authority

Inquiries can relate to user profiles on a single system or on multiple systems in the network.

No user profile data is held on the PC. When you click an icon for a ″view″ of the user profile database, the GUI performs an SQL query on the data on the central site AS/400 system and returns this information to your display.

Note that inquiries do not show any user profiles created outside the GUI since the last discovery was run.

Maintenance

Facilities are provided to add, change, delete, and copy user profiles on a single or multiple AS/400 systems. Be aware that changes to passwords do not use the OS/400 CHGPWD command. Instead, they use the CHGUSRPRF command, so any password rules that are checked with CHGPWD are not checked.

Creating a User Profile Management Work Area

As Figure 190 on page 305 shows, the default main work area contains no icons specifically for user profile management. The icons you need must be created from the Template Work Area.

As you are likely to create several icons, we recommend that you create a **User Profile Management** work area icon on the main work area and then place your profile management icons in the User Profile Management Work Area.

To create the User Profile Management Work Area:

- Use the **Template Work Area** icon to open the Template Work Area window, as in Figure 225.

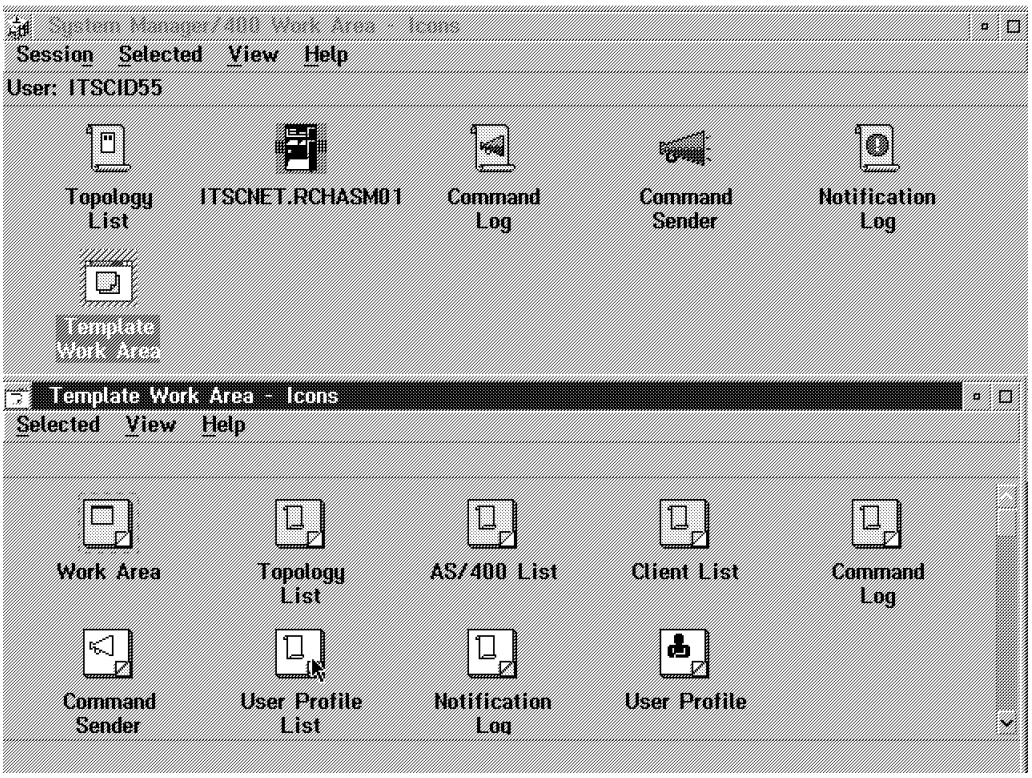


Figure 225. Main Work Area and Template Work Area (Repeat)

- Drag the **Work Area** icon from the Template Work Area and drop it on the main work area. This creates a copy in the main work area.
- Open the newly-created **Work Area** as settings.
- Rename the icon **User Profile Management**.
- Click on **Save** to save the icon in the main work area.

Your main work area should now look the same as Figure 226 on page 360.

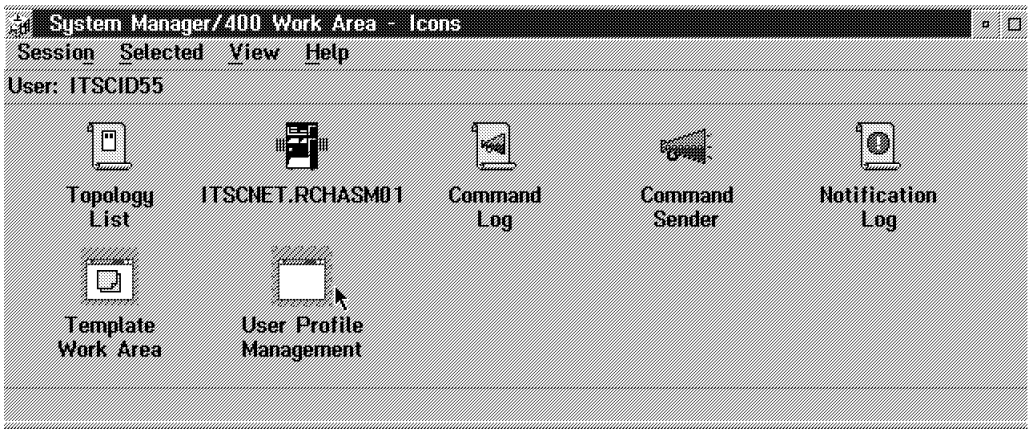


Figure 226. Main Work Area with User Profile Management Icon Added

Tip

We recommend you create a copy of the **Command Log** icon in the User Profile Management Work Area. Many of the user profile tasks submit a remote command and it saves you time and effort if you can monitor the progress without leaving this work area. Simply open the User Profile Management window, then CTRL-drag-and-drop the **Command Log** icon from the main work area to the User Profile Management Work Area.

Using User Profile List Icons

You can use **User Profile List** icons to make inquiries on the User Profile Database.

The Template Work Area includes a **User Profile List** template icon, as shown in Figure 225 on page 359. If you only want to run an inquiry once, you can run it directly from that icon in the Template Work Area. However, it is more likely that you want to re-run your inquiries from time to time. In that case, it makes sense to define them once, save them in your User Profile Management Work Area, and run them from there whenever you want.

We shall now look at some examples of defining and running these inquiries.

Creating and Running an Inquiry on All Users

Suppose you want to look at all of the user profiles on the AS/400 systems in your network. This is the default provided by the **User Profile List** icon in the Template Work Area.

To create this inquiry in the User Profile Management Work Area:

- If the Template Work Area is not already open, use the **Template Work Area** icon in the main work area to open it.
- Use the **User Profile Management** icon to open the User Profile Management Work Area window.
- Drag the **User Profile List** icon from the Template Work Area and drop it on the User Profile Management Work Area. This creates a copy in the User Profile Management Work Area.
- Open the newly-created **User Profile List** icon as settings.

- Rename the icon, for example, ***All AS/400s*** (n/l) ***All Users*** (where (n/l) means "new line").
- Click on **Save** to save the icon in the User Profile Management Work Area.

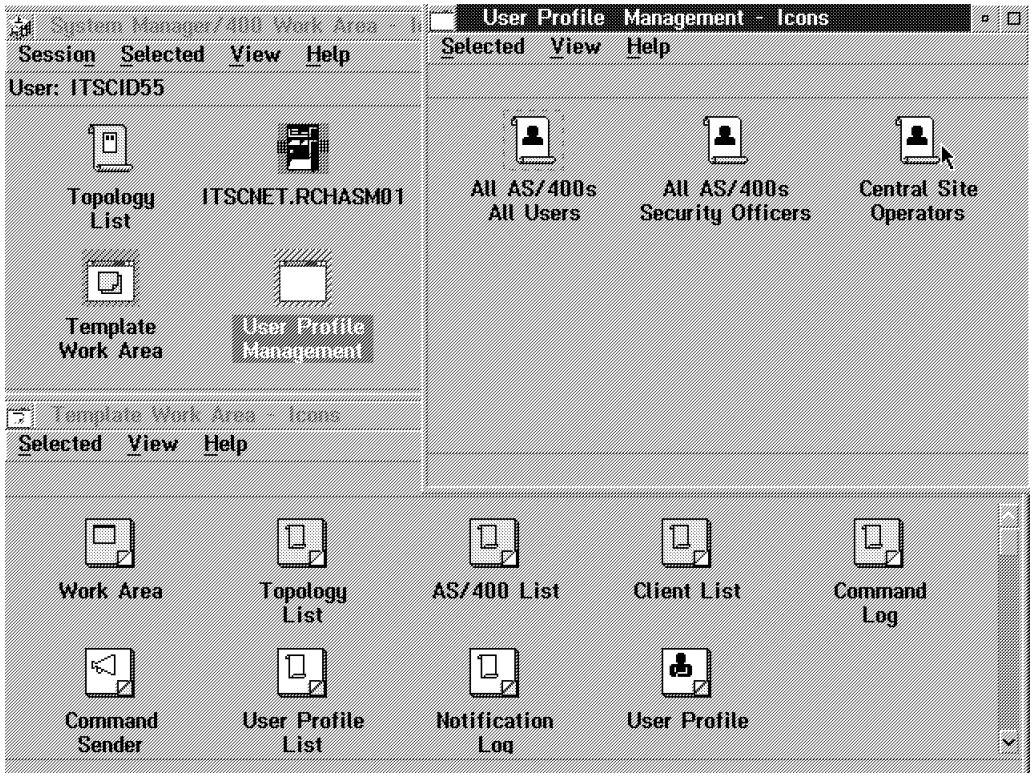


Figure 227. Inquiry Icons Added to User Profile Management Work Area

Your three open work areas should look similar to Figure 227, but with just the first icon in the User Profile Management Work Area.

To run the inquiry, all you need to do is to double-click on the newly-created **All AS/400s - All Users** icon. The results are returned as a window on the GUI, as illustrated in Figure 228 on page 362.

All AS/400s All Users - Details

Selected View Help

0 minutes old

Icon	Name	Node address	Description	User class
	ITSCID50	ITSCNET.RCHAS040	Stu Preacher - Valid until 9/8/95	Security officer
	ITSCID50	ITSCNET.RCHASM03	Stu Preacher - Valid until 9/8/95	Security officer
	ITSCID50	ITSCNET.RCHASM01	Stu Preacher - Valid until 9/8/95	Security officer
	ITSCID50A	ITSCNET.RCHASM01	Stu Preacher - Valid until 9/8/95	Security officer
	ITSCID55	ITSCNET.RCHAS040	Peter Goody	Security officer
	ITSCID55	ITSCNET.RCHASM03	Peter Goody	Security officer
	ITSCID55	ITSCNET.RCHASM01	Peter Goody	Security officer
	ITSC01	ITSCNET.RCHASM01		System operator
	ITSC02	ITSCNET.RCHASM01		System operator
	ITSC03	ITSCNET.RCHASM01		System operator
	ITSC04	ITSCNET.RCHASM01		System operator
	ITSC05	ITSCNET.RCHASM01		System operator
	ITSC06	ITSCNET.RCHASM01	ITSC Resident	System operator
	ITSC21	ITSCNET.RCHASM01		User
	ITSC22	ITSCNET.RCHASM01		User
	ITSC23	ITSCNET.RCHASM01		Programmer
	ITSC24	ITSCNET.RCHASM01		User
	ITSC55	ITSCNET.RCHASM01	Jane Porter - CA/400 Residency	Security officer
	JAH	ITSCNET.RCHASM03		Programmer

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Figure 228. User Profile Inquiry Results

The presentation of this data is flexible. See the section "Controlling the Format and Content of Inquiry Results".

Tip

You cannot print the search results from the GUI. To obtain a hardcopy list of your users, you can run a query directly against the user profile database file QUSRSYS/QASVNUPP. See the section "User-Written Queries on the User Profile Database" later in this chapter.

Creating and Running Qualified Inquiries

Figure 227 on page 361 shows three inquiry icons including the one we have just discussed. The other two are simple examples of qualified inquiries you can make:

- Security officers on all AS/400 systems.
- System operators on the central system.

You create these in just the same way and then define your search criteria while the newly-created icon is opened as settings. This is illustrated in Figure 229 on page 363.

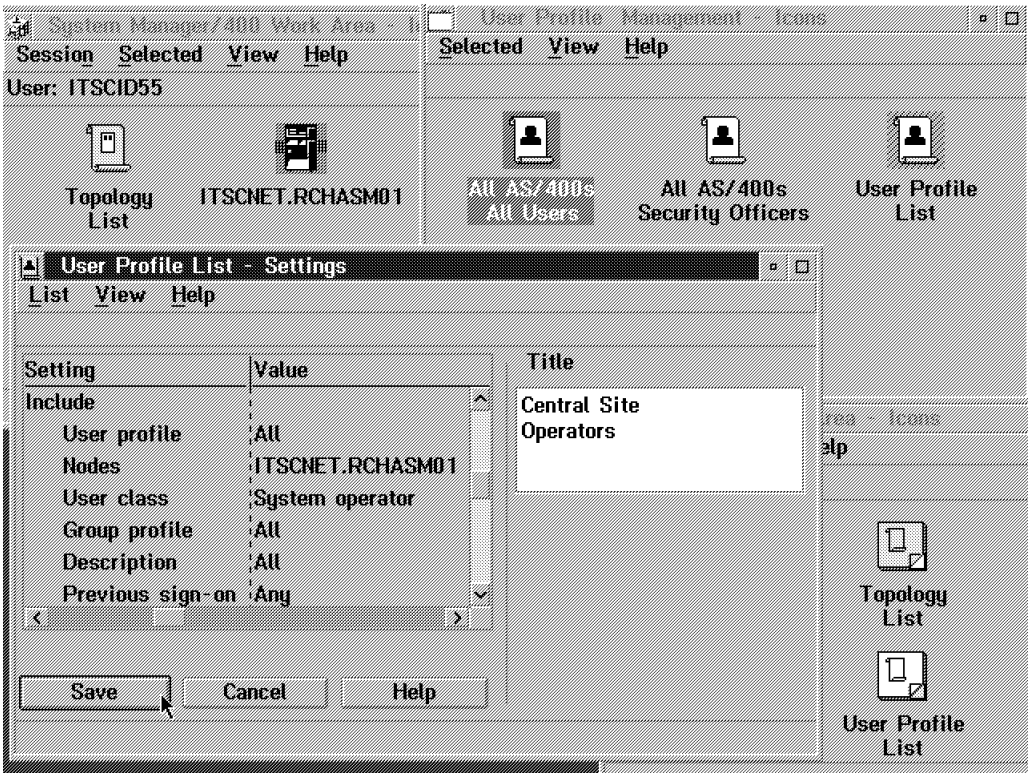

Figure 229. Defining User Profile Inquiry Search Criteria

The figure shows the creation of the **Central Site Operators** inquiry. By default, *nodes* and *user class* are set to ″all″. To inquire only on central site operators:

- Change the value of *nodes* to the name of your central site system (in our case ITSCNET.RCHASM01).
- Change the value of *user class* to ″system operator″.
- Click on **Save** to save the icon in the User Profile Management Work Area.

Tip

The setting of *user class* is done by scrolling a list from which only one class may be selected. Also, selection can only be inclusive; there is no exclusive (″all except″) capability. Therefore, it is not possible to set up an inquiry of ″all users with class higher than *USER″ using this setting.

Similarly, it is not possible to set up an inquiry of ″all users with any special authority″ by means of the *special authority* setting. The value ″any″, which appears by default for this setting, means ″any value of this criterion″ (including no special authority), **not** ″any special authority″. Furthermore, the special authorities you select can only be AND-combined, not OR-combined, so you cannot search on ″any one or more of these authorities″.

However, you can set up these inquiries by defining a query directly against the user profile database file QUSRSYS/QASVNUPP. See the section ″User-Written Queries on the User Profile Database″ later in this chapter.

The full list of criteria you may set in a **User Profile List** inquiry is:

User profile	All or full generic name.
Nodes	All or list of system name or names.
User class	All or **one** user class.
Group profile	All, none or full generic name.
Description	All or user profile description.
Previous sign-on	All or ″before date″.
Special authority	Any (including none) or list of authorities combined by ″and″.

Creating and Running a General Inquiry

In addition to the predefined inquiries we have discussed so far, you might also want to run some general inquiries, where the exact criteria is specified at the time of the inquiry. Rather than change your predefined inquiries, it is better to create a ″spare″ icon that can be changed at random, with a name such as ***User Profile*** (n/l) ***Inquiry (Specify)*** which clearly indicates its purpose.

It is not possible to leave a criterion ″blank″ when defining an inquiry icon. The only approach is to create the icon by drag-and-drop, as before, probably leaving most or all of the defaults, then change the settings to what you want just before you run each inquiry.

To specify and run an inquiry from this icon:

- Right-click the icon.
- Open as Settings.
- Set your search criteria for this particular inquiry, as illustrated in Figure 230.
- Click on **Save** to save the new settings.
- Double-click the icon to run the inquiry.

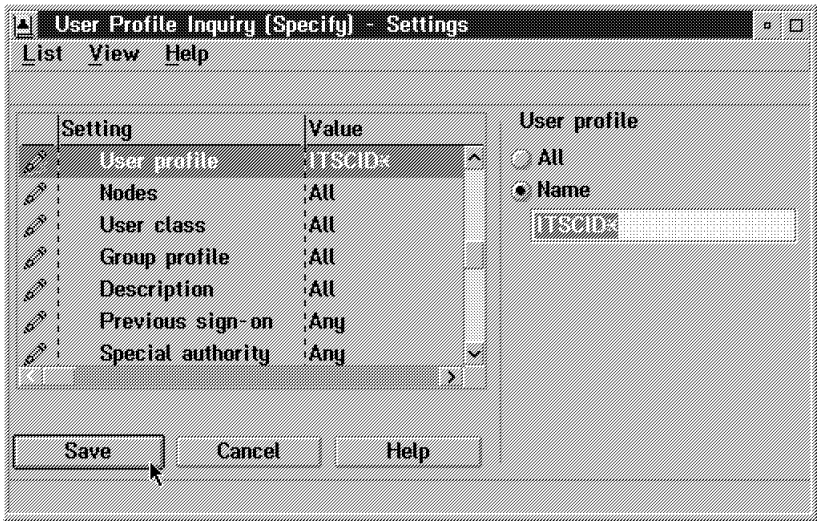

Figure 230. Specifying and Running a General Inquiry.

The results of your inquiry are returned as before.

Running User Profile Inquiries From the Topology List

Tip

If you decide to make significant use of the topology list for user profile tasks, we recommend you create a copy of the **Topology List** icon in the User Profile Management Work Area. It saves you time and effort if you can initiate your tasks without leaving this window. Simply open the User Profile Management window, then CTRL-drag-and-drop the **Topology List** icon from the main work area to the User Profile Management Work Area.

There are two kinds of user profile inquiries you can make from the *Topology List* window:

- All user profiles
- User profiles by name

You do not have the opportunity to specify any other search criteria. These two inquiries are discussed in the following sections.

You can also create user profiles from the *Topology List* window. This is discussed in the later section ″Creating a User Profile from the Topology List″.

All User Profiles

From the *Topology List* window, you can inquire on all user profiles as follows:

- **CTRL-Right-click** on the ″black box″ icon for each AS/400 system on which you want to inquire.
- Click on **Selected**.
- Click on **User Profiles**.

The results of your inquiry are returned as before.

User Profiles by Name

From the *Topology List* window, you can inquire on user profiles by name as follows:

- **CTRL-Right-click** on the ″black box″ icon for each AS/400 system on which you want to inquire.
- Click on **Selected**.
- Click on **Find user**.
- In the window presented, either accept the **All** option or specify the full or generic profile name on which you want to inquire.
- Click on **Find**.

The results of your inquiry are returned as before.

Tip

You can initiate similar inquiries to these by right-clicking the **Central Site System** icon in the main work area, but only for that system.

Controlling the Content and Format of Inquiry Results

Sample inquiry results are shown in Figure 228 on page 362, which is reproduced as Figure 231. You can control the quantity and format of the results displayed by selecting certain options. These are discussed in the following section. However, because inquiry results windows are temporary, it is not possible to save your chosen options for future use.

All AS/400s All Users - Details

Selected View Help

0 minutes old

Icon	Name	Node address	Description	User class
	ITSCID50	ITSCNET.RCHAS040	Stu Preacher - Valid until 9/8/95	Security officer
	ITSCID50	ITSCNET.RCHASM03	Stu Preacher - Valid until 9/8/95	Security officer
	ITSCID50	ITSCNET.RCHASM01	Stu Preacher - Valid until 9/8/95	Security officer
	ITSCID50A	ITSCNET.RCHASM01	Stu Preacher - Valid until 9/8/95	Security officer
	ITSCID55	ITSCNET.RCHAS040	Peter Goody	Security officer
	ITSCID55	ITSCNET.RCHASM03	Peter Goody	Security officer
	ITSCID55	ITSCNET.RCHASM01	Peter Goody	Security officer
	ITSC01	ITSCNET.RCHASM01		System operator
	ITSC02	ITSCNET.RCHASM01		System operator
	ITSC03	ITSCNET.RCHASM01		System operator
	ITSC04	ITSCNET.RCHASM01		System operator
	ITSC05	ITSCNET.RCHASM01		System operator
	ITSC06	ITSCNET.RCHASM01	ITSC Resident	System operator
	ITSC21	ITSCNET.RCHASM01		User
	ITSC22	ITSCNET.RCHASM01		User
	ITSC23	ITSCNET.RCHASM01		Programmer
	ITSC24	ITSCNET.RCHASM01		User
	ITSC55	ITSCNET.RCHASM01	Jane Porter - CA/400 Residency	Security officer
	JAH	ITSCNET.RCHASM03		Programmer

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Figure 231. User Profile Inquiry Results (Repeat)

Include Options

You can control the quantity of information presented in the Inquiry Results by setting a number of *Include* options. To do this, click on **View**, then click on **Include**. The *Include* display is shown. Options available are:

User profile All or full generic name.

Nodes All or list of system name or names.

User class All or **one** user class.

Group profile All, none or full generic name.

Description All or user profile description.

Previous sign-on All or ″after date″.

Special authority Any (including none) or list of authorities combined by ″and″.

To set your choices, click on each option in turn and then select or enter your desired value or values as appropriate. When you have completed your selections, click on **OK**. The Inquiry Results are re-displayed in accordance with your selections.

Column Options

You can control the content of information presented in the Inquiry Results by specifying which *Columns* or attributes you want to be displayed. To do this, click on **View**, then click on **Columns**. The *Columns* display is shown.

You can select any combination of the following command attributes:

Icon	The *User Profile* icon
Name	User profile name
Node address	Network ID and system name
Address type	SNA or IP.
Description	User profile text description
Last discovered	Date and time
	(All other columns refer to user profile attributes with their usual meaning.)
Status	
User class	
Previous sign on	
Sign-on attempts not valid	
Current library	
Initial program	
Initial menu	
Assistance level	
Limit capabilities	
Group profile	
Printer	
Job description	
Highest scheduling priority	
Message queue	

For most purposes, a reasonable selection is *icon, name, node address, description, status*, and *user class*. You might add other fields, depending on the purpose of your inquiry.

To set your choices, hold CTRL and click on each column you want to include, scrolling the list of columns as necessary. When you have completed your selections, click on **OK**. The Inquiry Results are re-displayed in accordance with your selections.

Tip

If you want to view attributes of a particular profile that are not in the columns displayed, you can do so by double-clicking on the icon for that user profile. The *settings* for that profile are then shown, which include all of the attributes previously referred to.

Sort Options

You can control the order in which information is presented in the Inquiry Results by specifying a *Sort Order*. To do this, click on **View**, then click on **Sort**. The *Sort* display is shown.

You can select **one** of the following sort criteria:

By user

By node

Click on the criterion of your choice, then click on **OK**. The Inquiry Results are re-displayed in accordance with your selections.

User-Written Queries on the User Profile Database

The GUI User Profile List functions described earlier provide an easy-to-use capability for displaying lists of users based on the following criteria:

User profile
Nodes
User class
Group profile
Description
Previous sign-on
Special authority

However, the GUI-supplied functions do not enable you to save the inquiry results in a spool file for printing. Furthermore, you may well want to run inquiries based on other criteria, for example:

All profiles with status *DISABLED
All profiles with class higher than *USER
All profiles with class *SECOFR or *SECADM
All profiles having *any* special authorities
All profiles subject to audit with object and action audit values

You can achieve this by writing queries directly on the User Profile Database and creating Command Sender icons to run them. This approach is described here and three examples are given.

User Profile Database File

The user profile database physical file is QUSRSYS/QASVNUPP. This can be accessed through logical file QUSRSYS/QASVNUP, which is documented in Appendix I of the *System Manager Use*, SC41-3321-01, to which you should refer.

The **record format** is **UPINFR**.

The **fields** used in the examples in this section are:

UPISYS	System name
UPINAM	User profile name
UPISTS	Status
UPIUCN	User class
UPISAU	Special authorities
UPIOAV	Object audit value
UPIUAL	User action audit level

Example: All Profiles with Class Higher than *USER

The following is a sample query to provide a list of all users having a class higher than *USER, showing user profile name, network ID/system name, and user class.

```
Selected files

  ID     File          Library       Member        Record Format
  T01    QASVNUPP      QUSRSYS       *FIRST        UPINFR


Result fields

  Name        Expression

  SHORTSYSN   substr(UPISYS, 1, 21)


Select record tests

  AND/OR   Field            Test     Value

           UPIUCN           NE       '*USER'


Ordering of selected fields

  Field           Sort      Ascending/
  Name            Priority  Descending

  UPINAM          10        A
  SHORTSYSN       20        A
  UPIUCN


Report column formatting and summary functions
  Summary functions:  1-Total, 2-Average, 3-Minimum, 4-Maximum, 5-Count
  Field           Summary    Column                                Dec
  Name            Functions  Spacing  Column Headings         Len  Pos

  UPINAM                     0                                 10

                                      User Profile
  SHORTSYSN                  1                                 21

                                      System Name
  UPIUCN                     2                                 10

                                      User Class
```

This query produces output similar to the following.

```
User Profile System Name            User Class
 ADAN        ITSCNET RCHASM01       *SECOFR
 ADAN        ITSCNET RCHASM03       *SECOFR
 ADAN        ITSCNET RCHAS040       *SECOFR
 AUDITOR     ITSCNET RCHASM01       *PGMR
 CCLIEN02    ITSCNET RCHASM01       *PGMR
 DEM001      ITSCNET RCHASM01       *SYSOPR
 DEM001      ITSCNET RCHASM03       *SYSOPR
 DEM001      ITSCNET RCHAS040       *SYSOPR
```

Example: All Profiles Having Any Special Authority

The following is a sample query to provide a list of all users having any special authority, showing user profile name, network ID/system name, and a table of special authorities granted.

```
Selected files

  ID     File           Library       Member        Record Format
  T01    QASVNUPP       QUSRSYS       *FIRST        UPINFR


Result fields

  Name        Expression

  ALLOBJ      substr(UPISAU, 1, 1)
  SECADM      substr(UPISAU, 2, 1)
  JOBCTL      substr(UPISAU, 3, 1)
  SPLCTL      substr(UPISAU, 4, 1)
  SAVSYS      substr(UPISAU, 5, 1)
  SERVICE     substr(UPISAU, 6, 1)
  AUDIT       substr(UPISAU, 7, 1)
  IOSYSC      substr(UPISAU, 8, 1)
  SHORTSYSN   substr(UPISYS, 1, 21)


Select record tests

  AND/OR   Field             Test     Value

           ALLOBJ            EQ       'Y'
   OR      SECADM            EQ       'Y'
   OR      JOBCTL            EQ       'Y'
   OR      SPLCTL            EQ       'Y'
   OR      SAVSYS            EQ       'Y'
   OR      SERVICE           EQ       'Y'
   OR      AUDIT             EQ       'Y'
   OR      IOSYSC            EQ       'Y'


Ordering of selected fields

  Field           Sort      Ascending/
  Name            Priority  Descending

  UPINAM          10        A
```

```
  SHORTSYSN       20        A
  ALLOBJ
  SECADM
  JOBCTL
  SPLCTL
  SAVSYS
  SERVICE
  AUDIT
  IOSYSC


Report column formatting and summary functions
  Summary functions:  1-Total, 2-Average, 3-Minimum, 4-Maximum, 5-Count
  Field           Summary    Column                                  Dec
  Name            Functions  Spacing  Column Headings         Len  Pos

  UPINAM                     0                                 10

                                      User Profile
  SHORTSYSN                  1                                 21

                                      System Name
  ALLOBJ                     1                                  1

                                      Allobj
  SECADM                     1                                  1

                                      Secadm
  JOBCTL                     1                                  1

                                      Jobctl
  SPLCTL                     1                                  1

                                      Splctl
  SAVSYS                     1                                  1

                                      Savsys
  SERVICE                    1                                  1

                                      Service
  AUDIT                      1                                  1

                                      Audit
  IOSYSC                     1                                  1

                                      Iosyscfg
```

This query produces output similar to the following (the true output continues to the right of this sample).

```
User Profile System Name          Allobj Secadm Jobctl Splctl Savsys Service
 ADAN        ITSCNET RCHASM01       Y      Y      Y      Y      Y       Y
 ADAN        ITSCNET RCHASM03       Y      Y      Y      Y      Y       Y
 ADAN        ITSCNET RCHAS040       Y      Y      Y      Y      Y       Y
 AUDITOR     ITSCNET RCHASM01       N      N      Y      N      Y       N
 CCLIEN02    ITSCNET RCHASM01       N      N      Y      N      Y       N
 DEM001      ITSCNET RCHASM01       N      N      Y      N      Y       N
 DEM001      ITSCNET RCHASM03       N      N      Y      N      Y       N
 DEM001      ITSCNET RCHAS040       N      N      Y      N      Y       N
```

Example: All Profiles Subject to Audit

The following is a sample query to list all users subject to object or action audit, showing user profile name, network ID/system name, and a table of audit values.

```
Selected files

  ID     File           Library       Member        Record Format
  T01    QASVNUPP       QUSRSYS       *FIRST        UPINFR


Result fields

  Name        Expression

  ACTAUD      substr(UPIUAL, 1, 12)
  CMD         substr(UPIUAL, 1, 1)
  CREATE      substr(UPIUAL, 2, 1)
  DELETE      substr(UPIUAL, 3, 1)
  JOBDTA      substr(UPIUAL, 4, 1)
  OBJMGT      substr(UPIUAL, 5, 1)
  OFCSRV      substr(UPIUAL, 6, 1)
  PGMADP      substr(UPIUAL, 7, 1)
  SAVRST      substr(UPIUAL, 8, 1)
  SECURITY    substr(UPIUAL, 9, 1)
  SERVICE     substr(UPIUAL, 10, 1)
  SPLFDTA     substr(UPIUAL, 11, 1)
  SYSMGT      substr(UPIUAL, 12, 1)
  SHORTSYSN   substr(UPISYS, 1, 21)


Select record tests

  AND/OR   Field             Test     Value

           UPIOAV            NE       '*NONE'
   OR      ACTAUD            NE       'NNNNNNNNNNNN'


Ordering of selected fields

  Field           Sort      Ascending/
  Name            Priority  Descending

  UPINAM          10        A
  SHORTSYSN       20        A
  UPIOAV
  CMD
  CREATE
  DELETE
  JOBDTA
  OBJMGT
  OFCSRV
  PGMADP
  SAVRST
  SECURITY
  SERVICE
  SPLFDTA
```

```
  SYSMGT


Report column formatting and summary functions
  Summary functions:  1-Total, 2-Average, 3-Minimum, 4-Maximum, 5-Count
  Field           Summary    Column                                  Dec
  Name            Functions  Spacing  Column Headings         Len  Pos

  UPINAM                     0                                 10

                                      User Profile
  SHORTSYSN                  1                                 21

                                      System Name
  UPIOAV                     1                                 10

                                      Obj Audit
  CMD                        2                                  1

                                      Cmd
  CREATE                     1                                  1

                                      Crt
  DELETE                     1                                  1

                                      Dlt
  JOBDTA                     1                                  1

                                      Job
  OBJMGT                     1                                  1

                                      Objmgt
  OFCSRV                     1                                  1

                                      Ofc
  PGMADP                     1                                  1

                                      Pgmadp
  SAVRST                     1                                  1

                                      Savrst
  SECURITY                   1                                  1

                                      Sec
  SERVICE                    1                                  1

                                      Svc
  SPLFDTA                    1                                  1

                                      Splf
  SYSMGT                     1                                  1

                                      Sysmgt
```

This query produces output similar to the following (the true output continues to the right of this sample).

```
User Profile System Name          Obj Audit   Cmd Crt Dlt Job Objmgt Ofc
 FIORINI     ITSCNET RCHASM01     *ALL         Y   Y   Y   N    Y     N
 FIORINI     ITSCNET RCHASM03     *CHANGE      Y   Y   Y   N    Y     N
 FIORINI     ITSCNET RCHAS040     *CHANGE      Y   Y   Y   N    Y     N
 GOODY       ITSCNET RCHASM01     *ALL         Y   Y   Y   N    Y     N
 GOODY       ITSCNET RCHASM03     *NONE        Y   N   N   N    N     N
 GOODY       ITSCNET RCHAS040     *NONE        Y   N   N   N    N     N
 PREACHER    ITSCNET RCHASM01     *ALL         Y   Y   Y   N    Y     N
 PREACHER    ITSCNET RCHASM03     *NONE        Y   N   N   N    N     N
 PREACHER    ITSCNET RCHAS040     *NONE        Y   N   N   N    N     N
```

Creating and Using an Icon for a User Profile Database Query

After writing a user profile database query, you can create a Command Sender icon in the User Profile Management Work Area to run the query, as follows:

- Use the **User Profile Management** icon to open the User Profile Management Work Area window.
- CTRL-drag the **Command Sender** icon from the main work area and drop it on the User Profile Management work area. This creates a copy in the User Profile Management work area.
- Open the newly-created **Command Sender** icon as settings. You are presented with a window into which to enter the command and related information.
- Specify a title for the icon that reflects the query to be run.
- Specify the command. The command to use depends on how you want your output returned to you.
  - If you want to produce a printed Query report, you should use the SBMJOB command. So, for example, if you want to run the query UPSPECAUT in library SM400LIB, you should specify

    ```
    SBMJOB CMD(RUNQRY QRY(SM400LIB/UPSPECAUT))
    ```

  - If you want to see the results of your query at the workstation (only), as part of the GUI's returned printer output, you must use the RUNQRY command directly. So, in our example, you should specify

    ```
    RUNQRY QRY(SM400LIB/UPSPECAUT)
    ```

    Tip

    In this case, you also have to attend to the output definitions within the query itself. Settings of output 2=Printer and printer *PRINT are known to work. Ironically, specifying 1=Display does not.

  Short of calling a CL program that contains both an SBMJOB and a direct RUNQRY, there is no convenient way of being able to display the Query output through the GUI *and* print it neatly.
- Specify the target node on which the command is to be run. This is the name of the central site system where the user profile database resides.
- Specify any security information to be used.
- Click on **Save** to save the icon in the User Profile Management work area.

To run the query, you can either:

- Right-click on the appropriate **Command Sender** icon.

- Click on **Send now**.

or:

- Double-click on the appropriate **Command Sender** icon.
- Click on **Send**.

The query is submitted to be run. You can track the progress and success of the request through the Command Log.

User Profile Maintenance

User profile maintenance allows you to maintain user profile parameters using the GUI. The ability to add, copy, change, and delete user profiles across the network brings a greater degree of consistency than when making individual changes to systems.

When creating a user profile, you can optionally also create a directory entry for the user. This is based on the user profile being created or an existing user profile.

The results of an inquiry are very often the starting point for some user profile maintenance. From the inquiry results, you can change, copy, or delete a user profile, including password changes.

The function to change a password uses the CHGUSRPRF command and not the CHGPWD command. Any rules that are tested with CHGPWD are not tested. CHGPWD is an interactive command that is run by a user and not by an administrator so this is no different from the administrator resetting a user's password with the CHGUSRPRF command. Under these circumstances, you may want to specify that the password is expired, thereby forcing the user to change it with CHGPWD. However, such a change is not propagated around the network of AS/400 systems.

When you delete one or more user profiles, you also get the choice to delete any printer output for the deleted user profiles. This provides a way to clean up the system. The default is not to delete printer file output.

Note that maintenance cannot be performed using the inquiry techniques described in the following sections on any user profiles created outside the GUI since the last discovery was run.

When running a command or managing a user profile, a change request is created and submitted on the central site system by the GUI. The change request is used to monitor and track the request. All change requests submitted from the GUI follow a naming convention; user profile requests are called QSVNGUP. The change requests submitted through the GUI are viewed and monitored from the GUI using the **Command Log** icon or with the Work with Submitted Change Requests (WRKSBMCRQ) command.

The User Profile Template

The User Profile template is used for creating user profiles. It is not used for changing or deleting them.

The User Profile template is provided, along with the others, in the Template Work Area. However, unlike every other template, drag-and-drop does not create a copy, or instance, in your target work area. Instead, drag-and-drop

moves the template to the target. Therefore, you can have the User Profile template in the Template Work Area or in the User Profile Management Work Area but not both. We recommend you move it to the User Profile Management Work Area so that all of your user profile icons are invoked from there.

Note that you cannot change the title of this icon.

Creating a User Profile Using the Template

You can use the **User Profile** icon to create a user profile as follows:

- **Right-click** on the User Profile icon.
- Click on **Create another**.
- In the window presented to you, specify the systems on which the user profile is to be created and the attributes of the profile.
- Click on **Create**.

This is illustrated in Figure 232.

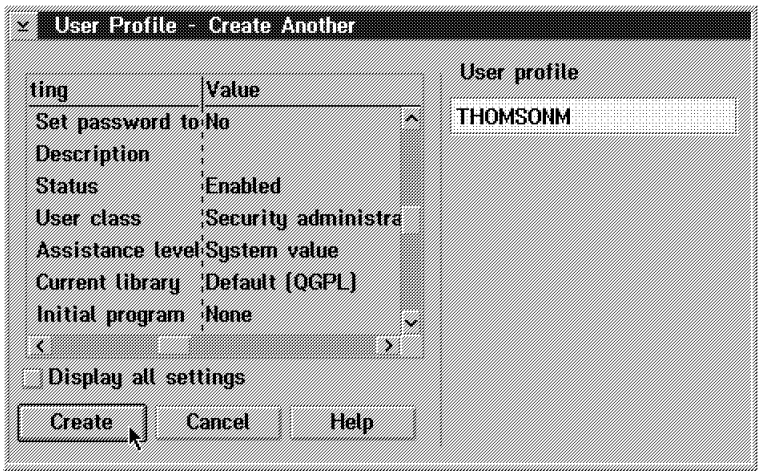

Figure 232. Creating a User Profile

A change request is then submitted to create the profile. You can track the progress and success of the request through the Command Log.

Important

The window in which you specify nodes and attributes offers the opportunity to encode the resultant CRTUSRPRF command but you see this option only if you click **Display all settings**. If you do not request encoding, the command, including the password, is shown on the returned spool file.

Creating a User Profile from the Topology List

From the *Topology List* window, you can create a user profile as follows:

- **Right-click** on the "black box" icon for each AS/400 system on which you want to create the user profile.
- Click on **Create user**.

- You are presented with the same window as described in the section ″Creating a User Profile Using the Template″, but with all the target nodes pre-filled, and you can proceed in the same way.

Tip

You can initiate a similar inquiry by right-clicking the **Central Site System** icon in the main work area, but only that system name is pre-filled.

Copying an Existing Profile

You can use a **User Profile List** icon, such as the general inquiry icon we discussed earlier, or the **Topology List** icon, to copy a user profile. Suppose, for example, we have created a model profile USERMODL with class *User* and we want to set up a new user profile with these or similar characteristics.

We can set up the new user profile as follows:

- Run an inquiry on user profile USERMODL, as described earlier.
- When the results are returned, click on one occurrence to select it.
- Click on **Selected**.
- Click on **Copy**.
- In the window presented to you, specify the name of the new user profile and the systems on which the user profile is to be created.
- Specify any other changes to the attributes of the profile. At a minimum, you want to specify a password or, if you do leave it to default to ″Same as user profile″, you should set it to ″expired″. You should also give the user profile a meaningful description.
- Click on **Create**.

This is the same as in Figure 232 on page 376.

A change request is then submitted to create the profile. You can track the progress and success of the request through the Command Log.

Changing the Password for a User Profile

You can use a **User Profile List** icon, such as the general inquiry icon we discussed earlier, or the **Topology List** icon, to change the password for a user profile, as follows:

- Run an inquiry on the user profile whose password is to be changed.
- When the results are returned, click on **All** occurrences to select it on all of the systems where it is found.
- Click on **Selected**.
- Click on **Change password**.
- In the window presented to you, specify the new password (twice).
- Click on **Change**.

A separate change request is then submitted for each system to change the password. You can track the progress and success of the requests through the Command Log.

Tip

A user profile change that ends with return code 10 may actually have been successful. An error may have been detected when re-creating the directory entry.

If you click on messages from any target node entry, you see the following:

MSS2002 1 change user profile related functions failed. (Sev 20)
CPF9082 User ID and address *userid sysname* not added to directory (Sev 40)
CPD8983 User ID and address already exists in the system distribution directory. (Sev 20)

If your return code is 10 and you have only these messages, the change has been successful.

Making Other Changes to a User Profile

You can also use a **User Profile List** icon, or the **Topology List** icon, to make more general changes to a user profile. However, when you have done the inquiry, the selection options include **change password, rename, copy, delete**.., but no **change** option. Therefore, you have to do things a little differently:

- Run an inquiry on the user profile to be changed.
- When the results are returned, click on **All** occurrences to select it on all of the systems where it is found.
- Click on **Selected**.
- Open as settings. One window is presented to you for each system in turn.
- In the window presented to you, specify the changes for that system. (You cannot change the node to add in the other system names with this one.)
- Click on **Save**.
- Repeat for the other systems.

A separate change request is submitted for each system to make the changes. You can track the progress and success of the requests through the Command Log.

Deleting a User Profile

You can use a **User Profile List** icon, such as the general inquiry icon we discussed earlier, or the **Topology List** icon, to delete a user profile, as follows:

- Run an inquiry on the user profile to be deleted.
- When the results are returned, click on **All** occurrences to select it on all of the systems where it is found.
- Click on **Selected**.
- Click **Delete**.
- In the window presented to you, specify your choice for the following deletion options:
  - Delete owned objects (*Yes, No, Change owner to...*)
  - Primary group (*No, Change to...*)

- Delete printout (*Yes, No*)

- Click on **Delete**.

A separate change request is then submitted for each system to delete the profile. You can track the progress and success of the requests through the Command Log.

Password Synchronization Across AS/400 Systems

With the proliferation of user profiles across multiple systems comes an increasing desire among users to keep their passwords synchronized across the various AS/400 systems to which they have access. In addition, the point was made in the section "Remote Command Security" on page 344 that if a user profile and password are to be specified under which a remote command is to run, then the password must be the same on all of the target nodes.

The GUI does provide a facility for a central security administrator to change the password for a given user profile across multiple systems. However, it provides no facility for a change of password by a user on any one system to be replicated across all of the other systems on which the relevant user profile exists.

This section sets out a sample scheme for achieving network password synchronization by taking advantage of two APIs recently made available that allow you to work with encrypted passwords for user profiles. You should adapt the sample scheme and code to your own requirements, with regard to the considerations given later in the section.

Note

Are you sure that the same user profile name always represents the same user on all of the systems where it exists? If not, you may be enabling your users to change other people's passwords. If you *intend* to have any given profile name be unique to one individual, you probably want to audit the user profiles on your systems to ensure uniqueness before you implement a synchronization scheme.

Design Considerations

1. System security must *NOT* be compromised by this solution.
2. The status of the request to change the user profile must be trackable so that central site operators can determine if any problems were encountered.
3. The request to change the profiles should accommodate network outages; when communications is re-established the request should be completed. This precludes using solutions based on an MS-transport-like remote command.

Design Assumptions

1. The user profile database QASVNUP at the central site system contains all the user profiles in the network. It means that the change request description QGPL/QSVNUPDS is run as often as needed to keep the user profile information updated throughout the network.
2. A user's password is the same on all of the systems in the network.
3. The same User ID represents the same user on all of the systems in the network.
4. Directory entries for user profiles are the same as the User ID.
5. OS/400 V3R1M0, System Manager/400 V3R1M1, and Managed System Services/400 V3R1M1 are installed on all of the systems in the network.
6. System value QPWDVLDPGM has been changed on all systems in the network to specify PGM1 as the password validation program.
7. 5763-SS1 PTF SF23664 is installed on all systems in the network. This PTF provides two APIs that allow you to work with encrypted passwords.
8. Once you code the production programs, they have observability removed.

Change Network Password Components

The proposed design solution is made up of four programs. Programs one, two and four are on all systems in the network, including the central site. Program three is only needed on the central site system. The system value *Password Validation Program (QPWDVLDPGM)* is changed on all systems in the network to specify PGM1. See "PGM1 - Security Validation Program" for information on this program.

When a user on any system in the network uses the CHGPWD command to change the password, PGM1 is called and our proposed tool for network password synchronization is triggered.

PGM1 - Security Validation Program

The system value QPWDVLDPGM is changed on all systems to specify PGM1 as the Password validation program. This provides the ability for a user-written program to do additional validation on passwords.

The program obtains the old encrypted password, User ID, NETID, and CP name and puts it into a data queue (QUSRSYS/PWCHANGE). If the data queue does not exist, it creates it.

The owner of the PGM1 must be QSYS and must adopt the owner's authority.

PGM1 should do the following:

1. Receive parameters from the CHGPWD command.
2. Blank the new password passed to this program as it is not used.
3. Retrieve the current encrypted password using the QSYRUPWD API provided by PTF SF23664. See "Retrieve and Set Encrypted User Password - PTF SF23664" on page 384 for more information on this API. Save the current password in a PREVPASS variable.
4. Retrieve the following information.
   - NETID and CP Name of current system.

- User ID that is being changed.

5. Add the following information to the QUSRSYS/PWCHANGE data queue:

   `PREVPASS, NETID, CP Name, User ID`

   If the data queue does not exist, then create it.

6. If the data queue is damaged, then send an alertable message to QSYSOPR and to the user. Do not delete the data queue or try to recover any further. Return a 1 - errors found.

7. Return a 0 if no errors were found. Return a 1 if errors were found.

PGM2 - Send Change Password Request to Central Site

This program is used in a long running job that is automatically started when the system is IPLed. The job waits on data queue QUSRSYS/PWCHANGE for an entry. When an entry is received, it processes the request and sends the request to change the password to the central site.

The owner of the PGM2 must be QSYS and must adopt the owner's authority.

The program should do the following:

1. Read data queue QUSRSYS/PWCHANGE (get PREVPASS, NETID, CP Name, User ID).

2. Use the QSYSPWD API to obtain the new encrypted password. See "Retrieve and Set Encrypted User Password - PTF SF23664" on page 384 for more information on this API.

3. Make sure the password has been changed. Compare the encrypted passwords if they are the same, then wait for 1 minute and try it again. If they are still the same, send a message to QHST indicating that nothing has changed and return. The user must have ended the CHGPWD command.

4. Retrieve the central site NETID and CP Name from the QUSRSYS/PWCONTROL data area.

   Note: This data area must be created and updated with the central site information as part of the installation of this tool.

5. Old and new passwords are different so build the request and submit it to the central site. Two choices are available here: SBMNETJOB or Remote Data Queue support. See "Remote Data Queue Support - PTF SF21555" on page 384 for more information on remote data queues. There are pros and cons with each approach so it is up to the implementer of this solution to decide. In either case, the following information is passed:

   ```
   NETID and CP Name of current system
   User ID that is being changed
   PREVPASS
   CURRPASS
   ```

   - If you are using SBMNETJOB:

     a. Create a file in QTEMP and build the statements to call PGM3 at the central site and pass parameters.

     b. Use the retrieved central site NETID and CP name from (PWCONTROL data area) as the system to run the job on.

     c. The job must run under a User ID with authority to change management functions.

d. Call the SBMNETJOB command.

e. If errors are detected, send a message to QHST indicating a problem was encountered.

f. If no errors, send a message to QHST saying "PW request was sent to the central site for user XXXXXXXXXX".

Note: The major disadvantage of this approach is that communications to the central site cannot be tested. It can take a long time to have the passwords updated throughout the network. There is also multiple jobs on the central site to handle the requests. The advantage is that the request is queued for later delivery even if the communications link between a system and the central site is down.

- If you are using Remote Data Queue Support:

  a. Build the data queue entry from the retrieved information:

```
NETID and CP Name of current system
User ID that is being changed
PREVPASS
CURRPASS
```

  b. Put the information on the remote data queue. If errors occur, send a message to QHST, otherwise send a message indicating success for user xxxxxxxxxx.

  Note: The major disadvantage of this approach is that the request is not queued for later delivery. The main advantage is that there is only one job on the central site to process all of the change password requests and it is known that the request made it to the central site.

PGM3 - Process Change Password Requests From the Network

This program runs at the central site and is used to accept the passed information from PGM2, either from the remote data queue or from the call parameters for the job submitted by SBMNETJOB. It reads the user profile database (QASVNUP) for all of the systems that the user has records for. If the user does not have an entry in the database for the system that the request came from, the request is not processed and may be considered to be a security violation. The list of systems that the user is authorized to is built. A RUNSMGOBJ command is built with a call to PGM4 on the target system and passes the parameters.

The owner of the PGM3 must be QSYS and must adopt the owner's authority and public authority must be *EXCLUDE.

The job should run under a User ID that has authority to change management functions. The change request for RUNSMGOBJ is created with this User ID.

This program should:

1. Validate that User ID has a record in QASVNUP for the passed NETID and CP Name.
2. If record is not found, return or put out a message indicating a possible security violation.

   Note: Optionally, you can decide to either force the password change at the target system or compare old passwords (the old password at the source system and at the target system) to make sure this is a valid request and

only make the change if they are identical. To add this option, you can have a data area at the central site system to determine if force or compare should be done.

3. Build the parameters for RUNSMGOBJ command. The parameters are:

```
                USERID
                PREVPASS
                CURRPASS
                NETID and CP Name of originating system
optional        Central site value for compare or force password
```

4. Read the database for the User ID
5. If the returned NETID and CP Name match the originating system, read the next record (GOTO 4).
6. If no more records for User ID found, GOTO 10.
7. Add this system to the list of systems parameter on the RUNSMGOBJ.
8. Check to see if this is the 50th system added. If it is, put in the closing parenthesis and submit this command. Build up the command again and read the next record (GOTO 4).
9. GOTO 4 to read the next record.
10. Add closing parenthesis and submit the command, only if there is at least one system in the list.
11. Send a message to QHST to indicate that change password was started for this user. You can retrieve the message generated when the RUNSMGOBJ is submitted. Retrieve the change request name and sequence number and put this into the message.

PGM4 - Process Password Change at the Target System

This program is used to do the actual password change.

The owner of the PGM4 must be QSYS and must adopt the owner's authority. Public authority must be *EXCLUDE. The program first checks the data area on the target system to see if compare or force is in effect. If compare is in effect, then the PREVPASS must match what is on the system before the change is done. A distribution security program is implemented to prevent anyone from running this program if the request is coming from any system other than the central site. Another option is to send the program with each change password request; this way the program only exists on the remote system while it is being run, and gets deleted after it is run.

This program should perform the following steps:

1. Get data area and determine if compare or force is in effect. This step is optional. By default, the central site controls this, so if no entry is found, the passed status from the central site is used. The data area on the central site can have one of two values: force or compare. The data area on the target systems can have one of three values: force, compare, or blank to let the central site control what is to be done. In most cases, blank is at the remote site. If the data area at the target system is blank, then the passed values from the central site are used. Otherwise, the data area values from that remote site are used.
2. If compare is done, then retrieve the encrypted password for the User ID.

3. If they do not match, send a message to the User ID at the passed NETID and CP name saying that the password change failed.
4. If they match or force is done, then call the *Set encrypted user password (QSYSUPWD) API* with the CURRPASS.
5. If the API fails, then send a message to the User ID at the passed NETID and CP name reporting the change failure.
6. Send a message to QHST to indicate the success or failure of the change password request.

Retrieve and Set Encrypted User Password - PTF SF23664

PTF SF23664 is now available. This PTF provides two APIs to allow the user to work with encrypted passwords for the user profiles. The first (QSYRUPWD) allows the user to retrieve the encrypted password for a user profile and the second (QSYSUPWD) allows the user to set the encrypted password for a user profile. These two APIs allow the user to more easily mirror the user profile activity on a second system based upon the activity on the first system.

The following new APIs (Application program interfaces) support retrieving and setting an encrypted password for a user profile:

- QSYRUPWD - Retrieve encrypted user password
- QSYSUPWD - Set encrypted user password

Refer to the cover letter for PTF SF23664 for information on how to use the APIs in a user program.

Remote Data Queue Support - PTF SF21555

This PTF provides new support through Distributed Data Management (DDM) to allow data queue functions to be done remotely. The data queue APIs that support remote data queues are QCLRDTAQ (Clear Data Queue), QSNDDTAQ (Send to Data Queue), and QRCVDTAQ (Receive from Data Queue). The user must first use the CRTDTAQ (Create Data Queue) command to create a DDM data queue before using these APIs to operate on a remote data queue.

The CRTDTAQ (Create Data Queue) CL command has been changed to optionally allow the creation of a DDM data queue. The changed and new parameters of the CRTDTAQ command are described in the PTF cover letter.

Chapter 8. National Language Support Considerations

This chapter discusses NLS considerations that apply to Operations Control Center/400 data distribution and remote command functions. Operations Control Center/400 uses SNA Distribution Services (SNADS) to distribute data across the network.

When character data is passed from system to system with different national languages installed, it is extremely important to maintain data integrity. To accomplish this, IBM uses the Character Data Representation Architecture (CDRA). Using CDRA, you can achieve consistent representation, processing, and interchange of characters (data) in the AS/400 system and across IBM systems platforms that support CDRA.

The AS/400 implementation of CDRA is through coded character set identifier (CCSID) support.

Character Representation

Character representation in the AS/400 system is controlled by the following elements of the Character Data Representation Architecture: CDRA identifies characters by encoding scheme (ESid), character set, pairs of character sets and code pages (as needed), and additional coding-related information (as necessary). This identification is established by a system of tags. The tags are handled by OS/400 in a way that ensures character set integrity. The overall objective of CDRA is to define a method of assigning and preserving the meaning of coded graphic characters through various stage of processing and interchanging.

Encoding Scheme

The CDRA system of tags uses an encoding scheme to specify:

- The coding space (number and allowable value of code points in a code page).
- Rules for sharing the coding space between control and graphic characters.
- Rules related to specific options, such as the number of bits in a byte, single-byte, double-byte, or mixed-byte, permitted in that scheme.
- Rules related to code extensions techniques (if used).

The rules for encoding schemes are followed when code points are assigned to graphic characters in a particular code page. Some common encoding schemes are Extended Binary Coded Decimal Interchange Code (EBCDIC) and American Standard Code for Information Interchange (ASCII).

Conversion of Character Data

The CDRA system of tags ensures that you can convert character data in a predictable, repeatable way. Conversion pertains to converting a code point assigned to a character in one code page to its corresponding code point in another code page. Conversion should not be equated to translating from one language to another.

CCSID Values

CDRA defines the following range of values for CCSIDs:

CCSID Value	Purpose/Meaning
0000	Use next higher hierarchical CCSID.
0001 through 65533	IBM-registered CCSIDs.
65534	Refer to lower hierarchical CCSID.
65535	No automatic conversion of data between this CCSID and any other CCSID. (This is the default setting of the OS/400 QCCSID system value).

CDRA uses a tag field to hold a CCSID value to identify the meaning of coded graphic characters. The tag field may be in a data structure that is logically associated with the data object (explicit tagging), or it may be inherited from the tag field associated with the other objects within the operating system (implicit tagging).

Character Data Integrity

The CDRA system of tags uses coded character set identifiers (CCSIDs) to maintain the data integrity when character data is passed from system to system or from user to user. CCSIDs assign a value that uniquely identifies the coded graphic character representation used for character data.

Table 11 shows the meaning of maintaining data integrity. A database file created by a U.S. user contains a dollar sign and is read by a user in the United Kingdom and in Denmark. If the application does not assign CCSID tags that are associated with the data to the file, users see different characters.

Table 11. Data Integrity is Not Maintained Using CCSID 65535 Across Countries

Country	Keyboard Type	Code Page	CCSID	Code Point	Character
U.S.	USB	037	65535	X'5B'	$
U.K.	UKB	285	65535	X'5B'	£
Denmark	DMB	277	65535	X'5B'	

If the application assigns a CCSID associated with the data to a file, the application can use AS/400 CCSID support to maintain the integrity of the data. When the file is created with CCSID 037, the user in the United Kingdom (job CCSID 285) and the user in Denmark (job CCSID 277) see the same character. Database management takes care of the mapping.

Table 12. Data Integrity is Maintained Using CCSID Tags

Country	Keyboard Type	Code Page	CCSID	Code Point	Character
U.S.	USB	037	00037	X'5B'	$
U.K.	UKB	285	00285	X'4A'	$
Denmark	DMB	277	00277	X'67'	$

For more information about CDRA, refer to the *Character Data Representation Architecture Executive Overview* or the *Character Data Representation Architecture - Level 2 Reference* .

Operation Control Center/400 Remote Command Support

Operations Control Center/400 uses SNADS as the transport vehicle so that data integrity between systems in the network is guaranteed.

Important

This is valid only if the system value QCCSID of all of the systems in the network is set to the right CCSID value. If you use 65535, the automatic mapping does not take place.

The only exception in Operations Control Center/400 is the remote command support.

Remote Commands in Different National Languages

The central site system and managed system can run under different national language versions at the same time. For example, if the central site system sends a remote command request to a managed system, the managed system can process the command and provide feedback in the language in which the command was sent. However, this is true only if the language of the job sending the request is a secondary language on the managed system.

When a remote command request is sent to a managed system, the managed system searches its list of secondary languages for a match. The managed system then automatically changes the library list to add the secondary language library to the top of the job library list before it runs the command. The central system receives messages and output from the managed system in the language in which it sent the command. After the command was executed, the secondary library is removed from the list.

When searching to match the language in which the remote command request was sent, the managed system maps to a library on the system. That library, QSYSXXXX (where XXXX is the national language version), contains messages and any translatable text. In our example, the job sending the remote command uses CCSID 280 and the national language ID is ITA, so the managed system searches for national language version 2932. See Table 13 for a partial list of the national language versions used. For a complete list, see the *Managed System Services/400 Use* manual.

Table 13. Partial List of National Versions Used by Remote Command Processing

National Language Version	CCSID	National Language ID
2963	00500	NLB
2966	00500	FRB
2980	00037	PTB
2981	00500	FRC
2926	00037	DAN
2924	00037	ENU
2928	00297	FRA
2929	00273	DEU
2932	00280	ITA
2962	05026	JPN

If the language of the job sending the request is not installed on the managed system, the managed system still sends all of the requested status and data to

the central system. The data sent to the central system is in the primary language of the managed system. Character set conversion is done by the managed system, so that all of the characters are mapped to the original code page of the central site system.

Remote Command Example

As an example, we use the RUNSMGCMD command between an Italian and an English system. System RCHASM02 is the Italian system and it sends the following command:

```
RUNSMGCMD CMD(DSPMSGD RANGE(CPF4201) OUTPUT(*PRINT))
CPNAME((*NETATR RCHAS040)) USRPRF(TEDZ1) PASSWORD()
```

to the RCHAS040 English system. RCHAS040 has the secondary language Italian (QSYS2932) installed.

```
                    Emissione tasto stampa                          Pagina 1
   5763SS1 V3R1M0 940909               RCHASM02           12/06/94  13:18:48
   Unità video . . . . . . . :  TEDZI
   Utente. . . . . . . . . . :  TEDZ1
                         Run SMG Command (RUNSMGCMD)
Immettere le scelte e premere Invio.
Command to run . . . . . . . . . > DSPMSGD RANGE(CPF4201) OUTPUT(*PRINT)

                                                                    ...
Managed systems node list:
  Node list  . . . . . . . . . .   *NONE         Name, *NONE
    Library  . . . . . . . . . .                 Name, *LIBL, *CURLIB
Managed system node names:
  Network identifier . . . . . . > *NETATR       Name, *NONE, *NETATR
  Control point  . . . . . . . . > RCHAS040      Name
             + per altri valori
                                                                Segue...
F3=Fine   F4=Richiesta   F5=Rivisualizzazione   F10=Altri parametri
F12=Annullamento         F13=Come usare lo schermo   F24=Altri tasti
```

Figure 233. Italian RUNSMGCMD

As a result, RCHAS040 adds library QSYS2932 **1** at the top of the system library list for job QCQSVSRV.

```
                        Print Key Output                                Page   1
   5763SS1 V3R1M0 940909                RCHAS040            12/13/94  15:50:01
   Display Device  . . . . . :  TEDZF
   User  . . . . . . . . . . :  TEDZ
                            Display All Messages
                                                            System:   RCHAS040
 Job . . :   QCQSVSRV      User . . :   TEDZ1         Number . . . :   013494
     Library QSVMSS added to library list.
     La libreria QSYS2932 1  é stata aggiunta alla lista delle libreri
     L'oggetto sostituito QAVARSPLUI di tipo *USRIDX é stato aggiunto in
       QRPLOBJ.
     Non é stata trovata la stampante PRT01. La coda di emissione é stata
       modificata con QPRINT nella libreria QGPL.
     E' stato cancellato l'oggetto QAVARSPL in QTEMP di tipo *FILE.
     File QAVARSPL creato nella libreria QTEMP.
     Membro QAVARSPL aggiunto al file QAVARSPL in QTEMP.
     Nel file QAVARSPL in QTEMP sono stati copiati 30 record.
     La libreria QSVMSS é stata eliminata dalla lista delle librerie.
     Library QSYS2932 2  removed from library list.
                                                                      Bottom
 F3=Exit   F5=Refresh   F12=Cancel   F17=Top   F18=Bottom
```

Figure 234. QCQSVSRV Joblog

When the remote command has finished, library QSYS2932 **2** is removed from the library list. The result of the command is shown in Figure 235.

```
                          Returned Spooled File Data                          Page    1
5763SM1 V3R1M0  940909                                              RCHASM02  12/06/94  13:10:52
 Change Request . . . . . . . . . . . . . :  TEDZ1
  Number . . . . . . . . . . . . . . . . :   000180
 Activity name  . . . . . . . . . . . . . :  QACT000010
 Command:
 DSPMSGD RANGE(CPF4201) OUTPUT(*PRINT)
 Control point  . . . . . . . . . . . . . :  RCHAS040
 Network ID . . . . . . . . . . . . . . . :  ITSCNET
 Status . . . . . . . . . . . . . . . . . :  Successful
 Spooled file . . . . . . . . . . . . . . :  QPMSGD
  5763SS1 V3R1M0 940909          Descrizione messaggio (Testo formattato)          12/06/94 13:10:09    Pag.     1
  File messaggi . . . . . . . . . :  QCPFMSG     Libreria . . . . . . . . . . . :  QSYS2932
  ID messaggi:        CPF4201
  CPF4201
   Messaggio . . . :  La descrizione unità &1 non é valida per la sesione
     retail pass-through.
   Causa . . . . . :  E' stato fatto un tentativo di avviare una sessione retail
     pass-through con la descrizione unità &1 per il lavoro &7/&8/&9 L'unitàche
     non é un'unità &2. La descrizione unità &1 é stata specficata nella lista
     di configurazione retail pass-through (QRTLPASTHR).
   Correzione  . . : Usare il comando Modifica lista configurazione (CHGCFGL)
     per modificare questa descrizione di unità, nella lista di configurazione
     retail pass-through, in un'unità &2 valida.
   Gravità . . . . . . . . . . . . . . . . . :   SEV      40
   Formati dei campi dati del messaggio . . . :   FMT
    Lunghezza   Tipo dati       Lungh.        Byte var. o Pos. dec.
     &1         *CHAR            10
     &2         *CHAR             6
     &3         *CHAR            10
     &4         *BIN             2
     &5         *CHAR             0
     &6         *CHAR             4
     &7         *CHAR             6
     &8         *CHAR            10
     &9         *CHAR            10
   Livello messaggio. . . . . . . . . . . . . :   LVL      01/02/90 06
   Opzione di avviso  . . . . . . . . . . . . :   ALROPT    *NO
   Registrazione problema . . . . . . . . . . :   LOGPRB    *NO
   ID serie di caratteri codificati . . . . . :   CCSID     65535
                 **** F I N E  D E L L A  L I S T A****
                          ***** E N D  O F  L I S T I N G  *****
```

Figure 235. Spool File Returned by RUNSMGCMD

Additional Considerations

If you use the Remote Command Key (KEY) parameter of the CHGMGDSYSA command, make sure you enter the 64 characters in *HEX*. The command allows you to enter just the characters as text, but they are stored in hex if you press Enter.

With systems in your network having different CCSID values, you end up with different hex remote command keys.

Example Remote Command Key

In this example, we use the left bracket character ({) in an English system with code page 0037 and in an Italian system with code page 280.

In both systems, this is our Remote command key parameter:

```
 Remote command key . . . . . . . > {{{{{{{{{{{{{{{{{{{{{{{{{{{{{{{{{{{
{{{{{{{{{{{{{{{{{{{{{{{{{{{{{
```

The hex result in both systems is different. The character string entered in an English system is translated as :

```
 Remote command key . . . . . . . > X'C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0
C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0C0
C0'
```

The character string entered in an Italian system is translated as:

```
 Remote command key . . . . . . . > X'4444444444444444444444444444444444
444444444444444444444444444444444444444444444444444444444444444444444444
44'
```

Tip

Do not enter a character string but a hexadecimal string in the Remote Command Key parameter of the CHGMGDSYSA command to avoid problems if your systems are set at different code pages.

Chapter 9. Comparing Operations Control Center/400 and the System Management Tools PRPQ

The functions and infrastructure provided by Operations Control Center/400 supersede those in the System Management Tools PRPQ (PRPQ number 5799EFT).

Operations Control Center/400 offers functions superior to those in SMT; just to mention a few examples:

- Operations Control Center/400 provides sophisticated logging and tracking capabilities through the submitted change request; you can follow the progress of a distribution or command execution with multiple levels of granularity.

  SMT logs the progress of outbound tasks *only* in the QAMTLOG file in library QUSRSYS; to track the status you must browse the QAMTLOG member.

- Operations Control Center/400 allows the use of node lists to group managed systems and submit activities to all of the systems simultaneously.

  SMT does not allow the use of node lists.

- Operations Control Center/400 allows you to implement complex functions through the use of multiple activities, conditioning of activities and scheduling.

- In V3R1M1 and V3R6, Operations Control Center/400 maintains a central user profile database and provides access for network-wide inquiry and maintenance of user profiles through the graphical user interface (GUI).

SMT provides only the equivalent to fast path commands: a predefined set of commands, each one meant only to implement one specific function.

Most of the functions provided by Systems Management Tools/400 are implemented with Operations Control Center/400. Operations Control Center/400 provides fast path commands and change requests that are used to perform complex actions to manage your systems. While Operations Control Center/400 does not entirely duplicate SMT function in all areas, it is used to provide similar support.

In this chapter, we provide a table that summarizes how to implement SMT tasks using Operations Control Center/400 and we include some examples that are based on SMT commands and programs that were modified to utilize the Operations Control Center/400 robust infrastructure.

Implementing SMT Functions with Operations Control Center/400

Table 14 shows how SMT tasks are implemented using Operations Control Center/400. In the table, you see the use of fast path commands (RUNSMGCMD or SNDSMGOBJ), change requests, and the GUI. For one-time use, the fast path commands are used. For complex tasks or tasks repeated regularly, a change request is used. The GUI is used for both categories of task.

Table 14 (Page 1 of 2). Implementing SMT Functions with Operations Control Center/400

SMT Function	Operations Control Center/400
Distribute objects/libraries	Use SNDSMGOBJ command to send an object.
Execute commands	Use RUNSMGCMD or the Command Sender icon to run a command.
Change network attributes Change system values	Use RUNSMGCMD or the Command Sender icon to run the CHGNETA or CHGSYSVAL command.
Display network attributes	Change request: • *CMD activity to DSPNETA *PRINT, RNTSPLF(*YES). • Spool files for all systems are returned in one spool file. • Look at the detail data for the activity to obtain the spool file name. • Copy the spool file to a permanent file if needed. - or - Use the Command Sender icon to run the DSPNETA command and view or print the returned printer output through the Command Log icon.
Display system values	Change request: • *CMD activity with RNTSPLF(*YES) running WRKSYSVAL (value) OUTPUT(*PRINT). • Repeat this command for each system value wanted. • Spool files for all systems are returned in one spool file. • Look at detail data for the activity to obtain the spool file name. • Copy the spool file to a permanent file if needed. - or - Use the Command Sender icon to run the DSPSYSVAL or WRKSYSVAL command one or more times and view or print the returned printer output through the Command Log icon.
Maintain a user profile database on the central site system.	**V3R1M0** - Change request: • *CMD activity to delete, define, or clear user profile database on central site (optional). • *CMD to DSPUSRPRF *OUTFILE on all managed systems. • *OBJ activity to *RTV OUTFILE from all managed systems. • *CMD to CPYF OUTFILE to single member file on central site system. • *CMD activity to delete OUTFILE on all managed systems. • *CMD activity to delete retrieved files on central site system (optional). - or - **V3R1M1 and V3R6** - GUI: Central user profile database created and maintained automatically and accessed for user profile inquiry and maintenance through the User Profile and User Profile List icons.

Table 14 (Page 2 of 2). Implementing SMT Functions with Operations Control Center/400	
SMT Function	**Operations Control Center/400**
Manage User Profiles	
Create	Use RUNSMGCMD or Command Sender icon for CRTUSRPRF. - or - Use the User Profile icon to create the user profile or the User Profile List icon to copy an existing user profile.
Change	Use RUNSMGCMD or Command Sender icon for CHGUSRPRF. - or - Use the User Profile List icon to change the user profile.
Delete	Use RUNSMGCMD or Command Sender icon for DLTUSRPRF, specifying new owner of objects. - or - Use the User Profile List icon to delete the user profile, specifying new owner of objects and printout cleanup choice.
Rename	Change request: • *CMD activity to create new user profile. • *CMD activity to CHGDLOOWN to new owner. • *CMD activity to delete old user profile, specifying new owner of objects. - or - Use the User Profile List icon to rename the user profile.
VLIC logs	RUNSMGCMD for PRTINTDTA TYPE(*NOTES) RTNDATA(*YES) • Spool files for all systems are returned in one spool file. • Look at detail data for the activity to obtain the spool file name. • Copy the spool file to a permanent file if needed. - or - Use the Command Sender icon to run the PRTINTDTA command and view or print the returned printer output through the Command Log icon.
Error Logs	Change request: • *CMD activity for PRTERRLOG to *OUTFILE. • *OBJ activity to *RTV the OUTFILE. • *CMD activity to CPYF OUTFILE to permanent file. -or- • RUNSMGCMD for PRTERRLOG to *PRINT RTNDATA(*YES). • Spool files for all systems are returned in one spool file. • Look at detail data for the activity to obtain the spool file name. • Copy the spool file to a permanent file if needed. - or - Use the Command Sender icon to run the PRTERRLOG command and view or print the returned printer output through the Command Log icon.

Maintaining a User Profile Database on the Central Site System

This section is relevant to V3R1M0. With V3R1M1 and V3R6, a user profile database is maintained automatically on the central site. Therefore, if you have V3R1M1 or V3R6 on your AS/400 systems, disregard this section.

This section shows how to keep a database on the central site system with the user profile information from the managed systems. In this step-by-step approach, we explain how to implement the tasks described in Table 14 for maintaining a user profile database on the central site system.

1. Create a catalog entry for the user profile database on every managed system. Enter the following command:

   ```
   RUNSMGCMD CMD(ADDDSTCLGE GLBNAME(*NETID *CPNAME USERPROFILE OCCUSRPRF)  +
   OBJTYPE(*FILE) OBJ(GG244372/OCCUSRPRF) MBR(*FIRST) +
   TEXT('User Profile Information')) +                                      +
   NODL(GG244372/PRODUCTION) CPNAME(*NONE) USRPRF(ADAN) PASSWORD()   +
   ENCODE(*NO)
   ```

2. On the central site system, create a catalog entry for each managed system pointing to the corresponding member of the file GG244372/OCCUSRPRF. Enter the following command for each managed system:

   ```
   ADDDSTCLGE GLBNAME(*NETID RCHASM03 USERPROFILE OCCUSRPRF) OBJTYPE(*FILE)
   OBJ(GG244372/OCCUSRPRF) MBR(RCHASM03) TEXT('User Profile Data for RCHASM03')
   ```

3. Create a change request description on the central site system:

   ```
   CRTCRQD CRQD(GG244372/OCCUSRPRF) TEXT('User Profile Data Base')
   ```

4. Add a change request activity to create or refresh the user profile database on the central site system. Enter the command:

   ```
   ADDCMDCRQA CRQD(GG244372/OCCUSRPRF) CMD(DSPUSRPRF USRPRF(*ALL)    +
   OUTPUT(*OUTFILE) OUTFILE(GG244372/OCCUSRPRF) OUTMBR(*FIRST *REPLACE))  +
   CPNAME(*LOCAL) USRPRF(ADAN) PASSWORD()                            +
   TEXT('DSPUSRPRF on Central Site System')
   ```

5. Run the DSPUSRPRF command on all of the managed systems and store the data in the file GG244372/OCCUSRPRF. Enter the command:

   ```
    ADDCMDCRQA CRQD(GG244372/OCCUSRPRF) CMD(DSPUSRPRF USRPRF(*ALL) +
   OUTPUT(*OUTFILE(GG244372/OCCUSRPRF) OUTMBR(*FIRST *REPLACE))
   NODL(GG244372/PRODUCTION)USRPRF(ADAN) PASSWORD()             +
   TEXT('DSPUSRPRF on Managed Systems')
   ```

   Note: The Display User Profile (DSPUSRPRF) command can be issued by any user who has read authority for the user profile being displayed. If you want to display all of the user profiles, the command must be issued by a user with read authority for all of the user profiles.

6. Retrieve the file OCCUSRPRF from all of the managed systems into members of the file OCCUSRPRF on the central site system. Enter the command:

   ```
   ADDOBJCRQA CRQD(GG244372/OCCUSRPRF) ACTIVITY(QACT000030) ACTION(*RTV) +
   OBJ(*GLOBAL) GLBNAME(*NETID *ANY USERPROFILE OCCUSRPRF)    +
   NODL(GG244372/PRODUCTION) REPLACE(*YES)
   TEXT('Retrieve OCCUSRPRF from Managed Systems') +_
   COND(*PRV *EQ *SUCCESS *SAMENODE))
   ```

7. Copy the data from all of the members of OCCUSRPRF into the single member file NETUSRPRF. Having all of the data in a single member makes it possible to use SQL/400 or QUERY/400. Enter the command:

   ```
   ADDCMDCRQA CRQD(GG244372/OCCUSRPRF) ACTIVITY(QACT000040) CMD(CPYF +
   FROMFILE(GG244372/OCCUSRPRF) TOFILE(GG244372/NETUSRPRF) FROMMBR(*ALL)
   MBROPT(*REPLACE) CRTFILE(*YES)) NODL(*NONE) CPNAME(*LOCAL) +
   TEXT('Copy data into NETUSRPRF') COND((*PRV *EQ *SUCCESS *ALLNODES))
   ```

8. Delete the OCCUSRPRF file on the managed systems for security reasons. Enter the command:

   ```
   ADDCMDCRQA CRQD(GG244372/OCCUSRPRF) CMD(DLTF FILE(GG244372/OCCUSRPRF)) +
   NODL(GG244372/PRODUCTION) CPNAME(*NONE) TEXT('Delete OCCUSRPRF on
   Managed Systems') COND((*PRV))
   ```

   Figure 236 on page 396 shows the printout of the change request description OCCUSRPRF created following the steps previously described.

```
                                        Change Request Description                                          Page     1
Change request description . . . . . . . . . :   OCCUSRPRF
  Library  . . . . . . . . . . . . . . . . . :     GG244372
User profile . . . . . . . . . . . . . . . . :   *SBM
Problem ID . . . . . . . . . . . . . . . . . :   *NONE
  Origin . . . . . . . . . . . . . . . . . . :
Text . . . . . . . . . . . . . . . . . . . . :   User Profile Data Base



                                                     ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000010
Activity type  . . . . . . . . . . . . . . . :   *CMD
Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   DSPUSRPRF on central site system
Action . . . . . . . . . . . . . . . . . . . :   Run command
Command:
  DSPUSRPRF USRPRF(*ALL) OUTPUT(*OUTFILE) OUTFILE(GG244372/OCCUSRPRF) OUTMBR(*FIRST *REPLACE)


                                                     ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000020
Activity type  . . . . . . . . . . . . . . . :   *CMD
Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   DSPUSRPRF on Managed Systems
Action . . . . . . . . . . . . . . . . . . . :   Run command
Command:
  DSPUSRPRF USRPRF(*ALL) OUTPUT(*OUTFILE) OUTFILE(GG244372/OCCUSRPRF)
Managed system start time:
Time zone  . . . . . . . . . . . . . . . . . :   *LCLSYS
  Start after date and time  . . . . . . . . :     *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :     *ANY        *ANY
Return spooled files . . . . . . . . . . . . :   *YES
User profile . . . . . . . . . . . . . . . . :   ADAN
Password specified . . . . . . . . . . . . . :   *YES


                                                     ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000030
Activity type  . . . . . . . . . . . . . . . :   *OBJ
Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   Retrieve OCCUSRPRF from Managed System
--------------------Conditions----------------------
                                          Condition
Activity       Relation     Code          Mode
*PRV             *EQ        *SUCCESS      *SAMENODE

Action . . . . . . . . . . . . . . . . . . . :   Retrieve object
Global object name:
  To be retrieved  . . . . . . . . . . . . . :   *NETID *ANY USERPROFILE OCCUSRPRF
Data object class  . . . . . . . . . . . . . :   '00000000'X
Replace  . . . . . . . . . . . . . . . . . . :   *ALLOWED
```

Figure 236 (Part 1 of 2). CRQD OCCUSRPRF - Keep User Profile Database on Central Site System

```
                                                  ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000040
Activity type  . . . . . . . . . . . . . . . :   *CMD
Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHASM02
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   Copy data into NETUSRPRF
--------------------Conditions----------------------
                                        Condition
Activity       Relation     Code        Mode
*PRV             *EQ        *SUCCESS    *ALLNODES


Action . . . . . . . . . . . . . . . . . . :   Run command
Command:
  CPYF FROMFILE(GG244372/OCCUSRPRF) TOFILE(GG244372/NETUSRPRF) FROMMBR(*ALL) MBROPT(*REPLACE) CRTFILE(*YES)



                                                  ------- Activity -------
Activity name . . . . . . . . . . . . . . . :   QACT000060
Activity type  . . . . . . . . . . . . . . . :   *CMD
Node list  . . . . . . . . . . . . . . . . . :   PRODUCTION
  Library  . . . . . . . . . . . . . . . . . :     GG244372
Scheduled start:
  Start after date and time  . . . . . . . . :   *CURRENT    *CURRENT
  Start before date and time . . . . . . . . :   *ANY        *ANY
Hold . . . . . . . . . . . . . . . . . . . . :   *NO
Text . . . . . . . . . . . . . . . . . . . . :   Delete OCCUSRPRF on Managed Systems
--------------------Conditions----------------------
                                        Condition
Activity       Relation     Code        Mode
*PRV             *EQ        *SUCCESS    *ALLNODES

Action . . . . . . . . . . . . . . . . . . :   Run command
Command:
  DLTF FILE(GG244372/OCCUSRPRF)
Managed system start time:
Time zone  . . . . . . . . . . . . . . . . :   *LCLSYS
  Start after date and time  . . . . . . . :     *CURRENT    *CURRENT
  Start before date and time . . . . . . . :     *ANY        *ANY
Return spooled files . . . . . . . . . . . :   *YES
User profile . . . . . . . . . . . . . . . :   ADAN
Password specified . . . . . . . . . . . . :   *YES
                                  * * * * *  E N D   O F   L I S T I N G   * * * * *
```

Figure 236 (Part 2 of 2). CRQD OCCUSRPRF - Keep User Profile Database on Central Site System

9. Submit the change request OCCUSRPRF and track the progress of the activities with the WRKSBMCRQA command:

```
                        Work with Submitted CRQ Activities
                                                                System:   RCHASM02
Change request  . . . . . :   OCCUSRPRF
  Number  . . . . . . . . :     000010
Text  . . . . . . . . . . :   User Profile Data Base



Type options, press Enter.
  3=Hold   5=Display details   6=Release   8=Work with nodes for activity
  10=Display messages          13=End

                                                                      Highest
     Activity                                                           End
Opt  Name        Type        Node               Status                Code
     QACT000010  *CMD        *LCL               Ended                  00
     QACT000020  *CMD        ITSCNET.RCHASM...  Running
     QACT000030  *OBJ        ITSCNET.RCHASM...  Running
                                                                        More...
Parameters or command
===>
```

Figure 237. Tracking the Status of the CRQ OCCUSRPRF with the WRKSBMCRQA Command

Extracting Information from the User Profile Database

This section is relevant to V3R1M0. With V3R1M1 and V3R6, user profile inquiry and maintenance can be performed network-wide through the GUI. Therefore, if you have V3R1M1 or V3R6 on your AS/400 systems, disregard this section.

Now that we have the user profile data from all of the managed systems centralized in the user profile database GG244372/NETSURPRF on the central system, we can query this information to audit the network security periodically or to answer the network or system administrator's ad hoc questions. Use your favorite query tool to do so.

The first step is to post the questions you want to ask to the database and the second step is to find the field and conditions to answer the questions. To find the fields, you need to know the file field descriptions for the NETUSRPRF file which is the result of the Display User Profile (DSPUSRPRF) command. To obtain a full list of all the fields in the NETUSRPRF file, enter the command:

```
DSPFFD FILE(GG244372/NETUSRPRF) OUTPUT(*PRINT)
```

We found it convenient to keep the spool file online to search for the description of the field that answers our queries.

In the following sections, we provide some examples of typical questions you might want to ask to the user profile database on the central site system.

Who are the Users with Special Authorities *ALLOBJ or *SECADM?

To answer this question, we created the SQL/400 query *SPCAUT* in library GG244372:

```
SELECT
      UPSYST, UPUPRF, UPSPAU
      FROM "GG244372"/"NETUSRPRF"
      WHERE ((UPSPAU  = '*ALLOBJ')
              OR (UPSPAU  = '*SECADM'))
      ORDER BY UPSYST, UPUPRF
```

We selected the fields:

UPSYST System

UPUPRF User Profile Name

UPSPAU Special Authorities

Figure 238 shows the printout that we obtained after running the query using the data in our NETUSRPRF file.

```
                          Special
System    User        Authorities
--------  ----------  --------------------------
RCHASM02  NGP         *SECADM
          ENGELB      *ALLOBJ
          TETTENB     *ALLOBJ
          HELMUT      *ALLOBJ
          MARCELA     *ALLOBJ


RCHASM03  JIM         *ALLOBJ


RCHAS040  MARCELA     *ALLOBJ
```

*Figure 238. Users with Special Authority *ALLOBJ or *SECADM*

Where is ADAN?

To answer this question, we created the SQL/400 query *WHEREIS* in library GG244372:

```
SELECT
      UPSYST, UPUPRF
      FROM "GG244372"/"NETUSRPRF"
      WHERE (UPUPRF  = 'ADAN')
```

We selected the fields:

UPSYST System

UPUPRF User Profile Name

Figure 239 shows the printout that we obtained after running the query using the data in our NETUSRPRF file.

```
System    User
--------  ----------
RCHASM02  ADAN
RCHASM03  ADAN
RCHAS040  ADAN
```

Figure 239. Where is ADAN?

Who are the Users with More than Two Invalid Sign-on Attempts?

To answer this question, we created the SQL/400 query *INVSIGNON* in library GG244372:

```
SELECT
      UPSYST, UPUPRF, UPNVSA
      FROM "GG244372"/"NETUSRPRF"
      WHERE (UPNVSA  > 2)
      ORDER BY UPSYST, UPNVSA DESC, UPUPRF
```

We selected the fields:

UPSYST System

UPUPRF User Profile Name

UPNVSA Sign-on attempts not valid

Figure 240 shows the printout that we obtained after running the query using the data in our NETUSRPRF file.

```
                      Sign-on Attempts
System    User           Not Valid
--------  ----------  ----------------
RCHASM02  ITSCID13                   7
          ITSCID04                   6
          ALAIN                      5
                                      *
RCHAS040  OCCLAB01                   3
                    *
```

Figure 240. Users with More than Two Invalid Sign-on Attempts

Who are the Users Using More than 500KB of Disk Storage?

To answer this question, we created the SQL/400 query *STORAGE* in library GG244372:

```
SELECT
      UPSYST, UPMXSU, UPUPRF
      FROM "GG244372"/"NETUSRPRF"
      WHERE (A.UPMXSU  > 500000)
      ORDER BY UPSYST, UPMXSU DESC, UPUPRF
```

We selected the fields:

UPSYST System

UPUPRF User Profile Name

UPMXSU Storage Used

Figure 241 on page 401 shows the printout that we obtained after running the query using the data in our NETUSRPRF file.

```
                                Storage
System                           Used    User
--------  ------------------------  ----------
RCHASMO2                 3,298,529   QSYS
                         1,765,365   QSECOFR
                           630,563   QDFTOWN
                           588,895   QPGMR
                           527,355   CRAIG
          ------------------------
        *                6,810,707

RCHASMO3                 1,200,942   QSYS
          ------------------------
        *                1,200,942

RCHASO40                 1,219,598   QSYS
                           506,032   QSECOFR
          ------------------------
        *                1,725,630
```

Figure 241. Users with More than 500KB of Storage Used

Working with SMT Network Attributes - Example

The purpose of this example is to use Operations Control Center/400 to implement functions equivalent to those provided by the following SMT commands:

- Change SMT Network Attributes (CHGSMTNETA)
- Display SMT Network Attributes (DSPSMTNETA)
- Get SMT Network Attributes (GETSMTNETA)

We modified original SMT commands and programs to implement two commands that you can find in the redbook library (GG245372):

- Change OCC Network Attribute (CHGOCCNETA)
- Display OCC Network Attribute (DSPOCCNETA)

Due to resource constraints, we were not able to enhance the original SMT code to support new network attributes, node lists, nodes in multiple networks (multiple network IDs), start time on managed system, activity start time, and so on. Use this section as an example of how you can implement system management functions using the Operations Control Center/400 infrastructure.

Change OCC Network Attributes (CHGOCCNETA Command)

Use the CHGOCCNETA command to change network attributes on one or more managed systems in the central site system's network. After the network attributes are changed on the managed system, they are automatically retrieved into the network attributes database at the central site system.

This command is based on the CHGSMTNETA command.

Limitations: This command has the following limitations:

- All of the managed systems must be in the same network as the central site system (only the central site system network ID is supported).
- New network attributes added after OS/400 V2R1 are not supported (but you can enhance the source code provided with this redbook to support new network attributes).

- New parameters in Operations Control Center/400 change requests activities are not supported (node list, schedule date and time, and so on).

You can enhance this command and customize it to your specific needs.

CHGOCCNETA Implementation

Before you can use the CHGOCCNETA command, you must:

1. Distribute the redbook library GG244372 to the managed systems as discussed in “Sending the Redbook Library” on page 98.
2. Create a catalog entry on each managed system using the command:

   ```
   RUNSMGCMD CMD(ADDDSTCLGE GLBNAME(*NETID *CPNAME SMTNA QAMTNA) +
   OBJTYPE(*FILE) OBJ(GG244372/QAMTNA) TEXT('NETA database on  +
   managed system')) NODL(GG244372/PRODUCTION) USRPRF(ADAN) PASSWORD()
   ```

   An entry such as the one shown in Figure 242 should be created on the managed system.

```
                         Work with DST Catalog Entries
                                                          System:   RCHASM03
Type options, press Enter.
  1=Add   3=Copy DST repository object   4=Remove   5=Display detail
  6=Print detail   8=Display token attributes
Opt     Global Name

        ITSCNET RCHASM03 SMTNA QAMTNA
        ITSCNET RCHASM03 SUMMARY APPL1
        ITSCNET RCHASM03 SUMMARY APPL2
        I3IBM1 AS400 9AOCC02 V1R0M0 BASE ALL ALL REF 001 V3R1M0
```

Figure 242. Catalog Entry for Network Attributes Database (QAMTNA) on Managed System

3. Create a catalog entry at the central site for each managed system. Each entry points to a member in the central site network attributes database (GG244372/QAMTNA at the central site).

   At the central site, for each managed system, enter the command:

   ```
   ADDDSTCLGE GLBNAME(*NETID RCHASM03 SMTNA QAMTNA) OBJTYPE(*FILE) +
   OBJ(GG244372/QAMTNA) MBR(RCHASM03) TEXT('RCHASM03 Network Attributes')
   ```

   Entries such as the ones shown in Figure 243 on page 403 should be added to the catalog on the central site system.

```
                        Work with DST Catalog Entries
                                                          System:   RCHASM02
Type options, press Enter.
  1=Add   3=Copy DST repository object   4=Remove   5=Display detail
  6=Print detail   8=Display token attributes
Opt     Global Name

        ITSCNET RCHASM02 SUMMARY APPL1
        ITSCNET RCHASM03 SMTNA QAMTNA
        ITSCNET RCHASM03 SUMMARY APPL1
        ITSCNET RCHASM03 SUMMARY APPL2
        ITSCNET RCHAS040 SMTNA QAMTNA
        ITSCNET RCHAS040 SUMMARY APPL1
        ITSCNET RCHAS040 SUMMARY APPL2
        ITSCNET RCHAS040 SUMMARY APPL3
        I3IBM1 AS400 9AOCC01 V1R0M0 BASE ALL ALL REF 001 V3R1M0
        I3IBM1 AS400 9AOCC02 V1R0M0 BASE ALL ALL REF 001 V3R1M0
```

Figure 243. Catalog Entry for Network Attributes Database (QAMTNA) on Central Site System

Figure 244 shows the objects that comprise the CHGOCCNETA command and the relationship between them.

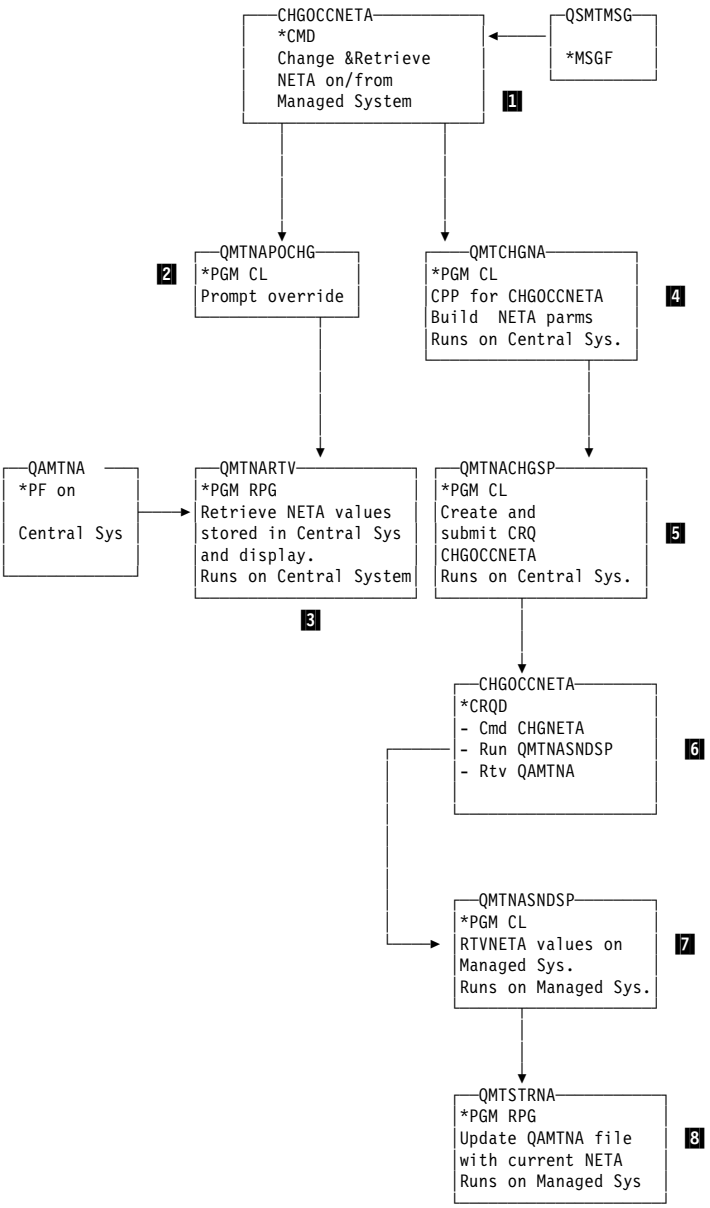

Figure 244. Objects in CHGOCCNETA Command

The following steps describe, at a high level, what takes place when you execute the CHGOCCNETA command:

1. Enter the **1** CHGOCCNETA command and prompt (F4). Fill in the Control Point Name (CPNAME) parameter. If you enter *LIST, you are prompted for the list of control points you want to send the Change Network Attributes (CHGNETA) command to. If you enter a single CP name, the current network attribute values for that particular system are retrieved from the network attributes database (QAMTNA) at the central site system and are displayed.
2. The **2** QMTNAPOCHG prompt override program is called which, in turn, calls **3** QMTNARTV to retrieve the network attributes values from the local (central site system) network attributes database (QAMTNA) if only one CP name was entered; if this is the case, the current values are displayed.

Note: The first time you run the CHGOCCNETA command, no values are stored in the central site network attributes database and, therefore, the current values are not known. Figure 245 on page 405 shows the CHGOCCNETA command display and the current values retrieved for the managed system RCHAS040.

```
                    Change OCC Network Attributes (CHGOCCNETA)

 Type choices, press Enter.

 Control point name . . . . . . . > RCHAS040      Name, *LIST
 Submit job user profile  . . . .   adan          Name, *CURRENT
 Submit job password  . . . . . .                 Name
 Notify user option . . . . . . .   *ERR          *ERR, *YES, *NO
 System name  . . . . . . . . . .   RCHAS040      Name, *SAME
 Default local location name  . .   RCHAS040      Name, *SAME
 Default mode . . . . . . . . . .   BLANK         Name, *SAME
 Maximum conversations  . . . . .   *SAME         2-512, *SAME
 Maximum intermediate sessions  .   00300         0-2000, *SAME
 Route addition resistance  . . .   00255         0-255, *SAME
 Server network ID:
   Network node server  . . . . .   *LCLNETID     Name, *NONE, *LCLNETID
   Control point name . . . . . .   *ANY          Name, *ANY
                + for more values
 Alert status . . . . . . . . . .   *ON           *SAME, *ON, *OFF, *UNAT
 Alert primary focal point  . . .   *NO           *SAME, *NO, *YES
                                                                      More...
F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
F24=More keys
```

Figure 245 (Part 1 of 2). Change OCC Network Attributes (CHGOCCNETA) Command

```
                    Change OCC Network Attributes (CHGOCCNETA)

 Type choices, press Enter.

 Alert default focal point  . . .   *NO           *SAME, *NO, *YES
 Alert logging status . . . . . .   *NONE         *SAME, *NONE, *LOCAL, *
 Alert controller description . .   *NONE         Name, *SAME, *NONE
 Alert hold count . . . . . . . .   00000         0-32767, *SAME, *NOMAX
 Message queue  . . . . . . . . .   QSYSOPR       Name, *SAME
   Library  . . . . . . . . . . .     QSYS        Name, *LIBL, *CURLIB
 Output queue . . . . . . . . . .   QPRINT        Name, *SAME
   Library  . . . . . . . . . . .     QGPL        Name, *LIBL, *CURLIB
 Network job action . . . . . . .   *FILE         *SAME, *REJECT, *FILE..
 Maximum hop count  . . . . . . .   00016         1-255, *SAME
 DDM request access . . . . . . .   *OBJAUT       Name, *SAME, *REJECT, *
   Library  . . . . . . . . . . .                 Name, *LIBL, *CURLIB
 PC support request access  . . .   *OBJAUT       Name, *SAME, *REJECT, *
   Library  . . . . . . . . . . .                 Name, *LIBL, *CURLIB


                                                                     Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 245 (Part 2 of 2). Change OCC Network Attributes (CHGOCCNETA) Command

3. The Command Processing Program **4** QMTCHGNA is called. It parses the parameters entered in the command display and calls QMTNACHGSP, passing the parsed values as a parameter in the call.
4. **5** QMTNACHGSP receives the parsed parameters and builds and executes the commands to:
   a. Create the **6** CRQD CHGOCCNETA.

b. Add a command change request activity to run the CHGNETA command with the new values on the managed system or systems.
c. Add an object change request activity to *run* the program QMTNASNDSP on the managed system.
d. Add an object change request activity to *retrieve* the updated network attributes database (QAMTNA) from the managed system to the central site system.
e. Submit the CRQD CHGOCCNETA previously created.

5. The program **7** QMTNASNDSP retrieves the new values for the network attributes on the managed system and calls QMTSTRNA.
6. The program **8** QMTSTRNA updates the managed managed system network attributes database (QAMTNA) with the new network attributes values.
7. After the CRQ CHGOCCNETA has successfully run on the managed systems, the network attributes are updated with the values you specified in the CHGOCCNETA command and the central site network attributes database is updated with the information from the remote sites.

You can track the progress of the submitted change request CHGOCCNETA using the command:

```
WRKSBMCRQA (CHGOCCNETA 000010)
```

Figure 246 shows the status of the change request activities for the CRQ CHGOCCNETA.

```
                        Work with Submitted CRQ Activities
                                                                System:   RCHASM02
 Change request  . . . . . :   CHGOCCNETA
   Number  . . . . . . . . :     000010
 Text  . . . . . . . . . . :



 Type options, press Enter.
   3=Hold   5=Display details   6=Release   8=Work with nodes for activity
   10=Display messages          13=End

                                                                          Highest
      Activity                                                              End
 Opt  Name        Type        Node               Status                   Code
      QACT000010  *CMD        ITSCNET.RCHAS040   Ended                     00
      QACT000020  *OBJ        ITSCNET.RCHAS040   Ended                     00
      QACT000030  *OBJ        ITSCNET.RCHAS040   Running
                                                                            Bottom
 Parameters or command

 ===>
 F3=Exit   F4=Prompt      F5=Refresh   F6=Print list     F9=Retrieve
 F11=Display conditions   F12=Cancel   F17=Position to   F24=More keys
```

Figure 246. WRKSBMCRQA for CHGOCCNETA

Display OCC Network Attributes (DSPOCCNETA Command)

Use the DSPOCCNETA command to display a network attribute on one or more selected systems in the central site system network. The network attribute information was previously retrieved using the CHGOCCNETA command and stored in a member of the physical file QAMTNA (one member per managed system).

This command is based on the DSPSMTNETA command.

Limitations: This command has the following limitations:

- All of the managed systems must be in the same network as the central site system (only the central site network ID is supported).
- New network attributes added after OS/400 V2R1 are not supported (but you can enhance the source code provided with this redbook to support new network attributes).

Use this command as an example and customize it to your specific needs.

DSPOCCNETA Implementation

Figure 247 shows the objects that comprise the DSPOCCNETA command and the relationship between them.

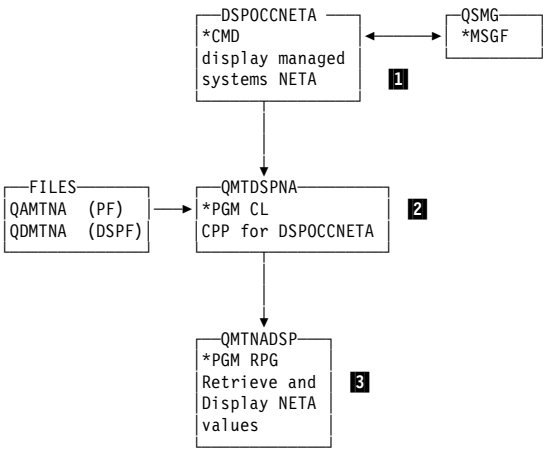

Figure 247. Objects in DSPOCCNETA Command

The following steps describe at a high level what takes place when you execute the DSPOCCNETA command:

1. Enter the **1** DSPOCCNETA command and prompt (F4). You can enter a single CP name or a list of CP names.

```
                    Display OCC Network Attributes (DSPOCCNETA)

 Type choices, press Enter.

 Control point name . . . . . . .   rchas040      Name
                + for more values   rchasm03
```

Figure 248. Display OCC Network Attributes (DSPOCCNETA) Command

2. The command processing program **2** QMTDSPNA is called. This program performs the file override and calls QMTNADSP.
3. The RPG program **3** QMTNADSP retrieves the network attribute values for the managed system or systems specified in the DSPOCCNETA command and displays the values as shown in Figure 249. The network attribute information has been previously stored in the file QAMTNA in the library GG244372 on the central site system by the command CHGOCCNETA.

```
                        Display OCC Network Attributes
                                                          System:   RCHASM02
Network system  . . . . . . . . . . :   RCHAS040
Last update . . . . . . . . . . . . :   12/26/94    16:06:57

Current system name . . . . . . . . :   RCHAS040
  Pending system name . . . . . . . :   RCHAS040
Local network ID  . . . . . . . . . :   ITSCNET
Local control point name  . . . . . :   RCHAS040
Default local location  . . . . . . :   RCHAS040
Default mode  . . . . . . . . . . . :   BLANK
Maximum number of conversations for
  a remote location . . . . . . . . :       0
APPN node type  . . . . . . . . . . :   *NETNODE
Maximum number of intermediate
  sessions  . . . . . . . . . . . . :     300
Route addition resistance . . . . . :     255


Press Enter to continue.                                            More...
```

Figure 249 (Part 1 of 3). Display OCC Network Attributes (DSPOCCNETA) Command

```
                        Display OCC Network Attributes
                                                          System:   RCHASM02
Network system  . . . . . . . . . . :   RCHAS040
Last update . . . . . . . . . . . . :   12/26/94    16:06:57

Network server ID/control point name:  *LCLNETID   *ANY

Alert Status  . . . . . . . . . . . :   *ON
Alert primary focal point . . . . . :   *NO
Alert default focal point . . . . . :   *NO
Alert logging status  . . . . . . . :   *NONE
Alert controller description  . . . :   *NONE
Alert hold count  . . . . . . . . . :   00000





Press Enter to continue.                                            More...
```

Figure 249 (Part 2 of 3). Display OCC Network Attributes (DSPOCCNETA) Command

```
                         Display OCC Network Attributes
                                                                System:   RCHASM02
 Network system  . . . . . . . . . . :   RCHAS040
 Last update . . . . . . . . . . . . :   12/26/94    16:06:57

 Message queue . . . . . . . . . . . :   QSYSOPR
   Library . . . . . . . . . . . . . :     QSYS
 Output queue  . . . . . . . . . . . :   QPRINT
   Library . . . . . . . . . . . . . :     QGPL
 Job action  . . . . . . . . . . . . :   *FILE
 Maximum hop count . . . . . . . . . :      35
 DDM request access  . . . . . . . . :   *OBJAUT
 PC support request access . . . . . :   *OBJAUT





 Press Enter to continue.                                            Bottom
```

Figure 249 (Part 3 of 3). Display OCC Network Attributes (DSPOCCNETA) Command

Working with SMT System Values - Example

The purpose of this example is to use Operations Control Center/400 to implement functions equivalent to those provided by the following SMT commands:

- Get SMT System Values (GETSMTSYSV)
- Work with SMT System Values (WRKSMTSYSV)
- Change SMT System Values (CHGSMTSYSV)

We modified original SMT commands and programs to implement three commands that you can find in the redbook library (GG245372):

- Get OCC System Values (GETOCCSYSV)
- Work with OCC System Values (WRKOCCSYSV)
- Change OCC System Values (CHGOCCSYSV)

Due to resource constraints, we were not able to enhance the original SMT code to support new system values, node lists, nodes in multiple networks (multiple network IDs), start time on managed system, activity start time, and so on. Use this section as an example of how you can implement system management functions using the Operations Control Center/400 infrastructure.

Get OCC System Values (GETOCCSYSV Command)

Use the GETOCCSYSV command to retrieve all of the system value data from one or more managed systems in the central site system's network.

This command allows you to retrieve all of the system value data from the specified managed system or systems. The system value information is stored on the central site system in a file named QAMTSV in the GG244372 library. Each member of the QAMTSV file at the central site contains system value data for a managed system. The system values are displayed or changed using the WRKOCCSYSV or CHGOCCSYSV commands.

This command is based on the GETSMTSYSV command.

Limitations: This command has the following limitations:

- All of the managed systems must be in the same network as the central site system (only the central site network ID is supported).
- New system values added after OS/400 V2R1 are not supported (but you can enhance the source code provided with this redbook to support new network attributes).
- New parameters in Operations Control Center/400 change requests activities are not supported (node list, schedule date and time, and so on).

The original programs were written before the Retrieve System Values (QWCRSVAL) API was available and, therefore, do not take advantage of this API. You can enhance this command and customize it to your specific needs.

GETOCCSYSV Implementation

Before you can use the GETOCCSYSV command, you must:

1. Distribute the redbook library GG244372 to the managed systems as discussed in "Sending the Redbook Library" on page 98.
2. Create a catalog entry on each managed system using the command:

   ```
   RUNSMGCMD CMD(ADDDSTCLGE GLBNAME(*NETID *CPNAME SMTSV QAMTSV) +
   OBJTYPE(*FILE) OBJ(GG244372/QAMTSV) TEXT('SYSV database on  +
   managed system')) NODL(GG244372/PRODUCTION) USRPRF(ADAN) PASSWORD()
   ```

   An entry such as the one shown in Figure 250 should be created on the managed system.

```
                         Work with DST Catalog Entries
                                                          System:   RCHASM03
Type options, press Enter.
  1=Add   3=Copy DST repository object   4=Remove   5=Display detail
  6=Print detail   8=Display token attributes
Opt     Global Name

        ITSCNET RCHASM03 SMTSV QAMTSV
        ITSCNET RCHASM03 SUMMARY APPL1
        ITSCNET RCHASM03 SUMMARY APPL2
        I3IBM1 AS400 9AOCC02 V1R0M0 BASE ALL ALL REF 001 V3R1M0
```

Figure 250. Catalog Entry for System Values Database (QAMTSV) on Managed System

3. Create a catalog entry at the central site for each managed system. Each entry points to a member in the central site system values database (GG244372/QAMTSV at the central site).

   At the central site for each managed system, enter the command:

   ```
   ADDDSTCLGE GLBNAME(*NETID RCHASM03 SMTSV QAMTSV) OBJTYPE(*FILE) +
   OBJ(GG244372/QAMTSV) MBR(RCHASM03) TEXT('RCHASM03 System Values')
   ```

   Entries such as the ones shown in Figure 251 on page 411 should be added to the catalog on the central site system.

```
                         Work with DST Catalog Entries
                                                          System:   RCHASM02
Type options, press Enter.
  1=Add   3=Copy DST repository object   4=Remove   5=Display detail
  6=Print detail   8=Display token attributes
Opt     Global Name

        ITSCNET RCHASM02 SUMMARY APPL1
        ITSCNET RCHASM03 SMTSV QAMTSV
        ITSCNET RCHASM03 SUMMARY APPL1
        ITSCNET RCHASM03 SUMMARY APPL2
        ITSCNET RCHAS040 SMTSV QAMTSV
        ITSCNET RCHAS040 SUMMARY APPL1
        ITSCNET RCHAS040 SUMMARY APPL2
        ITSCNET RCHAS040 SUMMARY APPL3
        I3IBM1 AS400 9AOCC01 V1R0M0 BASE ALL ALL REF 001 V3R1M0
        I3IBM1 AS400 9AOCC02 V1R0M0 BASE ALL ALL REF 001 V3R1M0
```

Figure 251. Catalog Entry for System Values Database (QAMTSV) on Central Site System

Figure 252 shows the objects that comprise the GETOCCSYSV command and the relationship between them.

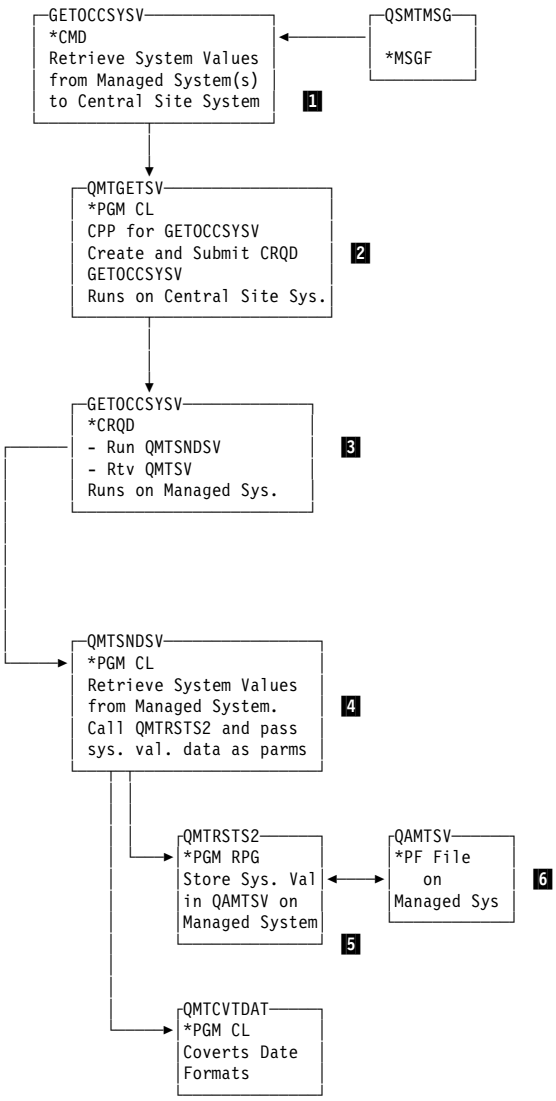

Figure 252. Objects in GETOCCSYSV Command

The following steps describe, at a high level, what takes place when you execute the GETOCCSYSV command:

1. Enter the **1** GETOCCSYSV command and prompt (F4).

```
                        Get OCC System Values (GETOCCSYSV)

 Type choices, press Enter.

 Control point name . . . . . . . > RCHASM03      Name
                 + for more values > RCHASM04
 Submit job user profile  . . . .   ADAN          Name, *CURRENT
 Submit job password  . . . . . .                 Name
 Notify user option . . . . . . .   *ERR          *ERR, *YES, *NO
```

Figure 253. GETOCCSYSV Command

   Enter the list of managed system you want to retrieve system values data from.

   Note: The Submit job user profile, Submit job password, and Notify user option parameters are inherited from the GETSMTSYSV command and are ignored in this command.

2. The **2** QMTGETSV Command Processing Program is invoked. This program creates, adds activities to, and submits the change request description GETOCCSYSV.
3. The **3** GETOCCSYSV CRQD contains activities to:
   - Run the program QMTSNDSV on the managed systems.
   - Retrieve system values data from the managed systems to the central site system.
4. The program **4** QMTSNDSV is run by the change request GETOCCSYSV on the managed systems. This program retrieves the system values on the managed system and calls the program QMTRSTS2.
5. The RPG program **5** QMTRSTS2 stores the system values data in GG244372/QAMTSV **6** on the managed system.
6. The last activity in the CHGOCCSYSV CRQ retrieves the system values data from the managed systems into members of QAMTSV on the central site system.

Use the Work with Submitted CRQ (WRKSBMCRQ) command to track the progress of the CRQ GETOCCSYSV created and submitted by the GETOCCSYSV command:

```
WRKSBMCRQ CRQ(GETOCCSYSV)
```

Select option 8, Work with Activities, to follow the progress of each activity in the change request.

```
                      Work with Submitted CRQ Activities
                                                                System:   RCHASM02
Change request  . . . . . :   GETOCCSYSV
  Number  . . . . . . . . :     000010
Text  . . . . . . . . . . :


Type options, press Enter.
  3=Hold   5=Display details   6=Release   8=Work with nodes for activity
  10=Display messages          13=End

                                                                        Highest
     Activity                                                             End
Opt  Name        Type        Node                Status                 Code
     QACT000010  *OBJ        ITSCNET.RCHASM...   Ended                   00
     QACT000020  *OBJ        ITSCNET.RCHASM...   Running
```

Figure 254. Change Request GETOCCSYSV Submitted by the GETOCCSYSV Command

Work with OCC System Values (WRKOCCSYSV Command)

Use the WRKOCCSYSV command to work with system values from one or more managed systems in the network. The WRKOCCSYSV command is used to display a list of system values for a selected system; from this list you can select the system values to display or change. The system values data was previously retrieved and stored on the central site system using the GETOCCSYSV command. The information is stored in the system values database QAMTSV in the library GG244372 on the central site system.

This command is based on the Work with SMT System Values (WRKSMTSYSV) command.

Limitations: This command has the following limitations:

- All of the managed systems must be in the same network as the central site system (only the central site network ID is supported).
- New system values added after OS/400 V2R1 are not supported (but you can enhance the source code provided with this redbook to support new system values).
- New parameters in Operations Control Center/400 change requests activities are not supported (node list, schedule date and time, and so on).

The original programs were written before the Retrieve System Values (QWCRSVAL) API was available and, therefore, do not take advantage of this API. You can enhance this command and customize it to your specific needs.

WRKOCCSYSV Implementation

Before you can use the WRKOCCSYSV command, you must execute the GETOCCSYSV command to retrieve the system values data from the managed systems into the members of the system values database (QAMTSV) on the central site system. Refer to “GETOCCSYSV Implementation” on page 410 for information on how to use the GETOCCSYSV command. Figure 255 shows the objects that comprise the WRKOCCSYSV command and the relationship between them.

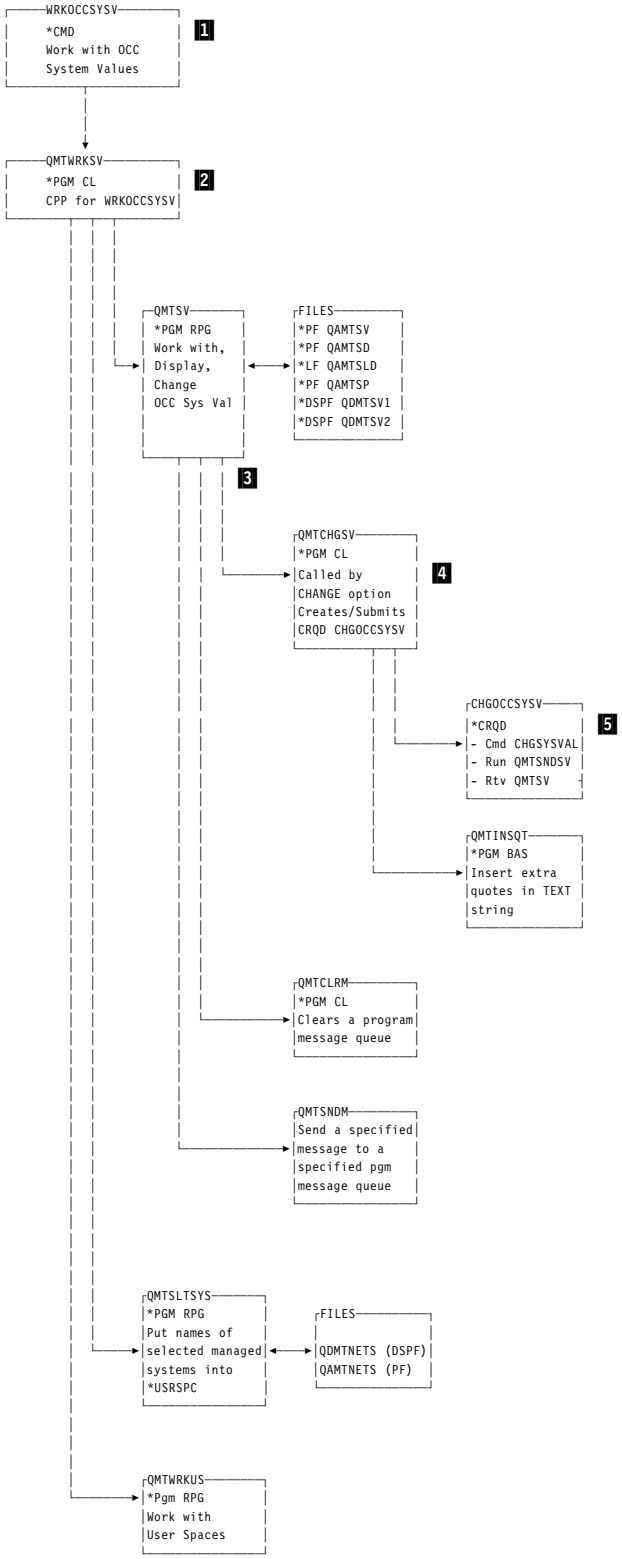

Figure 255. Objects in WRKOCCSYSV Command

The following steps describe, at a high level, what takes place when you execute the WRKOCCSYSV command:

1. Enter the **1** WRKOCCSYSV command and prompt (F4).

```
                    Specify More Values for Parameter CPNAME

Type choices, press Enter.

Control point name . . . . . . . > RCHASM03      Name
                                   RCHAS040
```

Figure 256. WRKOCCSYSV Command

Enter the list of managed systems for which you want work with system values data.

2. The **2** QMTWRKSV Command Processing Program is invoked. This program calls the RPG program QMTSV.
3. The **3** QMTSV program displays the list of system values for the first managed system.

```
                         Work with OCC System Values
                                                              System:   RCHASM02
Control point  . . . . :   RCHASM03
Record last updated  . :   12/21/94  14:34:54
Subset by Type . . . . .   *ALL      F4 for list

Type options, press Enter.
  2=Change   5=Display

        System
Option  Value       Type     Description
        QABNORMSW   *SYSCTL  Previous end of system indicator
        QACGLVL     *MSG     Accounting level
        QACTJOB     *ALC     Initial number of active jobs
        QADLACTJ    *ALC     Additional number of active jobs
        QADLSPLA    *ALC     Spooling control block additional storage
        QADLTOTJ    *ALC     Additional number of total jobs
        QAUDLVL     *SEC     Security auditing level
        QAUTOCFG    *SYSCTL  Autoconfigure devices
        QAUTOVRT    *SEC     Autoconfigure virtual devices
```

Figure 257. WRKOCCSYSV Command

You can select to subset the system values by type; for example, on the next display, we are subsetting by type *LIBL (library list).

```
                         Work with OCC System Values
                                                              System:   RCHASM02
Control point  . . . . :   RCHASM03
Record last updated  . :   12/21/94  14:34:54
Subset by Type . . . . .   *LIBL     F4 for list

Type options, press Enter.
  2=Change   5=Display

        System
Option  Value       Type     Description
        QSYSLIBL    *LIBL    System part of the library list
  5     QUSRLIBL    *LIBL    User part of the library list
```

*Figure 258. WRKOCCSYSV Subset by *LIBL*

4. Select option 5, Display, for the system value that you want to check. The following display appears:

```
                          Display SMT System Value
                                                                System:   RCHASM02
 Control point  . . . . :  RCHASM03
 System Value . . . . . :  QUSRLIBL
 Description  . . . . . :  User part of the library list

 Library           Library           Library           Library
 TEZCMDS
 QGPL
 QTEMP
```

Figure 259. Option 5, Display

5. Return to the previous display (press Enter) and select option 2, Change, to change the QUSRLIBL system value.
6. Enter the user profile and password to be used when executing the Change System Value (CHGSYSVAL) command on the managed system. The display in Figure 260 is shown.

```
                     Submit Job User Profile and Password
                                                                System:   RCHASM02

 Type submit job user profile and password, and press Enter.


 Submit job user profile . . . . . ADAN
 Submit job password . . . . . .





 Note:  Profile and password are the same as the last time entered.
```

Figure 260. Change System Value

7. Enter the new value for QUSRLIBL system value as shown in Figure 261.

```
                          Change SMT System Value
                                                                System:   RCHASM02
 Control point  . . . . :  RCHASM03
 System Value . . . . . :  QUSRLIBL
 Description  . . . . . :  User part of the library list

 Type choices, press Enter.

 Library           Library           Library           Library
 TEZCMDS
 QGPL
 QTEMP
 GG244372
```

Figure 261. Change System Value QUSRLIBL

You receive the following message indicating that your request has been submitted:

```
Change request for system value QUSRLIBL has been sent to system RCHASM03
```

8. When you request to change a system value, the program **4** QMTCHGSV is called; this program creates and submits the change request description CHGOCCSYSV.
9. The CRQD **5** includes the following activities:

- Run the CHGSYSVAL command on the managed system.
- Run the program QMTSNDSV to store the new system values in the file named QAMTSV in library GG244372 on the managed system.
- Retrieve the file QAMTSV into the corresponding member of QAMTSV on the central site system.

10. You can track the progress of the submitted change request using the WRKSBMCRQ command. Figure 262 shows the status of the activities in the submitted change request CHGOCCSYSV.

```
                        Work with Submitted CRQ Activities
                                                                System:   RCHASM02
 Change request  . . . . . :   CHGOCCSYSV
   Number  . . . . . . . . :     000040
 Text  . . . . . . . . . . :


 Type options, press Enter.
   3=Hold   5=Display details   6=Release   8=Work with nodes for activity
   10=Display messages          13=End

                                                                        Highest
     Activity                                                             End
 Opt Name        Type        Node                Status                 Code
     QACT000010  *CMD        ITSCNET.RCHASM03    Ended                   00
     QACT000020  *OBJ        ITSCNET.RCHASM03    Running
     QACT000030  *OBJ        ITSCNET.RCHASM03    Wait
```

Figure 262. Work with Submitted CRQ Activities (WRKSBMCRQA)

Change OCC System Value (CHGOCCSYSV Command)

Use the CHGOCCSYSV command to change a system value on one or more selected managed systems in the central site system network.

Some system values accept object names and library names. If the system values are qualified, use blanks to separate the object and library names, and enclose the value in apostrophes. Apostrophes are necessary only when the library or *LIBL is specified with the object name.

This command is based on the Change SMT System Value (CHGSMTSYSV) command.

Limitations: This command has the following limitations:

- All of the managed systems must be in the same network as the central site system (only the central site network ID is supported).
- New system values added after OS/400 V2R1 are not supported (but you can enhance the source code provided with this redbook to support new system values).
- New parameters in Operations Control Center/400 change requests activities are not supported (node list, schedule date and time, and so on).

The original programs were written before the Retrieve System Values (QWCRSVAL) API was available and, therefore, do not take advantage of this API. You can enhance this command and customize it to your specific needs.

CHGOCCSYSV Implementation

Figure 263 shows the objects that comprise the CHGOCCSYSV command and the relationship between them.

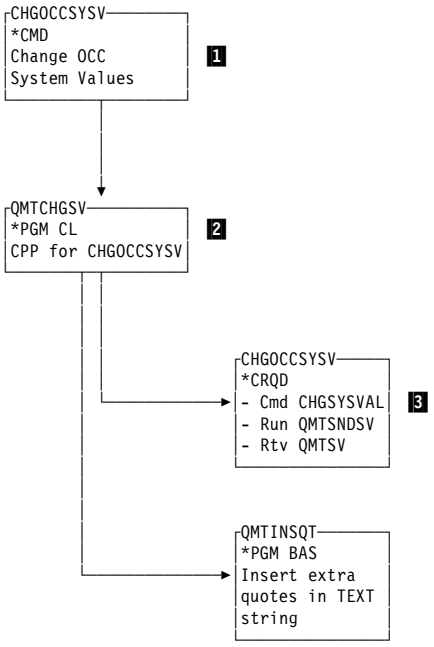

Figure 263. Objects in CHGOCCSYSV Command

The following steps describe, at a high level, what takes place when you execute the CHGOCCSYSV command:

1. Enter the **1** CHGOCCSYSV command and prompt (F4).

```
                    Change OCC System Value (CHGOCCSYSV)

 Type choices, press Enter.

 System value . . . . . . . . . . > QUSRLIBL     QACGLVL, QACTJOB, QADLA
 Control point name . . . . . . . > *LIST         Name, *LIST
 Submit job user profile  . . . . > ADAN          Name, *CURRENT
 Submit job password  . . . . . . >               Name
 New value  . . . . . . . . . . . > 'QGPL QTEMP GG244372'





 Control point list . . . . . . . > RCHASM03      Name
                + for more values > RCHAS040
 Notify user option . . . . . . .   *ERR          *ERR, *YES, *NO

                                                                    Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Figure 264. Change OCC System Value (CHGOCCSYSV) Command

Enter the system value you want to change (QUSRLIBL in our example), the CP name of the managed system or *LIST for a list of managed systems, the user profile and password under which the change is executed on the

managed system, and the new value for the system value that you are changing.

Note that the CHGOCCSYSV command allows you to change a single system value in multiple managed systems at the same time. You can use the WRKOCCSYSV command option 2, Change, to change a system value on a single managed system.

Note: The Notify user option parameter is inherited from the CHGSMTSYSV command and is ignored in this command.

2. The **2** QMTCHGSV Command Processing Program is invoked. This is the same program used in the WRKOCCSYSV command. See Figure 255 on page 414. This program creates and submits the change request description CHGOCCSYSV.
3. The CRQD **3** includes the following activities:
   - Run the CHGSYSVAL command on the managed system.
   - Run the program QMTSNDSV to store the new system values in the file named QAMTSV in library GG244372 on the managed system.
   - Retrieve the file QAMTSV into the corresponding member of QAMTSV at the central site system.
4. You can track the progress of the submitted change request using the WRKSBMCRQA command. Figure 265 shows the status of the activities in the submitted change request CHGOCCSYSV.

```
                      Work with Submitted CRQ Activities
                                                                System:   RCHASM02
Change request  . . . . . .:   CHGOCCSYSV
  Number  . . . . . . . . .:     000060
Text  . . . . . . . . . . .:


Type options, press Enter.
  3=Hold   5=Display details   6=Release   8=Work with nodes for activity
  10=Display messages          13=End

                                                                        Highest
     Activity                                                             End
Opt  Name        Type        Node               Status                  Code
     QACT000010  *CMD        ITSCNET.RCHASM...  Ended                    00
     QACT000020  *OBJ        ITSCNET.RCHASM...  Ended                    00
     QACT000030  *OBJ        ITSCNET.RCHASM...  Running

Parameters or command                                                    Bottom
===>
F3=Exit   F4=Prompt      F5=Refresh   F6=Print list     F9=Retrieve
F11=Display conditions   F12=Cancel   F17=Position to   F24=More keys
(C) COPYRIGHT IBM CORP. 1990, 1994.
```

Figure 265. Tracking the Status of the CRQ CHGOCCSYSV with the WRKSBMCRQA Command

Chapter 10. Problem Determination

Using a hypothetical example of the type ″Whatever *can* go wrong, *will* go wrong″, we describe in this chapter how you can do problem determination for various types of errors. We do that by going through the various states that a change request activity can have.

“Using Journal QCQJMJRN in QUSRSYS” on page 445 and “Database Files Used By System Manager/400” on page 447 describe additional sources of information for doing problem determination.

Various States of a Change Request Activity

As a guideline in this chapter, we use the status of a change request activity. During the lifetime of a submitted change request, each CRQ activity for each destination node can have different states at the various points of time. The final objective is, of course, to end all activities at all nodes successfully. In this case, however, we do not need any problem determination. All other states are caused by one of the following reasons:

- Either there is still work to be done (including waiting for a condition or certain scheduled time) before ending,
- Or there is a problem that has to be solved.

In this chapter, we explain possible reasons for the latter. At any time, a change request activity is in one of these states for each node defined in the activity:

Status	Description
Wait	The activity is waiting for one or more conditions specified in the activity to be met.
Ready	The activity is ready to be started. Conditions and schedules (if any) are met.
Running	The activity for this node was submitted to an SVDS distribution queue. It may be: • Waiting to be sent to the managed system. • Waiting to be processed by MSS at the managed system. • Currently being processed by MSS and actually ″running″. • Response is waiting to be sent to central site system. • Response is waiting to be processed by central site system MSS.
Scheduled	The activity is either waiting for the scheduled start time or one or more conditions need to be met.
Started	Processing of the activity has started at the central site system.
Not Started	The activity was not processed by the application because there is an error.
Held	The activity is held by the user.
Ending	A user tried to end the activity for a node that was in Started or Running status. The end is in progress.
Ended	The activity running at this node has ended.

Notes:

1. Each change request activity can be in a different status for each destination node. The Work with Submitted CRQ Activities (WRKSBMCRQA) display also shows a status for a CRQA representing the states of *all* nodes. While this status typically is the node having the most important or most critical status, keep in mind that all other nodes might be in a different status. Only the status ″ended″ for an activity means *all* nodes have been ended.
2. The Work with Submitted CRQs (WRKSBMCRQ) display shows a status for the entire change request, that is, for all activities. The possible CRQ states are ″Submitting″, ″Active″, and ″Ended″. Again, this summarizes the states of *all* activities (for *all* nodes).

When a CRQA finally has reached the End status, an end code explains *how* or *why* that activity was ended:

End Code	Meaning of End Code
00	Activity completed successfully
01-09	Activity with warning messages
10-29	Activity started running but failure occurred
30-39	Activity started running but was ended (activity or job)
30	Ended using *CNTRLD option
35	Ended using *IMMED option
39	Ended using *FRCFAIL option
40-49	Error detected by application before performing the function
40	Activity was not run for security reasons (at the central site or at the managed system)
90-99	Activity was not run because conditions or schedules were not met
95	Scheduled start time expired
99	Conditions cannot be met

Work with Submitted CRQ Activities (WRKSBMCRQA)

Assume that you have done the following:

- Created a CRQD (see “Create a Change Request Description (CRTCRQD)” on page 146) with the name SNDDTAARA in library GG244372.
- Added a CRQA QACT000010 to send data area MYDTAARA to the managed system RCHAS040.
- Added second CRQA (QACT000020) to change the data area MYDTAARA at system RCHAS040.
- Submitted the CRQ (see “Submitting a Change Request (SBMCRQ)” on page 158).

Now how do we find out what the status is? The easiest way at this point is to use option 12, Work with submitted CRQs, on the Work with CRQ Descriptions display. You can also use the command WRKSBMCRQ (see “Track the Progress of a Submitted Change Request” on page 160). However, option 12 directly displays only those requests based on the CRQD that we just created. You see a display such as the one shown in Figure 266 on page 423.

```
                    Work with Submitted Change Requests
                                                                System:   RCHASM02
Type options, press Enter.
  3=Hold   4=Delete   5=Display details   6=Release   8=Work with activities
  10=Display messages   13=End ...

                                                 Highest  Last
     Change                                        End    End
Opt  Request     Number  Status                   Code    Code
8_   SNDDTAARA   000010  Active

                                                                          Bottom
Parameters or command
===> ____________________________________________________________________________
F3=Exit      F4=Prompt         F5=Refresh   F6=Print list   F11=Display user
F12=Cancel   F17=Position to   F23=More options   F24=More keys
(C) COPYRIGHT IBM CORP. 1990, 1994.
```

Figure 266. Work with Submitted Change Requests (WRKSBMCRQ)

As we described in note 2 on page 422, the status for an entire CRQ is very generic. Status "active" just says the CRQ has been submitted but not yet ended. To find out what the status really is, you can use option 8, Work with activities to see the Work with Submitted CRQ Activities display. If you already know the name and number of the submitted CRQ, you can also enter the Work with Submitted CRQ Activities (WRKSBMCRQA) command on any command line. See Figure 284 on page 433 for an example.

Status = Scheduled

```
                    Work with Submitted CRQ Activities
                                                                System:   RCHASM02
Change request  . . . . . :   SNDDTAARA
  Number  . . . . . . . . :     000010
Text  . . . . . . . . . . :   Send a Data Area to System RCHAS040



Type options, press Enter.
  3=Hold   5=Display details   6=Release   8=Work with nodes for activity
  10=Display messages          13=End

                                                                        Highest
     Activity                                                             End
Opt  Name        Type        Node               Status                  Code
__   QACT000010  *OBJ        ITSCNET.RCHAS040   Scheduled
__   QACT000020  *CMD        ITSCNET.RCHAS040   Scheduled

                                                                          Bottom
Parameters or command
===> ____________________________________________________________________________
F3=Exit   F4=Prompt      F5=Refresh   F6=Print list     F9=Retrieve
F11=Display conditions   F12=Cancel   F17=Position to   F24=More keys
(C) COPYRIGHT IBM CORP. 1990, 1994.
```

Figure 267. Work with Submitted CRQ Activities (WRKSBMCRQA)

The display shown in Figure 267 shows that both activities have the status "scheduled". To keep this example simple, we sent the request to only one node. If there was more than one node, you must use option 8, Work with nodes for activity, to do the problem determination for each node.

The following sections describe some "worst case scenarios" covering as many error conditions as possible. Each section covers the possible error conditions

for one status, so you can go directly to the section describing the status your change request currently has. Reading all of the sections from the beginning to the end also explains what processes are performed by System Manager/400 and Managed System Services/400 ″under the covers″, and should help in solving other problems not described here.

Status scheduled means the activity (for this node) is either waiting for the scheduled start time or one or more conditions need to be met. Look at the conditions first. As described in “Conditions for Starting a Change Request Activity” on page 134, the start of each activity is conditioned upon the end of another activity within the same change request. You can display the conditions for each activity by pressing F11, Display conditions, in the Work with Submitted CRQ Activities display (see Figure 268).

```
                        Work with Submitted CRQ Activities
                                                                System:   RCHASM02
Change request  . . . . . :   SNDDTAARA
  Number  . . . . . . . . :     000010
Text  . . . . . . . . . . :   Send a Data Area to System RCHAS040



Type options, press Enter.
  3=Hold   5=Display details   6=Release   8=Work with nodes for activity
  10=Display messages          13=End


     Activity
Opt  Name        Type        Conditions
     QACT000010  *OBJ
     QACT000020  *CMD        (QACT000010 *EQ *SUCCESS)

                                                                          Bottom
Parameters or command
===> ____________________________________________________________________________
F3=Exit   F4=Prompt      F5=Refresh   F6=Print list     F9=Retrieve
F11=Display conditions   F12=Cancel   F17=Position to   F24=More keys
```

Figure 268. Work with Submitted Change Requests (WRKSBMCRQ)

While we know from Figure 267 on page 423 that both activities have the status ″scheduled″, we can tell from Figure 268 that the first activity is certainly not waiting for any condition to be met because there was no condition specified. So, it should start unless it is ″waiting for the scheduled start time″ (that is, a certain time of day the activity should wait for) before it can start. (See “Scheduling CRQ Activities” on page 135 for more information). You can see the scheduled start time by using option 5, Display details.

```
                    Display Submitted CRQ Activity Details
                                                          System:   RCHASM02
Change request . . . . . . . . . . . . . . . :   SNDDTAARA
  Number . . . . . . . . . . . . . . . . . . :     000010
Activity name  . . . . . . . . . . . . . . . :   QACT000010
Activity text  . . . . . . . . . . . . . . . :   Send  *DTAARA GG244372/MYDTAARA.


Activity type  . . . . . . . . . . . . . . . :   *OBJ
Node . . . . . . . . . . . . . . . . . . . . :   ITSCNET.RCHAS040
Scheduled start:
  Start after date and time  . . . . . . . . :   07/05/94  16:00:00
  Start before date and time . . . . . . . . :   *ANY        *ANY





                                                                      More...
Press Enter to continue.

F3=Exit   F5=Refresh   F9=Display conditions   F10=Display nodes
F11=Display type specific data   F12=Cancel
```

Figure 269. Display Submitted CRQ Activity Details

The Display Submitted CRQ Activity Details display in Figure 269 shows a start time that is exactly the time when we submitted the change request, that is, we did *not* specify any start time. So, our CRQ is supposed to start immediately, but why did it not? Maybe, System Manager/400 does not work properly, ... or we just did not start it! Actually, we overlooked a little warning message when we submitted the CRQ. Looking into the joblog of our interactive job makes it clear (Figure 270).

SMU1607 System Manager/400 Function Not Started

```
                        Additional Message Information

Message ID . . . . . . :   SMU1607       Severity . . . . . . . :   00
Message type . . . . . :   Information
Date sent  . . . . . . :   07/05/94      Time sent  . . . . . . :   16:00:05

Message . . . . :   Not able to process change request SNDDTAARA 000010.
Cause . . . . . :   Change request SNDDTAARA with sequence number 000010 was
  submitted but processing cannot start because the System Manager/400
  function is not started.
Recovery  . . . :   Use the Start System Manager (STRSYSMGR) command to start
  the System Manager/400 function.
```

Figure 270. SMU1607 Not Able to Process Change Request SNDDTAARA 000010

In “Start System Manager (STRSYSMGR Command)” on page 57, we explained how the System Manager/400 must be started. Because it was not started, it was not able to execute our CRQ. Therefore, by entering command STRSYSMGR on the command line of the ″Work with Submitted CRQ Activities″ display, we can start the system manager (STRSYSMGR).

Start System Manager (STRSYSMGR)

When you press F5, Refresh, the most current status is shown.

Status = Ready

After starting the system manager and pressing F5, the new status is shown in Figure 271.

```
                                                                  Highest
     Activity                                                       End
Opt  Name        Type        Node               Status             Code
__   QACT000010  *OBJ        ITSCNET.RCHAS040   Ready
__   QACT000020  *CMD        ITSCNET.RCHAS040   Wait
```

Figure 271. CRQ with Status Ready

Status ready means: ″The activity for this node is ready to be started. Conditions and schedules (if any) are met.″ Again, there was a warning we did not recognize after we started the system manager. This time it was the SMU162C message at the bottom of the display.

SMU162C SystemView Managed System Services/400 Not Active.

The full text of message SMU162C says: (see Figure 272).

```
                        Additional Message Information

 Message ID . . . . . . :   SMU162C       Severity . . . . . . . :   20
 Message type . . . . . :   Information
 Date sent  . . . . . . :   07/05/94      Time sent  . . . . . . :   16:00:30

 Message . . . . :   SystemView Managed System Services/400 not active.
 Cause . . . . . :   SystemView Managed System Services/400 must be active for
   the functions of SystemView System Manager/400 to be fully operational.
 Recovery  . . . :   Use the Start Managed Systems (STRMGDSYS) command to start
   the SystemView Managed System Services/400 function.
```

Figure 272. Work with Submitted Change Requests (WRKSBMCRQ)

The reason why the status changed is: While System Manager/400 performs the scheduling and initially starting of the CRQ (actually, that is, job QNSCRMON - see page 57), Managed System Services/400 really executes and sends the request. So, by entering command STRMGDSYS at the command line, we start Managed System Services.

Start Managed System Services (STRMGDSYS)

After that, waiting some seconds and pressing F5, the new status changes again (see Figure 273).

Status = Started

```
                                                                  Highest
     Activity                                                       End
Opt  Name        Type        Node               Status             Code
__   QACT000010  *OBJ        ITSCNET.RCHAS040   Started
__   QACT000020  *CMD        ITSCNET.RCHAS040   Wait
```

Figure 273. CRQ with Status Started

This status indicates the request is processed by Managed System Services/400, that is, job QCQSVSRV running under user profile of the CRQ's submitter has been started. If the CRQ remains in this status for a longer time, look at that job's job log and check for possible messages in the QSYSOPR message queue. Any error message is most likely caused by a defect in Managed System Services/400.

Status = Running

After waiting some seconds and pressing F5, the new status is shown.

```
                                                                  Highest
     Activity                                                       End
Opt  Name        Type        Node                Status            Code
__   QACT000010  *OBJ        ITSCNET.RCHAS040    Running
__   QACT000020  *CMD        ITSCNET.RCHAS040    Wait
```

Figure 274. CRQ with Status Running

For all activities other than remote commands, Status "running" means the activity request has been sent to an *SVDS distribution queue and no response has been received from the managed system yet. If this takes much longer than you expected, you can use the "Display Distribution Log" (DSPDSTLOG) command to find the cause of a possible problem.

If the QSNADS subsystem was not started (or it was ended with OPTION(*CNTRLD) but not completely ended yet), at either the central site system or the managed system, any submitted change request stays in status "running" and no error message is sent.

To verify whether the distribution has been accepted by QSNADS, you examine the distribution log by using the Display Distribution Log (DSPDSTLOG) command. For instance, to show all requests sent and received by Managed System Services/400 today after 4 PM, enter on any command line:

```
DSPDSTLOG PERIOD((160000)) ORGUSRID(*SVDS)
```

You know, for example, that a change request had been submitted at 4 PM and the *ORG entry in Figure 275 indicates that the request was submitted by Managed System Services/400 to the distribution queue.

```
                      Display Distribution Services Log

Type options, press Enter.
  5=Display details


    Function  Entry  ------Logged------                ----Originator----  Seq
Opt   Type    Type   Date      Time      Job Name      User ID   Address   Nbr
 _    *ORG    *NRM    7/05/94  16:00:49  QCQSVSRV      *SVDS               0007


                                                                           Bottom
F3=Exit      F12=Cancel
```

Figure 275. Display Distribution Services Log (DSPDSTLOG)

If you do not see any *RTR entries following the *ORG entry in Figure 275, it is very likely, that the QSNADS subsystem has not yet been started or is not working properly.

Start QSNADS Subsystem at Central Site System: Enter the STRSBS QSNADS command to start the QSNADS Subsystem at the central site system.

If the display looks similar to the one in Figure 276, the *RTR entry in the second line indicates that the request has been processed by the SNADS router, that is, QSNADS has been started and works correctly. However, at this point (at 16:00:49 in our example), the request has not yet been sent to the managed system. The reason may be a communication problem, for example.

```
                    Display Distribution Services Log

Type options, press Enter.
  5=Display details


    Function  Entry  ------Logged------                ----Originator----  Seq
Opt   Type    Type   Date      Time      Job Name     User ID   Address   Nbr
 _    *ORG    *NRM    7/05/94  16:00:49  QCQSVSRV     *SVDS               0007
 _    *RTR    *NRM    7/05/94  16:00:49  QROUTER      *SVDS               0007



                                                                        Bottom
F3=Exit      F12=Cancel
```

Figure 276. Display Distribution Services Log (DSPDSTLOG)

At this point, you should either check the system operator message queue (QSYSOPR) for any error messages or use the Work with Distributions Queues (WRKDSTQ) command to see if any entry appears. Figure 277 shows one entry having a Rty-Wait status.

```
                         Work with Distribution Queues

 Position to . . . . .

 Type options, press Enter.
   2=Send queue  3=Hold queue  5=Work with queue entries
   6=Release queue  7=Reroute queue


                       Queue      -----Send Time------  -Queue Depth-
 Opt  Queue Name       Priority   From     To    Force  Send  Current  Status
      RCHAS008         Normal       :   -   :      :      1      0    Waiting
      RCHAS008         High         :   -   :      :      1      0    Waiting
      RCHAS040         Normal       :   -   :      :      1      0    Waiting
      RCHAS040         High         :   -   :      :      1      0    Waiting
      RCHAS040ITSCNET  Normal       :   -   :      :      1      1    Rty-Wait
      RCHAS149         Normal       :   -   :      :      1      0    Waiting
      RCHAS149         High         :   -   :      :      1      0    Waiting
      RCHAS149ITSCNET  Normal       :   -   :      :      1      0    Waiting


                                                                        Bottom
 F3=Exit      F12=Cancel
```

Figure 277. Work with Distributions Queues (WRKDSTQ)

The Rty-Wait shows you that "something went wrong" when the SNADS sender tried to physically send the distribution. In such a case, you always find an error message in the QSYSOPR message queue.[9]

```
                         Additional Message Information

 Message ID . . . . . . :   CPI3A31       Severity . . . . . . . :   30
 Message type . . . . . :   Information
 Date sent  . . . . . . :   07/05/94      Time sent  . . . . . . :   16:03:46

 Message . . . . :   Starting recovery for SNADS *SVDS sender
   020214/QGATE/RCHAS040 serving distribution queue RCHAS040ITSCNET.
 Cause . . . . . :   The SNA distribution services (SNADS) job
   020214/QGATE/RCHAS040 has detected a retryable error having reason code 01
   while processing the *SVDS distribution queue RCHAS040ITSCNET and is
   attempting to restart normal processing. Reason code 01 indicates the cause
   of the error as defined in the list of reason codes below:
     01 -- Error while performing communications operation
     02 -- Error while processing distribution object
     03 -- Error while processing sender message queue
     04 -- Remote system sent a detach or a shutdown request
     05 -- Remote system sent SNA sense code
                                                                      More...
```

*Figure 278. CPI3A31 Starting Recovery for SNADS *SVDS Sender*

While this error message gives the first hint pointing to a communication problem, it also shows us where to find more information. The failing job was 020214/QGATE/RCHAS040. To find out more, now we can use the command:

```
DSPJOBLOG 020214/QGATE/RCHAS040
```

CPF5283 Remote System Abnormally Ended Transaction for File

```
                         Additional Message Information

 Message ID . . . . . . :   CPF5283       Severity . . . . . . . :   40
 Message type . . . . . :   Escape
 Date sent  . . . . . . :   07/16/94      Time sent  . . . . . . :   18:08:49

 Message . . . . :   Remote system abnormally ended transaction for file
   QCSNADSC in library QSYS for device ZDDEVNAME.
 Cause . . . . . :   The remote system abnormally ended the transaction. The
   Systems Network Architecture (SNA) error code is X'08640000'.
 Recovery  . . . :   Contact the remote system operator to determine the cause
   of the failure. Then try the request again.  If the problem continues,
   report the problem (ANZPRB command).
 Technical description . . . . . . . . :   A function management header type 7
   (FMH7) with SNA error code X'08640000' was received from the remote system.
   Descriptions of the SNA FMH7 error codes are available in the IBM SNA
   Formats, GA27-3136.

                                                                       Bottom
```

Figure 279. CPF5283 Remote System Abnormally Ended Transaction for File

Instead of message CPF5283, many other messages are possible also. However let's complete the problem determination for this case:

[9] Although it is a little bit beyond the scope of this book, a very quick way to find a QSYSOPR message is: Press the system request (SysReq) key, enter "6" on the line appearing at the bottom of your display, and press Enter. This gives you immediately access to the QSYSOPR message queue. But do not stop now! Move the cursor to the most interesting error message and press Help or F1. You find the valuable information for problem determination by looking at the second-level text. That is how we created Figure 278 on page 429, (for example, the one shown in Figure 278 on page 429).

At this point, we know that the SNADS receiver job at the managed system failed to accept the distribution sent by the central site system. Now we must have a look at the managed system. The SVDS receiver job always runs under the user profile QGATE, has the name of the communication device, and is of the type CMNEVK (″Started by communications″ - those jobs of type BATCH are the SVDS senders). There are many ways to find that job. After signing on to the managed system, we used command

```
WRKUSRJOB QGATE
```

and see all of the jobs for user QGATE such as those in Figure 280:

```
                              Work with User Jobs                      RCHAS040
                                                            07/16/94  18:40:29
Type options, press Enter.
  2=Change   3=Hold   4=End   5=Work with   6=Release   7=Display message
  8=Work with spooled files   13=Disconnect


Opt  Job         User        Type     -----Status-----  Function
     RCHASM02    QGATE       CMNEVK   OUTQ
     RCHASM02    QGATE       CMNEVK   OUTQ
     RCHASM02    QGATE       BATCH    ACTIVE
     RCHASM0200  QGATE       CMNEVK   OUTQ
     RCHASM0200  QGATE       CMNEVK   OUTQ
     RCHASM0200  QGATE       CMNEVK   OUTQ
     RCHASM0200  QGATE       CMNEVK   OUTQ
     RCHASM03    QGATE       BATCH    ACTIVE
     TCPIPLOC    QGATE       BATCH    ACTIVE

                                                                      Bottom
Parameters or command
===>
F3=Exit      F4=Prompt   F5=Refresh   F9=Retrieve   F11=Display schedule data
F12=Cancel   F21=Select assistance level
```

Figure 280. Display Distribution Services Log (DSPDSTLOG)

SVDS Distribution Queue Incorrectly or Not Configured

We look at the job log of the last job having the same name as our central site system and finally find error message CPC3A40 with reason code 01 telling us we have to define an SVDS distribution queue pointing to the central site system (see “Creating *SVDS Distribution Queues” on page 75 for information about how to do that). The reason for this is that, before the managed system accepts any requests sent by a central site system, it ensures that it can send any responses. If that is not possible, it rejects the request.

```
                        Additional Message Information

Message ID . . . . . . :   CPC3A40       Severity . . . . . . . :   50
Message type . . . . . :   Completion
Date sent  . . . . . . :   07/16/94      Time sent  . . . . . . :   18:12:13

Message . . . . :   Abnormal end of SNADS *SVDS receiver
  002582/QGATE/RCHASM0200 using distribution queue *N.
Cause . . . . . :   The SNA distribution services (SNADS) job
  002582/QGATE/RCHASM0200 detected an error while using distribution queue *N
  and is ending abnormally. Reason code 01 indicates the cause of the error as
  defined in the list of reason codes below:
    01 -- Distribution queue not configured
    02 -- Communications connection is in use
    03 -- Error while performing communications operation
    04 -- Available memory remaining has reached the threshold value
    05 -- Remote system sent bad data or violated protocol
    06 -- Recoverable error while processing internal objects
                                                                        More...
```

Figure 281. Display Distribution Services Log (DSPDSTLOG)

That means, the SVDS receiver job (002582/QGATE/RCHASM0200) did not find a proper distribution queue in order to send responses back to the central site system (see page 75).

With the Configure Distribution Service (CFGDSTSRV) command, the Add Distribution Queue (ADDDSTQ) command, or the Change Distribution Queue (CHGDSTQ), we can

Create or Change the SVDS Distribution Queue at the Managed System: After we fixed that problem, by creating or changing the SVDS distribution queue at the managed system, we look again at the distribution queue at the central site system and find (see Figure 282).

```
                         Work with Distribution Queues

 Position to . . . . .

 Type options, press Enter.
   2=Send queue  3=Hold queue  5=Work with queue entries
   6=Release queue  7=Reroute queue


                        Queue      -----Send Time------  -Queue Depth-
 Opt  Queue Name        Priority   From     To    Force  Send  Current  Status
      RCHAS008          Normal       :   -   :      :      1      0    Waiting
      RCHAS008          High         :   -   :      :      1      0    Waiting
      RCHAS040          Normal       :   -   :      :      1      0    Waiting
      RCHAS040          High         :   -   :      :      1      0    Waiting
      RCHAS040ITSCNET   Normal       :   -   :      :      1      1    Rty-Fail
      RCHAS149          Normal       :   -   :      :      1      0    Waiting
      RCHAS149          High         :   -   :      :      1      0    Waiting
      RCHAS149ITSCNET   Normal       :   -   :      :      1      0    Waiting


                                                                         Bottom
F3=Exit      F12=Cancel
```

Figure 282. Work with Distributions Queues (WRKDSTQ)

The Rty-Fail status means the SNADS sender job tried to establish the communication several times (by default three times in 5-minute intervals) and then decided to give up. You find the message CPI8826 Recovery failed for

SNADS gateway sender at that time in message queue QSYSOPR. We *must* restart the distribution queue by doing one of the following:

- Type option 2 in front of that queue in the Work with Distribution Queues display.
- Use the Send Distribution Queue (SNDDSTQ) by entering:

  SNDDSTQ DSTQ(RCHAS040ITSCNET) PTY(*NORMAL)
- End and start subsystems QSNADS (Not a good idea, if somebody else is using SNADS at the same time).

After having done this, our change request still stays at status "running". Why? Look at the distribution log again (see Figure 283):

```
                    Display Distribution Services Log

Type options, press Enter.
  5=Display details


    Function  Entry  ------Logged------                ----Originator----  Seq
Opt   Type    Type   Date      Time      Job Name     User ID   Address   Nbr
 _    *ORG    *NRM    7/05/94  16:00:49  QCQSVSRV     *SVDS               0007
 _    *RTR    *NRM    7/05/94  16:00:49  QROUTER      *SVDS               0007
 _    *SND    *NRM    7/05/94  16:45:51  RCHAS040     *SVDS               0006



                                                                        Bottom
F3=Exit      F12=Cancel
```

Figure 283. Display Distribution Services Log (DSPDSTLOG)

Finally - 45 minutes later - the request has actually been sent to the managed system. As long as we do not *receive* any information (type *RCV in the DSPDSTLOG display) from the managed system, the status of the change request never changes. Remember, the managed system sends the responses and status information using SNADS, so we *must* see any received distributions.

There are three possible causes at this point:

1. Subsystem QSNADS was not started at the managed system.
2. Managed System Services/400 was not started at the managed system.
3. Our change request is really still running.

Remember, that the remote command activities are *not* sent using an SVDS distribution queue, but directly through the APPC connection. If the QSNADS is not active at the managed system, we should still be able to submit a remote command. We even can use a remote command to start the QSNADS subsystem at the managed system.

Start the QSNADS Subsystem at the Managed System

So, why don't we try to start that subsystem using the remote operation function of Managed System Services/400? We can do so by submitting the command:

RUNSMGCMD CMD(STRSBS SBSD(QSNADS)) CPNAME((*NETATR RCHAS040)) ENCODE(*NO)

Because this is really a one-time request, we use the fast path command. Whenever you enter a fast path command at the Command Entry display or any

menu with a command line, you see completion message SMU1604, explaining that the change request has been successfully submitted and which name and number it has.

```
                                 Command Entry                        RCHASM02
                                                          Request level:   1
 Previous commands and messages:
    > SNDDSTQ DSTQ(RCHAS040ITSCNET) PTY(*NORMAL)
      Command prompting ended when user pressed F3.
    > wrkdstq
    > wrksbmcrqa (ITSCID11 000130)
    > DSPDSTLOG PERIOD((172200))
    > DSPDSTLOG PERIOD((190400))
    > WRKACTJOB OUTPUT(*PRINT) JOB(QCQR*)
    > wrksplf
    > DSPDSTLOG PERIOD((190400))
    > RUNSMGCMD CMD(STRSBS SBSD(QSNADS)) CPNAME((*NETATR RCHAS040)) ENCODE(*NO)
      Change request ITSCID11 000140 submitted.
    > wrksbmcrqa (ITSCID11 000140)
                                                                        Bottom
 Type command, press Enter.
 ===> wrksbmcrqa (ITSCID11 000140)
 F3=Exit   F4=Prompt   F9=Retrieve   F10=Include detailed messages
 F11=Display full      F12=Cancel    F13=Information Assistant   F24=More keys
```

Figure 284. Command Entry Showing Message SMU1604

You can use that information found in the completion message (see Figure 284), to go directly to the Work with Submitted CRQ Activities display for that specific CRQA (Figure 285).

```
                      Work with Submitted CRQ Activities
                                                          System:   RCHASM02
Change request  . . . . . :   ITSCID11
  Number  . . . . . . . . :     000140
Text  . . . . . . . . . . :



Type options, press Enter.
  3=Hold   5=Display details   6=Release   8=Work with nodes for activity
  10=Display messages          13=End

                                                                   Highest
     Activity                                                        End
Opt  Name        Type        Node                Status              Code
10   QACT000010  *CMD        ITSCNET.RCHAS040    Ended                20


                                                                     Bottom
Parameters or command
===>
F3=Exit   F4=Prompt      F5=Refresh   F6=Print list     F9=Retrieve
F11=Display conditions   F12=Cancel   F17=Position to   F24=More keys
(C) COPYRIGHT IBM CORP. 1990, 1994.
```

Figure 285. Work with Submitted CRQ Activities (WRKCRQA)

The End Code 20 in Figure 285 tells you at a glance that the remote command was not successful. Now use option 10, Display messages, to look at the error messages:

```
                        Display Submitted CRQ Messages
                                                              System:   RCHASM02
Change request  . . . . . . . . . . . . . . :   ITSCID11
  Number  . . . . . . . . . . . . . . . . . :     000140
Activity name . . . . . . . . . . . . . . . :   QACT000010
Managed system node name:
  Control point name  . . . . . . . . . . . :   *ALL
  Network identifier  . . . . . . . . . . . :   *ALL

Type options, press Enter.
  5=Display details   6=Print

Opt  Message
5    Remote command request failed.


                                                                        Bottom
F3=Exit   F5=Refresh   F6=Print list   F9=Command   F12=Cancel   F17=Top
F18=Bottom
(C) COPYRIGHT IBM CORP. 1990, 1994.
```

Figure 286. Display Submitted CRQ Messages

Option 5, Display details, shows the Display Submitted CRQ Message Details display (Figure 287).

```
                        Display Submitted CRQ Message Details
                                                              System:   RCHASM02
Change request  . . . . . . . . . . . . . . :   ITSCID11
  Number  . . . . . . . . . . . . . . . . . :     000140
Activity name . . . . . . . . . . . . . . . :   QACT000010
Managed system node name:
  Control point name  . . . . . . . . . . . :   RCHAS040
  Network identifier  . . . . . . . . . . . :   ITSCNET

Message ID  . . . . . . . . . . . . . . . . :   SMU18A2
Severity  . . . . . . . . . . . . . . . . . :   30
Date/time sent  . . . . . . . . . . . . . . :   07/16/94  21:30:38
Message . . . . . . . . . . . . . . . . . . :   Remote command request failed.


From job  . . . . . . . . . . . . . . . . . :   QCQSVSRV
  User  . . . . . . . . . . . . . . . . . . :     ITSCID11
  Number  . . . . . . . . . . . . . . . . . :     020132

                                                                        Bottom
Press Enter to continue.

F3=Exit   F10=Second level text   F12=Cancel
(C) COPYRIGHT IBM CORP. 1990, 1994.
```

Figure 287. Display Submitted CRQ Message Details

This display shows that job 020132/ITSCID11/QCQSVSRV reported the error. Press the F10 key to see message SMU18A2 in “Remote Command Request Failed (SMU18A2)” on page 435.

Remote Command Request Failed (SMU18A2)

```
                         Additional message information

 Message ID . . . . . . :   SMU18A2       Severity . . . . . . . :   30
 Date Sent  . . . . . . :   07/16/94      Time Sent  . . . . . . :   21:30:38

 Message . . . . :   Remote command request failed.

 Cause . . . . . :   The request to run a command on a remote system failed.
 Recovery  . . . :   The remote command failed with a sense code of 08A80003.
   The remote command status is 3.

                                                                        Bottom
 Press Enter to continue.

 F3=Exit   F12=Cancel
```

Figure 288. Additional Message Information SMU18A2

You may find the description of the sense code in Appendix D. "Sense Codes for Commands Done on Managed Systems" in *Managed System Services/400 Use*, SC41-3323. The explanation for sense code 08A80003 is:

```
The system cannot send the request because it cannot recognize
the remote application.
You may have specified an application name that is not valid,
or the managed system might not have started yet.
```

The suggested corrective action is:

```
Contact the system administrator of the managed system to start it,
or use the Start Managed System (STRMGDSYS)
command to start the managed system.
```

In this case, we have to use Display Station Pass-Through (STRPASTHR) to Start Managed System Services (STRMGDSYS), or call a person with direct access to that system to do so.

Since we still do not know whether the QSNADS Subsystem is active, we try once more to start it using the

```
RUNSMGCMD CMD(STRSBS SBSD(QSNADS)) CPNAME((*NETATR RCHAS040)) ENCODE(*NO)
```

fast path command and look at the Work with Submitted CRQ Activities display (see Figure 289 on page 436).

```
                      Work with Submitted CRQ Activities
                                                                 System:   RCHASM02
Change request  . . . . . :   ITSCID11
  Number  . . . . . . . . :     000150
Text  . . . . . . . . . . :


Type options, press Enter.
  3=Hold   5=Display details   6=Release   8=Work with nodes for activity
  10=Display messages          13=End

                                                                        Highest
     Activity                                                             End
Opt  Name        Type        Node                Status                 Code
__   QACT000010  *CMD        ITSCNET.RCHAS040    Ended                   00


                                                                         Bottom
Parameters or command
===>
F3=Exit   F4=Prompt      F5=Refresh   F6=Print list     F9=Retrieve
F11=Display conditions   F12=Cancel   F17=Position to   F24=More keys
(C) COPYRIGHT IBM CORP. 1990, 1994.
```

Figure 289. Work with Submitted CRQ Activities (WRKCRQA)

Note that, although we sent the same command a second time, this is a different change request activity than the one shown in Figure 289. Even though they have the same name (which is the user ID of the submitter), it has no relation to the one we submitted earlier.

Now, let's take a look at the distribution log again.

```
                      Display Distribution Services Log

Type options, press Enter.
  5=Display details


    Function  Entry  ------Logged------                ----Originator----  Seq
Opt   Type    Type   Date      Time      Job Name      User ID   Address   Nbr
 _    *ORG    *NRM    7/05/94  16:00:49  QCQSVSRV      *SVDS               0007
 _    *RTR    *NRM    7/05/94  16:00:49  QROUTER       *SVDS               0007
 _    *SND    *NRM    7/05/94  16:45:51  RCHAS040      *SVDS               0006
 _    *SND    *NRM    7/05/94  16:45:52  RCHAS040      *SVDS               0007
 _    *RCV    *NRM    7/05/94  16:46:54  RCHAS040      *SVDS               0001
 _    *RCV    *NRM    7/05/94  16:46:56  RCHAS040      *SVDS               0002
 _    *RTR    *NRM    7/05/94  16:46:56  QROUTER       *SVDS               0001
 _    *RTR    *NRM    7/05/94  16:46:57  QROUTER       *SVDS               0002
 _    *ARV    *NRM    7/05/94  16:47:51  QCQSVSRV      *SVDS               0002
 _    *ARV    *NRM    7/05/94  16:47:52  QCQSVSRV      *SVDS               0001
                                                                          More...
F3=Exit      F12=Cancel
```

Figure 290. Display Distribution Services Log (DSPDSTLOG)

Compare Figure 290 to the state of the distribution log shown in Figure 283 on page 432. The new entries printed in bold in Figure 290 show that a response from system RCHAS040 was received at 16:46:45. The following types are as follows:

- *RCV means received by the SNADS receiver job (this job can be invoked, even when QSNADS subsystem is not active).

- *RTR indicates that the job has been accepted by the QSNADS subsystem to determine its destination.
- *ARV states that the job has been delivered to the processing program (QCQSVSRV in this case) that is the Managed System Services/400 server job waiting for a status message indicating the termination of the change request that was sent earlier at 16:00:49.

We corrected a couple of errors and were finally able to successfully run a remote command, but before we proceed with our problem determination, let's summarize the problem symptoms and our solutions we described so far:

Table 15. Problem Symptoms and Solutions

Problem Symptom	**Solution**
"Status = Scheduled" on page 423	"Start System Manager (STRSYSMGR)"
"SMU1607 System Manager/400 Function Not Started" on page 425	"Start System Manager (STRSYSMGR)" on page 426
"Status = Ready" on page 426	"Start Managed System Services (STRMGDSYS)"
"SMU162C SystemView Managed System Services/400 Not Active." on page 426	"Start Managed System Services (STRMGDSYS)" on page 426
"Status = Started" on page 426	-
"Status = Running" on page 427	"Start QSNADS Subsystem at Central Site System"
"SVDS Distribution Queue Incorrectly or Not Configured" on page 430	"Create or Change the SVDS Distribution Queue at the Managed System" on page 431
"Status = Running" on page 427	"Start the QSNADS Subsystem at the Managed System" on page 432

But what happened to the change request SNDDTAARA we used to start this scenario in Figure 266 on page 423? We still know its number was 000010, so we can use the command:

```
WRKSBMCRQA (SNDDTAARA 000010)
```

to see whether its status changed now (see Figure 291 on page 438).

Status = Ended, End Code = 20

```
                        Work with Submitted CRQ Activities
                                                                System:   RCHASM02
Change request  . . . . . :   SNDDTAARA
  Number  . . . . . . . . :     000010
Text  . . . . . . . . . . :   Send a Data Area to System RCHAS040



Type options, press Enter.
  3=Hold   5=Display details   6=Release   8=Work with nodes for activity
  10=Display messages          13=End

                                                                      Highest
     Activity                                                           End
Opt  Name        Type        Node                Status                Code
10   QACT000010  *OBJ        ITSCNET.RCHAS040    Ended                  20
__   QACT000020  *CMD        ITSCNET.RCHAS040    Ended                  99

                                                                       Bottom
Parameters or command
===> ____________________________________________________________________________
F3=Exit   F4=Prompt      F5=Refresh   F6=Print list     F9=Retrieve
F11=Display conditions   F12=Cancel   F17=Position to   F24=More keys
 (C) COPYRIGHT IBM CORP. 1990, 1994.
```

Figure 291. Work with Submitted CRQ Activities (WRKSBMCRQA)

Although our objective was to see status ended for all activities, we are not yet completely satisfied because it was not *successfully* ended. It is important to look at the end code for all activities with status ″ended″.

On page 422, we summarized the meaning of all status codes. Although all end codes other than ″00″ require some kind of problem determination, end code ″20″ is the most common error condition. Others mostly result from easier-to-find error conditions. For example, code 99 in Figure 291 indicates ″Conditions not met″ and that is simply because the previous activity (QACT000010) failed with end code ″20″.

Therefore, we concentrate on some examples on how to do problem determination when an activity ended with end code ″20″. However, the methods described here apply for other end codes as well. For example, an activity ending with warnings (end code between ″01″ and ″09″) might also require some kind of investigation.

The best starting point for investigation on a failed activity is to use option 10, Display messages, on the Work with Submitted CRQ Activities display or (if there is more than one node for that activity) on the Work with Nodes for Activity display.

In either case, you see the Display Submitted CRQ Messages display (see Figure 292 on page 439).

```
                        Display Submitted CRQ Messages
                                                                System:   RCHASM02
Change request  . . . . . . . . . . . . . . :   SNDDTAARA
  Number  . . . . . . . . . . . . . . . . . :     000010
Activity name . . . . . . . . . . . . . . . :   QACT000010
Managed system node name:
  Control point name  . . . . . . . . . . . :   *ALL
  Network identifier  . . . . . . . . . . . :   *ALL

Type options, press Enter.
  5=Display details   6=Print

Opt  Message
_    Errors occurred while sending unit of work.
5    Object not found.
_    Additional information received from ITSCNET.RCHASM02.
_    Additional information received from ITSCNET.RCHASM02.



                                                                          Bottom
F3=Exit   F5=Refresh   F6=Print list   F9=Command   F12=Cancel   F17=Top
F18=Bottom
```

Figure 292. Display Submitted CRQ Messages

(See “Improving the Display Submitted CRQ Messages Panel” on page 444 for an easy method to avoid the following two steps.)

At a glance, we get two pieces of information:

1. The problem occurred on the central site system:

   `Errors occurred while sending ..`

2. An object was not found ..... which one?

The display shown in Figure 292 is only a starting point into problem determination. In order to see more information, you must select option 5, Display details, for one or (typically) more messages. The Display Submitted CRQ Message Details display (Figure 293 on page 440) is shown.

SMU16C1 Object not found.

```
                    Display Submitted CRQ Message Details
                                                          System:   RCHASM02
 Change request  . . . . . . . . . . . . . . :   SNDDTAARA
   Number  . . . . . . . . . . . . . . . . . :     000020
 Activity name . . . . . . . . . . . . . . . :   QACT000010
 Managed system node name:
   Control point name  . . . . . . . . . . . :   RCHAS040
   Network identifier  . . . . . . . . . . . :   ITSCNET

 Message ID  . . . . . . . . . . . . . . . . :   SMU16C1
 Severity  . . . . . . . . . . . . . . . . . :   40
 Date/time sent  . . . . . . . . . . . . . . :   07/17/94  20:09:19
 Message . . . . . . . . . . . . . . . . . . :   Object not found.


 From job  . . . . . . . . . . . . . . . . . :   QCQSVSRV
   User  . . . . . . . . . . . . . . . . . . :     ITSCID11
   Number  . . . . . . . . . . . . . . . . . :     020249

                                                                     Bottom
 Press Enter to continue.

 F3=Exit   F10=Second level text   F12=Cancel
```

Figure 293. Display Submitted CRQ Message Details

You can use the information given in this display to look into the joblog of the server job (QCQSVSRV in this case), or use command key F10 (second-level text) to look at the help for that message (see Figure 294).

```
                        Additional message information

 Message ID . . . . . . :   SMU16C1       Severity . . . . . . . :   40
 Date Sent  . . . . . . :   07/17/94      Time Sent  . . . . . . :   20:09:19

 Message . . . . :   Object not found.

 Cause . . . . . :   The object specified on the request was not found.
 Recovery  . . . :   Do the following:
     -- Use the Work with Change Request Descriptions (WRKCRQD) command to
   change the activity.  Specify an object name or a global name that
   identifies an existing object.
     -- Use the Submit Change Request (SBMCRQ) command to submit the activity
   again.
 Technical description . . . . . . . . :   The global name is ITSCNET
   AS400 OBJ GG244372 MYDTAARA DTAARA.  The SNA report code is X'089A0001'.
    See SNA Formats, GA27-3136, for a description of the report codes.
   Possible report codes are:
     -- 089A0001 - Unable to locate the requested data object.
                                                                       More...
 Press Enter to continue.

 F3=Exit   F12=Cancel
```

Figure 294. SMU16C1 Object Not Found

This clearly describes the error: the data area was not found in the specified library.

Note that the message shows the name of the object in the format of a global name using the prefix tokens to identify it as a standard AS/400 object name. See “Global Name Prefix Tokens (PFXTOKEN)” on page 54 for more information on prefix tokens..

After having corrected the cause of this problem (wrong library name), you can submit the same CRQD again. If this CRQ were created by a fast path command, you must call that command again.

The following subsections describe some error conditions that may occur at your systems also.

SMU1695 Prefix Tokens Not Defined

If you want to distribute AS/400 objects from a central site system to one or more managed systems, you must specify at least one prefix token for the parameter PFXTOKEN with the Change Managed System Attributes (CHGMGDSYSA) command. (See “Global Name Prefix Tokens (PFXTOKEN)” on page 54)

If you leave the default ***NONE**, each distribution activity using standard AS/400 object names fails with the end code 20 at the central site system. The Display Submitted CRQ Messages display (similar to Figure 292 on page 439) shows

`Prefix tokens not defined.`

When you use Option 5 in the Display Submitted CRQ Messages display, you see the complete message (seeFigure 295).

```
                          Additional message information

 Message ID . . . . . . :   SMU1695       Severity . . . . . . . :   40
 Date Sent  . . . . . . :   07/12/94      Time Sent  . . . . . . :   09:59:18

 Message . . . . :   Prefix tokens not defined.

 Cause . . . . . :   The distribution has not been performed because the prefix
   tokens are not defined in the managed system attributes.
 Recovery  . . . :   Do the following:
     -- Use the Change Management System Attributes (CHGMGDSYSA) command to
   define the prefix tokens.
     -- Use the Submit Change Request (SBMCRQ) command to submit the change
   request again.

                                                                        Bottom
 Press Enter to continue.

 F3=Exit   F12=Cancel
```

Figure 295. Error Message SMU1695 Prefix Tokens Not Defined

Note

If you *did* specify a prefix token, but the prefix tokens of the central site system do not match the ones at the managed system, the distribution is sent without any error message, but the objects are not restored to an AS/400 library. The objects stay within the distribution repository of the managed system and you must copy them to an AS/400 library using the Copy Distribution Repository Object (CPYDSTRPSO) command.

So after we specified prefix tokens at both the central site system and the managed systems, we may continue with our test and submit the CRQ SNDDTAARA again. Unfortunately, the first activity fails again and option 10 shows Figure 296 on page 442.

```
                        Display Submitted CRQ Messages
                                                                System:   RCHASM02
 Change request  . . . . . . . . . . . . . . :   SNDDTAARA
   Number  . . . . . . . . . . . . . . . . . :     000030
 Activity name . . . . . . . . . . . . . . . :   QACT000010
 Managed system node name:
   Control point name  . . . . . . . . . . . :   *ALL
   Network identifier  . . . . . . . . . . . :   *ALL

 Type options, press Enter.
   5=Display details   6=Print

 Opt  Message
 _    Request not successful.
 _    Request for ITSCNET.RCHAS040 failed.
 5    Additional information received.
 _    Additional information received.



                                                                        Bottom
 F3=Exit   F5=Refresh   F6=Print list   F9=Command   F12=Cancel   F17=Top
 F18=Bottom
```

Figure 296. Display Submitted CRQ Messages

(See “Improving the Display Submitted CRQ Messages Panel” on page 444 for an easy method to avoid the following two steps.)

The first two messages are not very helpful, but using option 5 and then command key F10 for the third message shows us the name (002592/QSVMSS/QCQRCVDS) of the server job running on the managed system (ITSCNET.RCHAS040) (see Figure 297).

```
                        Additional message information

 Message ID . . . . . . :   SMU1897       Severity . . . . . . . :   00
 Date Sent  . . . . . . :   07/18/94      Time Sent  . . . . . . :   17:48:18

 Message . . . . :   Additional information received.

 Cause . . . . . :   Additional information was received because the activity
   failed or the activity completed with warnings.  The following information
   was received: MSS0218 Response was sent from job 002592/QSVMSS/QCQRCVDS on
   ITSCNET.RCHAS040.
 Recovery  . . . :   See the additional information received.  Correct the
   error, then try the request again.
                                                                        Bottom
 Press Enter to continue.

 F3=Exit   F12=Cancel
```

Figure 297. MSS0218 Response was Sent from Job 002592/QSVMSS/QCQRCVDS

The last message points to some security problems (see Figure 298 on page 443).

```
                         Additional message information

 Message ID . . . . . . :   SMU1897       Severity . . . . . . . :   00
 Date Sent  . . . . . . :   07/18/94      Time Sent  . . . . . . :   17:48:18

 Message . . . . :   Additional information received.

 Cause . . . . . :   Additional information was received because the activity
   failed or the activity completed with warnings.  The following information
   was received: MSS001F Function not performed for security reasons.
 Recovery  . . . :   See the additional information received.  Correct the
   error, then try the request again.
                                                                        Bottom
 Press Enter to continue.

 F3=Exit   F12=Cancel
```

Figure 298. MSS001F Function Not Performed for Security Reasons

To complete this part of the problem determination, we have to look into the joblog of the server job by either using remote command:

```
RUNSMGCMD CMD(DSPJOBLOG JOB(002592/QSVMSS/QCQRCVDS) OUTPUT(*PRINT)) +
                                CPNAME((*NETATR RCHAS040)) ENCODE(*NO)
```

or by using Display Station Pass-Through (STRPASTHR). Doing so, we find the complete second-level text for message MSS001F including the actual value of the reason code (see Figure 299).

Function Not Performed for Security Reasons (MSS001F)

```
                         Additional Message Information

 Message ID . . . . . . :   MSS001F       Severity . . . . . . . :   40
 Message type . . . . . :   Diagnostic
 Date sent  . . . . . . :   07/18/94      Time sent  . . . . . . :   17:46:28

 Message . . . . :   Function not performed for security reasons.
 Cause . . . . . :   The security program QCQATDFT in library QSVMSS ended with
   reason code 1.  The reason codes are:
     1 -- Distribution rejected by the security program.
     2 -- Security program sent an exception message.
     3 -- Security program returned data that is not correct.
 Recovery  . . . :   For reason code 2, use the Display Job Log (DSPJOBLOG)
   command for job QCQRCVDS in subsystem QSYSWRK to review any detailed
   messages.  For reason codes 2 and 3, correct the security program.  If you
   want to use a different security program, use the Change Managed System
   Attributes (CHGMGDSYSA) command to specify a new program or library name.
                                                                        Bottom
 Press Enter to continue.

 F3=Exit   F6=Print   F9=Display message details   F12=Cancel
 F21=Select assistance level
```

Figure 299. MSS001F Function Not Performed for Security Reasons

According to reason code 1 in message MSS001F, the security program rejected the distribution. But did we specify any security program? As suggested in the message, we use the Change Managed System Attributes command (CHGMGDSYSA) and display the help text for parameter SECPGM (see Figure 300 on page 444).

```
                    Change Managed System Atr (CHGMGDSYSA)

 Type choices, press Enter.

 Accept received activities . . .   *YES          *SAME, *NO, *YES
 Distribution security pgm  . . .   *DFT          Name, *SAME, *DFT, *NONE
   Library  .  ..............................................................
 Default user  :          Distribution security pgm (SECPGM) - Help          :
 Inactive user :                                                             :
 Send intermed :   *DFT                                                      :
 Global name p :      The default distribution security program is used.     :
               :      This distribution security program allows PTFs to be   :
 Remote comman :      received but not applied to the system.  The program   :
   Library  .  :      does not allow other objects to be manipulated.        :
 Maximum retur :                                                             :
 Delete spool  :  *NONE                                                      :
 Remote comman :      No security program is specified.  All activities are  :
               :      accepted when ACCRCVACT(*YES) is specified.  The       :
               :      default user profile is used to process the activity.  :
               :                                                   More...   :
               :  F2=Extended help   F10=Move to top   F11=InfoSeeker        :
 F3=Exit   F4= :  F12=Cancel         F20=Enlarge       F24=More keys         :
 F24=More keys :                                                             :
               :.............................................................:
```

Figure 300. Change Managed System Atr (CHGMGDSYSA)

As we described in “Update Managed System Attributes” on page 62, you have to change parameter SECPGM in order to distribute objects other than PTFs. Because we decided to use more distribution function than just receiving PTFs, and do not want (for this example) to write our own security exit program, we have to specify *NONE for that parameter:

```
CHGMGDSYSA SECPGM(*NONE)
```

Now we can submit our change request one more time and using the Work with Submitted CRQ Activities (WRKCRQA) command, we see a status such as the one in Figure 301.

```
                                                                  Highest
     Activity                                                       End
Opt  Name        Type        Node                Status            Code
     QACT000010  *OBJ        ITSCNET.RCHAS040    Ended              00
     QACT000020  *CMD        ITSCNET.RCHAS040    Ended              20
```

Figure 301. Work with Submitted CRQ Activities (WRKCRQA)

According to end code 00 in Figure 301, we know that the first activity (Send a Data Area) has finally succeeded. The second activity, however, failed with end code 20. Therefore, we have to continue for further problem determination.

Improving the Display Submitted CRQ Messages Panel

In order to find out the reason for a failing change request, you can use option 10, Display messages, at the

- Work with Submitted Change Requests display.

  - or -

- Work with Submitted CRQ Activities display.

  - or -

- Work with Nodes for Activity display.

In many cases, you see one or more messages such as:

```
Additional information received
```

- or -

```
Additional information received from ......
```

To see more detailed information, use option 5, Display details, and then press F10 for second-level help (see Figure 292 on page 439 for an example). You can improve this process by changing two message descriptions in library QSMU. Enter the following two commands on any command line:

```
CHGMSGD MSGID(SMU1897) MSGF(QSMU/QSMUMSG) MSG('&3')
CHGMSGD MSGID(SMU16F1) MSGF(QSMU/QSMUMSG) MSG('&1: &3')
```

As a result, instead of seeing a display such as Figure 292 on page 439, the most important part of the message is shown immediately (see Figure 302).

```
                         Display Submitted CRQ Messages
                                                                System:   RCHASM02
Change request  . . . . . . . . . . . . . :   SNDDTAARA
  Number  . . . . . . . . . . . . . . . . :     000030
Activity name . . . . . . . . . . . . . . :   *ALL
Managed system node name:
  Control point name  . . . . . . . . . . :   *ALL
  Network identifier  . . . . . . . . . . :   *ALL

Type options, press Enter.
  5=Display details   6=Print

Opt  Message
_    Errors occurred while sending unit of work.
_    Object not found.
_    RCHASM02: MSS0218 Response was sent from job 020603/ITSCID11/QCQSVSRV ...
_    RCHASM02: MSS01C3 Object does not exist.



                                                                        Bottom
F3=Exit   F5=Refresh   F6=Print list   F9=Command   F12=Cancel   F17=Top
F18=Bottom
(C) COPYRIGHT IBM CORP. 1990, 1994.
```

Figure 302. Display Submitted CRQ Messages - Improved Version

Therefore, you do not need to use option 5, Display Details, and F10, second-level help in many cases.

Using Journal QCQJMJRN in QUSRSYS

Managed System Services/400 and System Manager/400 automatically logs their activities into journal QCQJMJRN in library QUSRSYS. The entries of that journal contain additional information based on the entry type:

- Cleanup entry (CL)
- Configuration entry (CO)
- Error entry (EP)
- Normal entry (CS)

- Job control entry (ON)
- Remote commands (RO)

The contents of each journal entry is described in Appendix E of *Managed System Services/400 Use*, SC41-3323. You can display the journal entries for a certain time interval by entering the following command on any command line:

```
DSPJRN QCQJMJRN FROMTIME(071894 170000)
```

Figure 303 shows the entries found for the time starting at 5pm on July, 18 1994:

```
                          Display Journal Entries

Journal  . . . . . . :   QCQJMJRN        Library  . . . . . . :   QUSRSYS

Type options, press Enter.
  5=Display entire entry


Opt    Sequence  Code  Type  Object      Library     Job         Time
 _        36201   U     ON                          QCQSVSRV    17:05:35
 _        36202   U     ON                          QCQSVSRV    17:05:39
 _        36203   U     EP                          QCQSVSRV    17:05:48
 _        36204   U     EP                          QCQSVSRV    17:05:48
 _        36205   U     EP                          QCQSVSRV    17:05:50
 _        36206   U     EP                          QCQSVSRV    17:05:50
 _        36207   U     CS                          QCQSVSRV    17:05:55
 _        36208   U     CS                          QCQSVSRV    17:05:56
 5        36209   U     CS                          QCQSVSRV    17:09:38
 _        36210   U     CS                          QCQSVSRV    17:09:40
 _        36211   U     CS                          QCQRCVDS    17:13:30
 _        36212   U     CS                          QCQSVSRV    17:13:34    +

F3=Exit   F12=Cancel
```

Figure 303. Display Journal Entries

Analyzing the journal entries may help you in performing further problem determination. For example, using option 5, Display entire entry for entry 36209 shows a ″normal″ entry (see Figure 304 on page 447).

```
                         Display Entry Specific Data

Sequence . . . . . . :   36209

            Entry specific data
Column      *...+....1....+....2....+....3....+....4....+....5
00001      'QCQFVENC  QSVMSS    ITSCNET RCHASM02              '
00051      '   000           -                        ¢*NONE   '
00101      '                                                 04'
00151      'FTITSCNET AS400 OBJ WILFRIED MYDTAARA DTAARA      '
00201      '                                                  '
00251      '                                                  '
00301      '                      L1WILFRIED  MYDTAARA        '
00351      '                                                 *'
00401      'DTAARA     S           D                          '
00451      '                                                  '
00501      '                    '

                                                          Bottom
Press Enter to continue.

F3=Exit   F6=Display entry   F11=Display hexadecimal format   F12=Cancel
F14=Display previous entry   F15=Display only entry details   F17=Position to
```

Figure 304. Journal QCQJMJRN Display Entry Specific Data

Database Files Used By System Manager/400

Library QSMU contains some database files with information about the status of submitted change requests. You may use your own programs to retrieve information from those files to support further problem determination. However, during the tests for this book, we did not find any reason to use these files. Therefore, we describe their contents only very briefly.

DB File	Description
QANSCRL	Database File for Change Request

Field	Text	Len	Dec
CRQNAM	Change request name	10	
CRQSEQ	Change request sequence number	6	0
CRQSTS	Status	1	(hex)
ENDCDH	Highest end code	2	
ENDCDL	Last end code	2	
USRPRF	User profile to run under	10	
PRBID	Problem ID	10	
PRBORG	Problem origin	21	
DESCRP	Text description	50	
SBMTR	Submitter's user profile	10	
SBMDT	Submitted date/time	8	(hex)
ENDDT	Ended date/time	8	(hex)
CRQDNM	CRQD name	20	
CRQDOP	CRQD owner's user profile	10	

QANSCRAL Database File for Activity

Field	Text	Len	Dec
CRQNAM	Change request name	10	
CRQSEQ	Change request sequence number	6	0
ACTIVY	Activity name	10	
STRADT	Start after date/time	8	(hex)
STRBDT	Start before date/time	8	(hex)

ASTRDT	Actual start date/time	8	(hex)
AENDDT	Actual end date/time	8	(hex)
ACTTYP	Activity type	10	
NODLNM	Node list name	20	
ACTSTS	Activity status	1	(hex)
ENDCDH	Highest end code	2	
DESCRP	Text description	550	
FNPARM	Function parameters	12288	(hex)

QANSCRCL Database File for Conditions

Field	Text	Len	Dec
CRQNAM	Change request name	10	
CRQSEQ	Change request sequence number	6	0
ACTIVY	Activity name	10	
CNDNBR	Condition number	2	0
CNDACT	Conditioning activity name	10	
CNDREL	Condition operator	1	
CNDCOD	Condition code	2	
MODE	Condition mode	1	

QANSCRNL Database File for Nodes

Field	Text	Len	Dec
CRQNAM	Change request name	10	
CRQSEQ	Change request sequence number	6	0
ACTIVY	Activity name	10	
NODE	Node name	21	
NODSTS	Node status	1	(hex)
ENDCOD	End code	2	
ASTRDT	Actual start date/time	8	(hex)
AENDDT	Actual end date/time	8	(hex)

QANSCRML Database File for Messages

Field	Text	Len	Dec
CRQNAM	Change request name	10	
CRQSEQ	Change request sequence number	6	0
ACTIVY	Activity name	10	
NODE	Node name	21	
DTSTMP	Message date/time stamp	8	(hex)
MSGID	Message ID	7	
MSGFIL	Message file name	20	
SEVRTY	Message severity	2	
JOBNAM	Job name	26	
MSGDTA	Message data	1000	(hex)

Appendix A. System Manager/400 GUI Configuration Checklist

This appendix covers the steps necessary to quickly get System Manager/400 GUI up and running. You can find reference material in the *Related Publications* section of this redbook.

Configure System Manager/400 and Managed System Services/400 for Remote Operations and Distribution

Before using SM/400 GUI, you should have the distribution and remote command functions operational. Follow the steps described in Chapter 2, “Configuring Operations Control Center/400 for Distribution and Remote Operations” on page 41 before you proceed.

Install PTFs

You must verify that the following PTFs (or superseding) are installed on your systems:

- 5763-SS1 V3R1M0 - OS/400 PTFs
  - SF22345
  - SF22346
  - SF22347
  - SF22478
  - SF22348
  - SF22394
  - SF22395
  - SF22396
  - SF23730
  - SF24258
- 5763-SM1 V3R1M1 - SM/400 PTFs
  - SF24155
  - SF24333
  - SF26743
  - SF27278
- 5763-MG1 V3R1M1 - MSS/400 PTFs
  - SF23690
  - SF24625

Installing SM/400 GUI

There are no installation diskettes for System Manager/400 GUI. All of the required PC code is in the folder QSVNOS2 on the AS/400 system. This folder comes with V3R1M1 of System Manager/400. You must download this code using Client Access/400 Shared Folders or Network Drive function.

1. **Run the System Manager/400 GUI install program from the shared folder QSVNOS2 on the AS/400 system:**
   a. At an OS/2 command prompt, change to the I: drive (or any other letter assigned to your shared folder drive.

Example: D:> **I:** (then press Enter)

b. Change the directory to the System Manager/400 GUI shared folder QSVNOS2.

Example: I:> **CD QSVNOS2** (then press Enter)

c. Start the installation program:

I:QSVNOS2> **INSTALL** (then press Enter)

You then see the Copyright panel. After a while, when that panel disappears, you are shown the *System Manager/400 - Installation* window to choose Default or Custom Installation.

2. **Continue the installation program using the Custom method from the** *System Manager/400 - Installation* **window:**

   a. Select **Custom installation**.

   b. Press the **Install** button.

   The *System Manager/400 GUI Custom Installation* notebook is displayed. You can click on each of the notebook tabs to see what choices are available. **Do not change** any options except on the *AS/400 Icons* page where you will define the icons to create for your managing system. If your PC has communications links to multiple systems, you will see an icon for each system. Remove all except the icon that represents the managing system.

   On the *AS/400 Icons* page:

   c. Click on **SYSX.**

   d. Press the **Remove** button.

   e. Click on **SYSY.**

   f. Press the **Remove** button.

   g. Click on the **Install** button.

      - If you get the message "GUI1C36 Target directory D:SM400OS2 does not exist. Do you wish to create it?", press the **Yes** button.
      - If you get the message "GUI1C14 System Manager/400 GUI is already installed in the target directory. If you continue, the existing copy will be overwritten.", press the **OK** button.
      - The *Installation Progress* window is displayed. This shows messages as the installation tasks are completed.
      - An information window is displayed next stating that System Manager/400 GUI has been installed.

   h. Click on **OK** to exit the installation program.

3. **Exit from the OS/2 prompt**.

   I:QSVNOS2> **EXIT** (then press Enter)

4. **Start the System Manager/400 GUI**:

   a. Open the OS/2 desktop icon named **System Manager/400 GUI**.

   b. From the **System Manager/400 - Icon View** window, double-click on the icon that represents your central system (CENTRSITE). This issues the command to start the System Manager/400 GUI.

If You Have Problems Starting the GUI

1. Check the network attributes of the system that you are having problems connecting to. Enter DSPNETA:
   - Make sure the *Server network ID/control point name* is **LCLNETID *ANY*.
   - Make sure the *Current system name* is **NOT** blank.
2. Clear your customization the first time you sign on.
   - Right click on the icon that represents your central site AS/400 system and *Open* as *Settings*.
   - Add the parameter /clrcst. This parameter prompts you to clear any customization data saved on the AS/400 system before starting the session.
3. Use a password *exactly* eight characters long.

AnyNet, TCP/IP, and SNMP Configuration Checklist

This section covers the steps necessary to set up AnyNet support on the AS/400 systems and PCs running Client Access/400 Optimized for OS/2. It also covers SNMP (Simple Network Management Protocol) setup and how to define the central site's sphere of control to allow you to manage the AS/400 systems and PC Clients from the managing system. CENTRSITE, MGDSYS1, and MGDSYS2 represent the managing and managed systems, and PCCLIENT is the PC we are managing.

After the configuration is finished, CENTRSITE is set up to collect topology information using SNMP. CENTRSITE is able to receive alerts and problems from the MGDSYS1 and MGDSYS2 systems.

It is assumed that you already have your central site and your managed systems communicating satisfactorily. That is to say, APPN and SNADS are configured and you should be able to use, for example, RUNSMGCMD command and to submit change requests to be performed on a managed system.

1. **Set up AnyNet support on the central site system**:

   Enable AnyNet support on the central site system:

   a. Type the following and press **Enter** to change the central site's network attributes (or use **F4** *Prompt*!). This sets up the managing system as a network node, enables it as an alert focal point, and enables it to support AnyNet.

   ```
   CHGNETA NODETYPE(*NETNODE)
           NETSERVER(*LCLNETID *ANY)
           ALRSTS(*ON)
           ALRLOGSTS(*ALL)
           ALRPRIFP(*YES)
           ALWANYNET(*YES)
   ```

   Note: We recommend that the central site system is an APPN network node.

   Define an *IP over SNA interface* on the managing system:

   b. Sign on to the CENTRSITE system with an ID that has IOSYSCFG authority.

c. Enter **CFGIPS** on the command line.

d. Choose **Option 1** *Work with IP over SNA interfaces*.

e. Type **1** in the *Opt* column, **100.1.1.80** in the *Internet Address* column, and press **Enter**.

f. Type **255.255.255.0** in the *Subnet Mask* field and press **Enter**.

The new entry should show as *Active*:

g. Press **Enter**.

Add an IP entry for the managing system:

h. Choose **Option 3** *Work with IP over SNA locations*.

i. Type **1** in the *Opt* column, **100.1.1.80** in the *Remote Destination* column, ***host** in the *Subnet Mask* column, and press **Enter**.

j. Type **CENTRSITE** in the *Location template* field and press **Enter**.

Add an IP entry for the first managed system:

k. Type **1** in the *Opt* column, **100.1.1.81** in the *Remote Destination* column, ***host** in the *Subnet Mask* column, and press **Enter**.

l. Type **MGDSYS1** in the *Location template* field and press **Enter**.

Add an IP entry for the second managed system:

m. Type **1** in the *Opt* column, **100.1.1.82** in the *Remote Destination* column, ***host** in the *Subnet Mask* column, and press **Enter**.

n. Type **MGDSYS2** in the *Location template* field and press **Enter**.

o. Press **Enter**.

Set up an IP entry for each PC on it's *"local managing system"*:

p. Type **1** in the *Opt* column, **100.1.1.xx** (where "xx" is a unique number for each PC) in the *Remote Destination* column, ***host** in the *Subnet Mask* column, and press **Enter**.

Tip

Do **not** make xx equal to 00.

q. Type **PCCLIENT** in the *Location template* field and press **Enter**.

Repeat the preceding two steps for each PC you want to add:

r. Press **Enter**.

2. **Configure SNMP support on the managing system**:

   a. Type **CFGTCPSNMP** on the command line and press **Enter**.

   b. Choose **Option 2** *Work with communities for SNMP*.

   c. Verify that the *community name* is **public**.

   d. Press **F3** to return to the *Configure TCP/IP SNMP* menu.

3. **Configure SNMP to start automatically with TCP/IP and set up system contact/location information**:

   a. Choose **Option 1** *Change SNMP attributes*.

   b. Type some meaningful contact and location information in the *System contact* and *System location* fields.

Tip

If you use *CNTINF in the *System contact* field, the value is obtained from the service contact information specified by using the Work with Contact Information (WRKCNTINF) command. The value obtained consists of the contact person and the contact telephone numbers. If the value is changed through WRKCNTINF, the changes are not automatically reflected in this parameter.

c. Type ***YES** in the *Automatic start* field.

d. Press **Enter**.

4. **Start TCP/IP on the managing system**:

   a. Type **STRTCP** on the command line and press **Enter**.

5. **Define CENTRSITE's Sphere of Control**:

   a. Type **WRKSOC** on the command line and press **Enter**.

   b. Type **1** in the *Opt* column, **MGDSYS1** in the *Control Point* column, and press **Enter**.

   c. Type **1** in the *Opt* column, **MGDSYS2** in the *Control Point* column, and press **Enter**.

----------End of managing system setup----------

Note: Repeat the following steps for all the managed systems in your network.

6. **Setup AnyNet support on the managed systems**:

   Enable AnyNet support on the MGDSYS1 system:

   a. Type the following and press **Enter** to enable the first managed system to support AnyNet:

      ```
      CHGNETA ALWANYNET(*YES)
      ```

   Define an *IP over SNA interface* on the first managed system:

   b. Sign on to the MGDSYS1 system with an ID that has IOSYSCFG authority.

   c. Enter **CFGIPS** on the command line.

   d. Choose **Option 1** *Work with IP over SNA interfaces*.

   e. Type **1** in the *Opt* column, **100.1.1.81** in the *Internet Address* column, and press **Enter**.

   f. Type **255.255.255.0** in the *Subnet Mask* field and press **Enter**.

   The new entry should show as *Active*:

   g. Press **Enter**.

   Add an IP entry for the managing system to MGDSYS1:

   h. Choose **Option 3** *Work with IP over SNA locations*.

   i. Type **1** in the *Opt* column, **100.1.1.80** in the *Remote Destination* column, ***host** in the *Subnet Mask* column, and press **Enter**.

   j. Type **CENTRSITE** in the *Location template* field and press **Enter**.

   Add an IP entry for MGDSYS1:

k. Type **1** in the *Opt* column, **100.1.1.81** in the *Remote Destination* column, ***host** in the *Subnet Mask* column, and press **Enter**.

l. Type **MGDSYS1** in the *Location template* field and press **Enter**.

m. Press **Enter**.

7. **Configure SNMP support on the first managed system**:

   a. Type **CFGTCPSNMP** on the command line and press **Enter**.

   b. Choose **Option 2** *Work with communities for SNMP*.

   c. Verify that the *community name* is **public**.

   d. Press **F3** to return to the *Configure TCP/IP SNMP* menu.

8. **Configure SNMP to start automatically with TCP/IP and set up system contact/location information**:

   a. Choose **Option 1** *Change SNMP attributes*.

   b. Type some meaningful contact and location information in the *System contact* and *System location* fields.

   Tip

   If you use `*CNTINF` in the *System contact* field, the value is obtained from the service contact information specified by using the Work with Contact Information (WRKCNTINF) command. The value obtained consists of the contact person and the contact telephone numbers. If the value is changed through WRKCNTINF, the changes are not automatically reflected in this parameter.

   c. Type ***YES** in the *Automatic start* field.

   d. Press **Enter**.

9. **Start TCP/IP on the managed system**:

   a. Type **STRTCP** on the command line and press **Enter**.

----------End of managed system setup----------

Start User Profile Discovery

This steps will setup and start User Profile Discovery on the central site:

Add CENTRSITE, MGDSYS1, and MGDSYS2 to the node list on CENTRSITE:

1. Type **WRKNODLE QGPL/QSVNUPDS** and press **Enter**.
2. Type **1** in the *Opt* column, **CENTRSITE** in the *Node Name* column, ***SNA** in the *Address Type* column, **CENTRSITE** in the *Text* column, and press **Enter**.
3. Type **1** in the *Opt* column, **MGDSYS1** in the *Node Name* column, ***SNA** in the *Address Type* column, **MGDSYS1** in the *Text* column, and press **Enter**.
4. Type **1** in the *Opt* column, **MGDSYS2** in the *Node Name* column, ***SNA** in the *Address Type* column, **MGDSYS2** in the *Text* column, and press **Enter**.
5. Press **Enter**.
6. Change the change request activity in the QGPL/QSVNUPDS change request to specify the user profile the request will run under on the managed system.

   a. Enter `WRKCRQD CRQD(QGPL/QSVNUPDS)`.

b. Select option 8, *Work with activities*.
c. Select option 2, *Change*.
d. Specify the user profile and password the activity should run under in the managed system.

Note: If no profile is specified in the activity, the request runs under the user profile specified in the managed system attributes.

Run a change request to discover user profile details from the systems in the node list.

7. Type **SBMCRQ QGPL/QSVNUPDS** on the command line and press **Enter**.

   Note: For regular discovery of user profiles in your network, use the job scheduler to submit the change request QSVNUPDS.

Set Up CA/400 Optimized for OS/2 to be a Managed Client

1. **Configure SNMP on the client PC**:
   a. Double-click on the *AS/400 Workstation* icon on the OS/2 desktop to open the *AS/400Workstation - Icon View* window.
   b. Double-click on *Software Products*.
   c. Double-click on *Client Access/400 Products Registry*.
   d. Right-click on *Client Access/400 SNMP Support*.
   e. Click on *Open*.
   f. Click on *General settings*.
   g. Press the *Configure AnyNet* button.
   h. Type **100.1.1.n** in the *IP Address for SNA* field.
   i. Type **255.255.255.255** in the *Address Mask* field.
   j. Type **PCCLIENT** in the *LU Template* field.
   k. Type **NETID** in the *SNA Network Name* field.
   l. Click on the *Remote nodes* tab.
   m. Type **100.1.1.80** in the *IP Address for SNA* field.
   n. Type **255.255.255.255** in the *Address Mask* field.
   o. Type **CENTRSITE** in the *LU Template* field.
   p. Type **NETID** in the *SNA Network Name* field.
   q. Press the *Save* button.
   r. Click on the *SNMP* tab.
   s. Type some meaningful data in the *System location* and *System contact* fields.
   t. Type **100.1.1.1** in the *System to notify* field.
   u. Close the *Client Access/400 Communications - General Settings* window and save your changes.
2. **Change the PC system name**:
   a. Edit *CONFIG.SYS*.
   b. Change or add the command `SET HOSTNAME = SMGUIxx` where `PCCLIENT`.

3. **Enabled the PC as a managed client**:

   This enables sockets and other components required to managed your PC from an SNMP-based managing system (the GUI in our case).

   a. Edit the `CASERV.CMD` file in `CAOS2` subdirectory.

      Change `REM CALL CASNMP.CMD` to `CALL CASNMP.CMD`

      Change `REM DETACH SIASTART.CMD` to `DETACH SIASTART.CMD`

   b. Edit the `CACOM.CMD` file in `CAOS2` subdirectory.

      Change `REM CALL SXSTART.CMD` to `CALL SXSTART.CMD`

Only for CM/2 Communications

Use the steps a through y below on only if you are using the CM/2 support. Do not follow these steps if you are using the CM/400 support provided in Client Access/400.

4. **Configure PC communications definitions**:

   a. Open the *Communication Manager/2* folder.

   b. Double-click on *Communications Manager Setup* in the *Communications Manager/2 - Icon View* folder.

   c. Press the *OK* button on the Copyright panel.

   d. Press the *Setup* button.

   e. Press the *OK* button.

   f. Click on *Additional definitions*.

   g. Select *Token-ring or other LAN types*.

   h. Select *CPI Communications*.

   i. Press the *Configure* button.

   j. Select *SNA Features*.

   k. Press the *Configure* button.

   l. Select *Transaction program definitions*.

   m. Press the *Create* button.

   n. Type **AREXECD** in the *Transaction program (TP) name* field.

   o. Type **D:CAOS2CWBARRRC.EXE** in the *OS/2 program path and file name* field.

   p. Type **Remote Command** in the *Optional comment* field.

   q. Press the *Continue...* button.

   r. Click on *Background*.

   s. Click on *Queued, Attach Manager started*.

   t. Press the *OK* button.

   u. Press the *Close* button.

   v. Press the *Close* button.

   w. Press the *Close* button.

x. Press the *Yes* button when asked to *dynamically update your SNA resources*.

y. Press the *Close* button.

Only for Client Access/400 Communications

Use the steps a through u below if you are using the Communications Manager support provided with Client Access/400. Do not follow these steps if you are using CM/2 support.

a. Open the *AS/400 Workstation* folder.

b. Double-click on *Software Products*.

c. Double-click on *Client Access/400 Products Registry*.

d. Right-click on *Client Access/400 Optimized for OS/2* (this is the first product in the list).

e. Click on *Open*.

f. Click on *General settings*.

g. Click on *TPs* tab to open the *Transaction Programs* page of the notebook.

h. Press the *Add* button.

i. Type **AREXECD** in the *Transaction program name* field.

j. Type **D:CAOS2CWBARRRC.EXE** in the *Program path and file name* field.

k. Type **Remote Command** in the *Description* field.

l. Press the *Advanced options...* button.

m. Click on *Allow commands from all users*.

n. Click on *Background*.

o. Click on *Queued, Attach Manager started*.

p. Press the *OK* button.

q. Press the *Add* button to close the *Transactions programs - add* window.

r. Close the *Client Access/400 - General Settings* window.

s. Close the *Client Access/400 Products Registry* window.

t. Close the *Software Products - Icon View* window.

u. Close the *AS/400 Workstation - Icon View* window.

5. **Start the trap manager on the managing system**:

   On the managing system:

   a. Type **STRTRPMGR** on the command line and press **Enter**.

Problems Discovering Nodes?

If you are having problems with topology manager, refer to “Debugging Topology Manager Function” on page 458 for techniques about debugging topology manager problems.

If you are having problems with Client Access/400 clients, refer to “Debugging Client Access/400 SNMP Support” on page 460.

Debugging Topology Manager Function

This section describes the various techniques that can be used when debugging a problem with the topology manager function.

Topology Manager Unable to Contact Remote System or Systems

Note: Symptoms from the GUI include:

- Icons appear as nodes instead of black AS/400 boxes.
- Nodes not found in topology list.

Check QVATTMGR job in subsystem QSYSWRK, it should be running. Look at joblog for any escape messages and/or timeout messages, (that is, unable to contact system ....). If the job is not found, look at the joblog under user profile QSVMSS.

Determine if timeouts are occurring for all systems, or just a few.

At the central site, issue the DSPAPPNINF command to view the local topology. These systems should also appear in the topology manager database file QAVATSYS. You can check by runnig a query:

```
RUNQRY *NONE QUSRSYS/QAVATSYS
```

Verify that TCP is started on all systems.

Note: TCP does not have to be configured. This is required for AnyNet.

Verify that SNMP agent is active. The following jobs should be running in the QSYSWRK subsystem: QSNMPSA, QTMSNMP, QTMSNMPRCV. Look at the SNMP agent joblogs to determine if an SNMP agent problem exists.

Verify the AnyNet configuration. The PRTIPSCFG command can be used. Verify the configuration at the central site and at the remote site.

Note: If configuration indicates that *NETATR was used to indicate the network id, verify that XPF PTF SF24258 is installed on the system.

If communications is suspected, FTP may be used (if available) to verify that AnyNet (sockets over SNA) is working correctly. Try to FTP from the central site to the remote site using the IP over SNA address. Also check VLOGs for any communication problems.

Verify that the community name used by the topology manager and configured for the SNMP agent are identical, (including blanks and null characters).

Try to discover the system from the GUI using the Discover Node option from the central site.

If network congestion is high, changing the SNMP timeout value may be appropriate. The timeout value is set to 45 seconds at install. This value should be sufficient. However, if this is suspected, to change the timeout value to 100 seconds, issue the command:

- CHGDTAARA DTAARA(QUSRSYS/QVATMGDA (281 4)) VALUE(X'00000064')

Note: The maximum timeout value allowed is 100 seconds.

Nodes Not Discovered

Note: Symptoms from the GUI include:

- Topology List does not contain the expected nodes.

Has the topology manager been started?

Verify that the central site is a Network Node.

Note: It is not required that the central site be a network node, however, network nodes are ″smarter″. It is recommended that the central site be a Network Node because they know about all other network nodes and local end nodes.

If the expected node is in another network (that is, a different network ID), verify that a point a presence is defined for that network.

Is the topology manager contacting the point of presence system? If not, verify TCP and SNMP is running on the remote system. Check AnyNet configuration and community names.

Topology Manager Unable to Discover Clients

Note: Symptoms from the GUI include:

- Client icons not appearing in topology list.

Verify that the client administration database on the AS/400 system managing the particular client is populated with the correct information (`RUNQRY *NONE QUSRSYS/QAZCADIR`).

If the client does not appear in the client administration database, verify that the client is configured to send an SNMP trap to the managing AS/400 system. For clients running Client Access Optimized for OS/2, verify that the system to notify is configured.

Verify the SNMP Trap Manager is started on the managing AS/400 system.

Test Mode Facility

The topology manager job QVATTMGR has the ability to dump informational messages to the joblog as the topology manager polls the remote systems for their information. In some cases, it may be beneficial to determine exactly when and where the topology manager encounters problems during the polling cycles. To submit the job in test mode, issue the following command:

```
SBMJOB CMD(CALL PGM(QSVMSS/QVATTMGR) PARM(TEST)) JOB(QVATTMGR)
                JOBD(QSVMSS/QVATJOBD) PRTDEV(*JOBD) OUTQ(*JOBD)
                USER(*JOBD) RTGDTA(*JOBD) INLLIBL(*JOBD)
```

Initializing the Topology Database

At times, it may be necessary to clear the topology database files and start all over. To initialize the database files, issue the command:

```
CALL QSVMSS/QVATINZ
```

This may be necessary in the following situations.

- A severe error corrupted the topology database files.

- Trying to debug a problem that occurs at startup.
- Clean up the topology database files immediately.

Debugging Client Access/400 SNMP Support

This section describes some techniques that can be used when debugging a problem with a client that is displayed as a client icon by the GUI.

Note: Symptoms from the GUI include:

- Icon appears as node instead of PC client box.

1. Verify the client is registered in the client administration database:

   ```
   RUNQRY *NONE QUSRSYS/QAZCADIR
   ```

2. Make sure the trap manager is running on the managing AS/400 system:

   ```
   WRKACTJOB SBS(QSYSWRK)
   ```

   You should see the following jobs:

   ```
   QTRAPMGR
   QTRAPRCV
   QZCATHR
   ```

   If you do not, enter STRTRPMGR, shut down, and restart your PC and CA/400 to force to send the trap again.

3. Make sure the SNACKETS mode exists on the AS/400 managing system.

   ```
   DSPMODD SNACKETS
   ```

4. Watch the SNAKETS window on the PC when it comes up and make sure there are no errors logged.

5. Make sure the client and the AS/400 system are communicating:

   - From the client, PING the AS/400 IP address.
   - From the AS/400 system, PING the client IP address.

6. Make sure there are no entries with the same client IP address and a different host name:

   ```
   RUNQRY *NONE QUSRSYS/QAZCADIR
   ```

   Move the window to the right (F20) and look for the IP address of the clients in the client administration database. Verify that there are no entries with host name ANYNETxxxx and the same IP address as your client.

7. To remove entries from the AS/400 client administration database:

   ```
   CALL PGM(QZCARMVC) PARM('***index***' X'00000000')
   ```

   where ***index*** is the unique client index associated with the client in the AS/400 client administration database.

8. To refresh a client in the database, call the AS/400 program:

   ```
   CALL PGM(QZCAREFC) PARM('***index***' '*ALL' X'0000002B' X'00000000')
   ```

9. Look for errors in the joblog for job QZCATHR in QSYSWRK.

Tip

Be Patient. Depending on the topology manager job cycle it might take between 30 minutes and 1 hour to discover the clients and display them as such in the GUI topology.

Appendix B. Programming Examples Used in this Book

This book contains many programming examples to demonstrate the usage of Operations Control Center/400. For most of the examples, we have provided source code as well as executable AS/400 objects to allow you to:

- Use these examples on your own system.
- Modify the code to fit in your environment.
- Use the examples for testing more advanced functions of Operations Control Center/400.

"Overview of Programming Examples" provides a short description of each object and refers to the appropriate page in this book where the example is described in detail.

"Diskettes Contents" on page 465 provides you with instructions to copy the examples from the provided PC diskette to your AS/400 system.

Note:

All sample programs provided on the diskette and described in the preceding chapters of this book are examples only. They are neither complete applications nor are they tested in depth. Although you *may* be able to use them for your day-to-day systems management tasks on your AS/400 system, you should not expect to do so without applying some modifications first.

Overview of Programming Examples

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Diskettes Contents

The following sections describe the contents of the diskettes that you received with this book and the installation instructions.

PC Files

The diskettes that you received with this book contain files in 3.5-inch PC format. After the installation is complete, the library GG244372 and the folder FRANCE are restored on your AS/400 system. We list the files in the diskettes for verification purposes only; you *do not* need to be concerned with the contents of the file to perform the installation. Figure 305 shows the diskette 1 directory.

```
DKTN001              9   2-10-95   9:19p
INSTALL  EXE    70837   4-08-94   1:42a
CSC2000           116  10-03-93   9:19p
CSC2001           520  10-03-93   2:37p
CSC2002          1106  10-03-93   1:37a
CSD2000           235   9-19-93   3:26a
CSM2000         48351   4-08-94  12:15a
CSM2050          9855   9-19-93   3:27a
INSTALL  DAT      205   2-10-95   9:29p
LIBSAVF  001  1323008   2-10-95   9:28p
```

Figure 305. Redbook Diskette 1 Directory

Figure 306 shows the diskette 2 directory.

```
DKTN002              9   2-10-95   9:29p
INSTALL  DAT      205   2-10-95   9:29p
LIBSAVF  001     6116   2-10-95   9:29p
DLOSAVF  001    11743   2-10-95   9:29p
```

Figure 306. Redbook Diskette 2 Directory

Install Process

Before attempting to restore the redbook's diskettes on an AS/400 system, verify the following:

1. OS/400 V3R1 or later is installed on your system.
2. DOS CA/400 router is active to the target AS/400 system. You **must** start the DOS CA/400 router using the user ID QSECOFR.
3. System Manager/400 and Managed System Services/400 are installed on your system.

Before proceeding, make sure you have access to the QSECOFR password.

Use the following steps to upload the library GG244372 and folder FRANCE to your AS/400 system:

1. Verify that a library with the name GG244372 and a folder named FRANCE do not already exist on your system.
2. Make sure there is an active DOS CA/400 router session to the AS/400 system you are uploading the contents of the diskette to. Start the router as QSECOFR.

3. Insert diskette 1 in drive A. At the A > prompt, type:

   `A:\>INSTALL//System_Name`

   Press Enter.

   If no target system name is specified, the default system name is used.

4. Insert diskette 1 or 2 as prompted.

The INSTALL process takes between 10 to 20 minutes depending on the model of your PC and AS/400 system and how busy your AS/400 system is.

At the end of the installation process, you should receive the following message:

`INSTALLATION PROCESS HAS COMPLETED SUCCESSFULLY`

Note: If problems arise during the installation, the installation program attempts to provide you with the necessary information to determine why the INSTALL failed.

If the failure is related to APPC (Advanced Program-to-Program Communication), only a return code is displayed. An APPC error is usually indicative of a CA/400 configuration problem or a resource contention problem.

When a failure is related to a Remote Command API, no message is displayed other than `Install of software product failed ...` For this type of failure, it is necessary to delete the installation library WWPCMINS0Z and rerun the install process using the /EMSG parameter, as follows:

`A:\>INSTALL//Sytem_Name/EMSG`

This displays all of the messages that occurred up to the point of failure. The failure is probably apparent once you are able to see the messages.

What to do After Installing the Redbook Library

After you have successfully restored the diskette contents to your AS/400 system, run the program:

`CALL GG244372/SETUPOCC`

This program sets up the environment for some of the examples in the redbook.

Authority Needed to Run the Redbook Examples

To run the redbook examples, you need authority to all of the System Manager/400 and Managed System Services/400 commands (by default, the commands have public authority *EXCLUDE). For the sake of simplicity, we recommend that you run the redbook examples using a user profile with *ALLOBJ authority.

On the managed system or systems, you must also change the default user profile for activities to run under a profile with *ALLOBJ authority. See “Changing the Default User Profile in the Managed System Attributes” on page 92 for information on how to change the default user profile on the managed systems.

Glossary

A

Activity. The name of an operation initiated by central site system. An activity is a single step within a change request description. This is equivalent to the PHASE name within NetView DM where the PHASE can only have one function. (Examples of an activities are SEND, DELETE, INSTALL, ACCEPT...)

Activity condition (or Condition). Defines criteria that must be met before the activity can start executing. An activity can be conditioned on the results of other activities.

Activity Type. The activity type specifies the type of operation the activity defines. The user can register his/her own activity types via the Register Activity Type API. (Examples of IBM defined activity types are *OBJ - object distribution, *PTF - PTF distribution, ...)

C

Central Site System. Within the context of System Manager/400, a central system is able to *manage* or *control* other systems. The SystemView architecture also describes this as a *focal point*. The counterpart of a central system is a *managed system*. Using Operations Control Center/400 products, a central system must have System Manager/400 and Managed System Services/400 installed.

Change Request. An executable instance of a change request description. A change request is uniquely identified by the change request name and a sequence number. A good analogy of the relationship of a change request description to a change request might be a job description and a submitted job.

Change Request Description. An object on the AS/400 that describes a change to be made to the computing environment. The object, which maintained only at the central site AS/400 system(s), consists of a list of activities which describe the steps needed to make the change. This is equivalent to the PLAN name within NetView DM.

Change Request Activity. See Activity

D

Distribution Catalog. In SystemView Managed System Services/400, a list of objects, identified by SNA global names, with associated object characteristics and indications as to where the objects are located. Objects may be stored as standard AS/400 objects (in a library or folder) or in the distribution repository.

Distribution Repository. In SystemView Managed System Services/400, a staging area for objects that are to be sent or have been received. Objects are leaded into the repository to be sent to managed systems at a later time.

G

Global Name. In SystemView Managed System Services/400, the name by which an object is known to SNA File Services (SNA/FS). SNA/FS enables objects to be uniquely named in an SNA network with systems of different types.

L

Licensed Internal Code (LIC). The layered architecture below the machine interface (MI) and above the machine, consisting of the model-independent, and the model-unique Licensed Internal Code or feature-unique Licensed Internal Code. The Licensed Internal Code is a proprietary system design that carries out many functions, including, but not limited to storage management, pointers and addressing, program management functions, exception and event management, data functions, I/O managers, and security.

M

Managed System. A managed system can be controlled by a central system. In terms of Operations Control Center/400 it uses Managed System Services/400.

N

Node(s). The system (specified as a network ID and control point name) that is the target of the activity. If the special value *LCL is displayed, the destination node is the local system.

Node list. The AS/400 node list object that defines the destination nodes for the activity.

P

PTF. Program Temporary Fix. A temporary solution to or bypass of a problem diagnosed by IBM as resulting from a defect in a current unaltered release of a licensed program.

R

Registered Enterprise-unique Identifier. A name given to an entire network that makes the network unique among other networks, including IBM networks. New users are requested to register the network name with IBM if they plan to communicate with IBM networks (for PTF information, for example).

S

Service Provider. The system used to provide problem-handling support to another AS/400 system or system connected to it by communications lines. The service provider may also be the alert focal point in a network. Contrast with *service requester*.

Service Requester. The AS/400 system with a program or equipment problem that requires and asks for problem-handling support from another AS/400 system in a network. Contrast with *service provider*.

SNA (Systems Network Architecture). In IBM networks, the description of the layered logical structure, formats, protocols, and operational sequences that are used for transmitting information units through networks, as well as controlling the configuration and operation of networks.

Systems Network Architecture (SNA). See SNA.

SNADS. SNA Distribution Services. An IBM asynchronous distribution service that defines a set of rules to receive, route, and send electronic mail in a network of systems.

SNA/MS. SNA Management Services Transport. A set of application program interfaces (APIs) that provide support for the transport of data between management applications running in an APPN network and assistance in maintaining the node relationships for network management.

SNA/FS. SNA/File Services. A service that allows files to be fetched moved, and stored at nodes in a SNADS network. SNA/FS provides name structure and version identification mechanisms that uniquely identify files in a network.

Systems Management. All of the actions and procedures that accomplish the business support activity of making information systems services available. Information systems services include host, application, network, and data services.

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