

System Automation for OS/390



User's Guide

Version 2 Release 1

System Automation for OS/390



User's Guide

Version 2 Release 1

Note!

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

Fifth Edition (December 2001)

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OS/2	OS/390
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About This Book

This book describes System Automation for OS/390 (SA OS/390), which runs on OS/390. Contents include information on how to use SA OS/390 to monitor and control your systems.

This document provides an overview of the operator tasks. It points you to ways to manage your systems. For further detail, refer to the help panels or online documentation available on both 3270 panels and workstation windows.

Who Should Use This Book

Installing, maintaining and using SA OS/390 is performed by personnel from the user groups defined in "SA OS/390 User Groups". This book is intended primarily for operators, but may also be useful for others. The information provided is specifically about using SA OS/390 and assumes the following knowledge and experience:

- An understanding of OS/390
- An understanding of basic network concepts and terminology
- Using NetView
- Using the NetView Management Console (NMC)
- Responding to messages and some trouble-shooting

System administrators, programmers and help desk personnel may find the information helpful for installation, maintenance, and investigating and correcting problems. It also helps educate users about the SA OS/390 functions.

SA OS/390 User Groups

There are the following primary SA OS/390 user groups:

- **System programmers** are responsible for:

- **product installation**

- This is basically taking the product from tape and moving it into system libraries.

- **system configuration**

- This is basically allocating data sets and configuring individual systems to run the product. At the end of this process, a ready to use installation of the customization dialog and NetView is available to be used by further SA OS/390 user groups. Additional work may be required to help set up processor operations and the NMC workstation.

- **maintenance**

- This is the task of applying APARs to the base code and performing whatever system actions are required afterwards.

- **Automation programmers** are responsible for:

- **policy migration**

- If your enterprise uses policy for earlier SA OS/390 releases, this information needs to be migrated to the new release.

- **policy definitions and distribution**

- Using the customization dialog, automation programmers will, with help

from specialist system programmers and operators, define the automation policy for the enterprise. This includes the definition of all automated resources and the individual definitions required for each resource. Thus they are creating the knowledge base that SA OS/390 will use to run their applications and systems. As the creation of this knowledge base can be done centrally on a system where the customization dialog is installed, the policy files that are created need to be distributed to the appropriate target systems before they can be used.

automation customization

This covers writing and modification of customer automation procedures that run alongside SA OS/390. Existing automation procedures may need modifying to take account of changes that have been made with the current SA OS/390 release.

workstation setup and configuration

This task will also often fall upon the automation programmers. It is concerned with getting a workstation set up to run the SA OS/390 workstation, the NMC workstation and for the workstation user to be able to issue commands from it.

- **Operators** are the end users of the product, as it aims to simplify their jobs. They are responsible for:

ensuring application availability

This basically means starting applications when they need to be started, picking them up if they break down and stopping them when required.

monitoring systems and applications

Operators are responsible for detecting any problems that might occur with the systems or with the application software running upon them. When they find one, they will generally try a few standard fixes and then contact a system programmer.

IPLs and shutdowns

Operators are responsible for ensuring the orderly shutdown of systems and applications when they need to be stopped, and for their successful restarting afterwards.

special operations

This covers all of the things that the operators are asked to do that are not a part of their scheduled (or planned) activities. Examples might be keeping an application available until later in the day, changing the time that a particular event will happen, recycling applications to pick up fixes, or issuing special commands after an application has been started.

Where to Find More Information

The System Automation for OS/390 Library

The following table shows the information units in the System Automation for OS/390 library:

Table 1. System Automation for OS/390 Library

Title	Order Number
<i>System Automation for OS/390 General Information</i>	GC33-7036
<i>System Automation for OS/390 Licensed Program Specifications</i>	SC33-7037
<i>System Automation for OS/390 Planning and Installation</i>	SC33-7038
<i>System Automation for OS/390 Customizing and Programming</i>	SC33-7035
<i>System Automation for OS/390 Defining Automation Policy</i>	SC33-7039
<i>System Automation for OS/390 User's Guide</i>	SC33-7040
<i>System Automation for OS/390 Messages and Codes</i>	SC33-7041
<i>System Automation for OS/390 Operator's Commands</i>	SC33-7042
<i>System Automation for OS/390 Programmer's Reference</i>	SC33-7043
<i>System Automation for OS/390 CICS Automation Programmer's Reference and Operator's Guide</i>	SC33-7044
<i>System Automation for OS/390 IMS Automation Programmer's Reference and Operator's Guide</i>	SC33-7045
<i>System Automation for OS/390 OPC Automation Programmer's Reference and Operator's Guide</i>	SC23-7046

The System Automation for OS/390 books (except Licensed Program Specifications) are also available on CD-ROM as part of the following collection kits:

IBM Online Library OS/390 Collection (SK2T-6700)

IBM Online Library z/OS Software Products Collection (SK3T-4270)

This softcopy collection includes the IBM Library Reader, a program that enables you to view online documentation.

SA OS/390 Homepage

For the latest news on SA OS/390, visit the SA OS/390 homepage at <http://www.ibm.com/servers/eserver/zseries/software/sa>

Related Product Information

The following table shows the books in the related product libraries that you may find useful for support of the SA OS/390 base program.

Table 2. Related Products Books

Title	Order Number
<i>ISPF User's Guide</i>	SC34-4484
<i>ISPF Dialog Management Guide and Reference</i>	SC34-4266
<i>MVS/ESA MVS Configuration Program Guide and Reference</i>	GC28-1817
<i>MVS/ESA Planning: Dynamic I/O Configuration</i>	GC28-1674
<i>MVS/ESA Support for the Enterprise Systems Connection</i>	GC28-1140
<i>MVS/ESA Planning: APPC Management</i>	GC28-1110
<i>MVS/ESA Application Development Macro Reference</i>	GC28-1822
<i>MVS/ESA SP V5 System Commands</i>	GC28-1442

Table 2. Related Products Books (continued)

Title	Order Number
<i>MVS/ESA SPL Application Development Macro Reference</i>	GC28-1857
<i>OS/390 Hardware Configuration Definition: User's Guide</i>	SC28-1848
<i>OS/390 Information Roadmap</i>	GC28-1727
<i>OS/390 Information Transformation</i>	GC28-1985
<i>OS/390 Introduction and Release Guide</i>	GC28-1725
<i>OS/390 JES Commands Summary</i>	GX22-0041
<i>OS/390 Licensed Program Specifications</i>	GC28-1728
<i>OS/390 Printing Softcopy Books</i>	S544-5354
<i>OS/390 Starting Up a Sysplex</i>	GC28-1779
<i>OS/390 Up and Running!</i>	GC28-1726
<i>Planning for the 9032 Model 3 and 9033 Enterprise Systems Connection Director</i>	SA26-6100
<i>Resource Access Control Facility (RACF) Command Language Reference</i>	SC28-0733
<i>S/390 MVS Sysplex Overview – An Introduction to Data Sharing and Parallelism</i>	GC23-1208
<i>S/390 MVS Sysplex Systems Management</i>	GC23-1209
<i>S/390 Sysplex Hardware and Software Migration</i>	GC23-1210
<i>S/390 MVS Sysplex Application Migration</i>	GC23-1211
<i>S/390 Managing Your Processors</i>	GC38-0452
<i>Tivoli/Enterprise Console User's Guide Volume I</i>	GC31-8334
<i>Tivoli/Enterprise Console User's Guide Volume II</i>	GC31-8335
<i>Tivoli/Enterprise Console Event Integration Facility Guide</i>	GC31-8337
<i>Tivoli for OS/390 NetView V1R3 Administration Reference</i>	SC31-8222
<i>Tivoli for OS/390 NetView V1R3 Application Programmer's Guide</i>	SC31-8223
<i>Tivoli for OS/390 NetView V1R3 APPN Topology and Accounting Agent Guide</i>	SC31-8224
<i>Tivoli for OS/390 NetView V1R3 Automation Guide</i>	SC31-8225
<i>Tivoli for OS/390 NetView V1R3 AON Customization Guide</i>	SC31-8662
<i>Tivoli for OS/390 NetView V1R3 AON User's Guide</i>	GC31-8661
<i>Tivoli for OS/390 NetView V1R3 Bridge Implementation</i>	SC31-8238
<i>Tivoli for OS/390 NetView V1R3 Command Reference Vol. 1</i>	SC31-8227
<i>Tivoli for OS/390 NetView V1R3 Command Reference Vol. 2</i>	SC31-8227
<i>Tivoli for OS/390 NetView V1R3 Customization Guide</i>	SC31-8228
<i>Tivoli for OS/390 NetView V1R3 Customization: Using Assembler</i>	SC31-8229
<i>Tivoli for OS/390 NetView V1R3 Customization: Using Pipes</i>	SC31-8248
<i>Tivoli for OS/390 NetView V1R3 Customization: Using PL/I and C</i>	SC31-8230
<i>Tivoli for OS/390 NetView V1R3 Customization: Using REXX and the NetView Command List Language</i>	SC31-8231
<i>Tivoli for OS/390 NetView V1R3 Data Model Reference</i>	SC31-8232
<i>Tivoli for OS/390 NetView V1R3 Installation and Administration Guide</i>	SC31-8236
<i>Tivoli for OS/390 NetView V1R3 Messages and Codes</i>	SC31-8237

Table 2. Related Products Books (continued)

Title	Order Number
<i>Tivoli for OS/390 NetView V1R3 MultiSystem Manager User's Guide</i>	SC31-8607
<i>Tivoli for OS/390 NetView V1R3 NetView Graphic Monitor Facility User's Guide</i>	GC31-8234
<i>Tivoli for OS/390 NetView V1R3 NetView Management Console User's Guide</i>	GC31-8665
<i>Tivoli for OS/390 NetView V1R3 User's Guide</i>	SC31-8241
<i>Tivoli for OS/390 NetView V1R3 Planning Guide</i>	GC31-8226
<i>Tivoli for OS/390 NetView V1R3 RODM and GMFHS Programmer's Guide</i>	SC31-8233
<i>Tivoli for OS/390 NetView V1R3 Security Reference</i>	SC31-8606
<i>Tivoli for OS/390 NetView V1R3 SNA Topology Manager and APPN Accounting Manager Implementation Guide</i>	SC31-8239
<i>Tivoli Management Platform Reference Guide</i>	GC31-8324
<i>TSO/E REXX/MVS User's Guide</i>	SC28-1882
<i>TSO/E REXX/MVS Reference</i>	SC28-1883
<i>VM/XA SP GCS Command and Macro Reference</i>	SC23-0433
<i>VSE/SP Unattended Node Support</i>	SC33-6412
<i>VTAM Messages and Codes</i>	SC31-6493
<i>VTAM Network Implementation Guide</i>	SC31-6404
<i>VTAM Network Implementation Guide</i>	SC31-6434

Using LookAt to look up message explanations

LookAt is an online facility that allows you to look up explanations for z/OS messages, system abends, and some codes. Using LookAt to find information is faster than a conventional search because in most cases LookAt goes directly to the message explanation.

You can access LookAt from the Internet at:

<http://www.ibm.com/servers/eserver/zseries/zos/bkserv/lookat/lookat.html>

or from anywhere in z/OS where you can access a TSO command line (for example, TSO prompt, ISPF, z/OS UNIX System Services running OMVS).

To find a message explanation on the Internet, go to the LookAt Web site and simply enter the message identifier (for example, IAT1836 or IAT*). You can select a specific release to narrow your search. You can also download code from the *z/OS Collection*, SK3T-4269 and the LookAt Web site so you can access LookAt from a PalmPilot (Palm VIIx suggested).

To use LookAt as a TSO command, you must have LookAt installed on your host system. You can obtain the LookAt code for TSO from a disk on your *z/OS Collection*, SK3T-4269 or from the LookAt Web site. To obtain the code from the LookAt Web site, do the following:

1. Go to <http://www.ibm.com/servers/eserver/zseries/zos/bkserv/lookat/lookat.html>.
2. Click the **News** button.
3. Scroll to **Download LookAt Code for TSO and VM**.

4. Click the ftp link, which will take you to a list of operating systems. Select the appropriate operating system. Then select the appropriate release.
5. Find the **lookat.me** file and follow its detailed instructions.

To find a message explanation from a TSO command line, simply enter: **lookat message-id**. LookAt will display the message explanation for the message requested.

Note: Some messages have information in more than one book. For example, IEC192I has routing and descriptor codes listed in *z/OS MVS Routing and Descriptor Codes*. For such messages, LookAt prompts you to choose which book to open.

Accessing licensed books on the Web

OS/390 licensed documentation in PDF format is available on the Internet at the IBM Resource Link Web site at:

<http://www.ibm.com/servers/resourceLink>

Licensed books are available only to customers with a OS/390 license. Access to these books requires an IBM Resource Link Web userid and password, and a key code. With your OS/390 order you received a memo that includes this key code.

To obtain your IBM Resource Link Web userid and password log on to:

<http://www.ibm.com/servers/resourceLink>

To register for access to the z/OS licensed books:

1. Log on to Resource Link using your Resource Link userid and password.
2. Click on **User Profiles** located on the left-hand navigation bar.
3. Click on **Access Profile**.
4. Click on **Request Access to Licensed books**.
5. Supply your key code where requested and click on the **Submit** button.

If you supplied the correct key code you will receive confirmation that your request is being processed. After your request is processed you will receive an e-mail confirmation.

Note: You cannot access the z/OS licensed books unless you have registered for access to them and received an e-mail confirmation informing you that your request has been processed.

To access the licensed books:

1. Log on to Resource Link using your Resource Link userid and password.
2. Click on **Library**.
3. Click on **zSeries**.
4. Click on **Software**.
5. Click on **OS/390**.
6. Access the licensed book by selecting the appropriate element.

Related Online Information

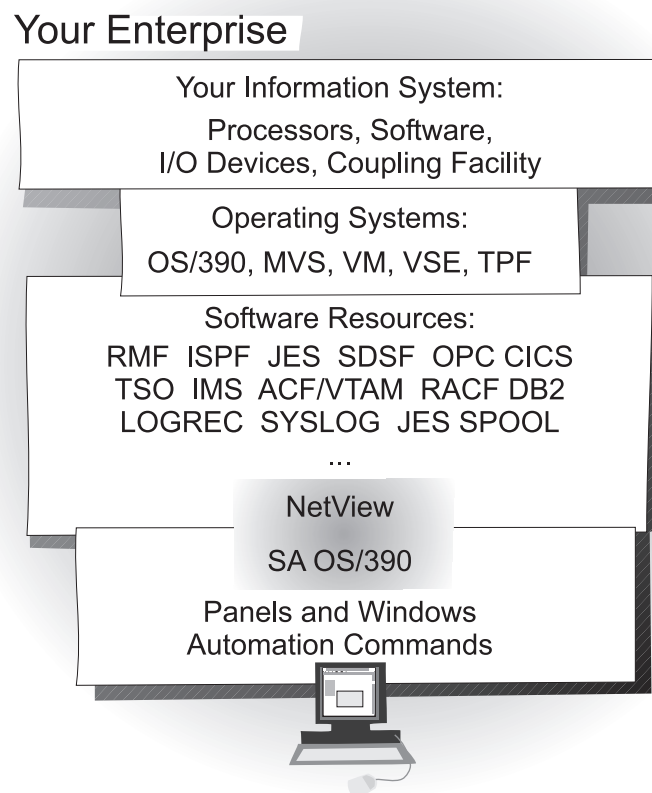
SA OS/390 provides online help for all parts of its operator interfaces. From any terminal display, press PF1 to obtain help for that display.

SA OS/390 also provides online help panels to support the tasks of installation and customization.

Part 1. Introduction and Concepts

Chapter 1. Introducing SA OS/390

System Automation for OS/390 (SA OS/390), which runs on OS/390[®], is a NetView-based application designed to provide you with a single point of control for a full range of systems management functions. SA OS/390 plays a key role in supplying high-end automation solutions. SA OS/390 functions include the monitoring, control and automation of a large range of system elements spanning both the hardware and software resources of your enterprise.



Overview

SA OS/390 is a systems management program with a single point of control. You see a single system image for a full range of essential systems management functions.

Monitor

Monitor your resources to respond before they affect end users:

- Monitor hardware components
- Monitor software products and applications
- Monitor automated processes
- Monitor messages and alerts

Control

Take action to control conditions:

- Start and stop your entire enterprise system; initiate hardware and software startup and shutdown sequences
- Manage both remote and local operations and support any MVS/ESA[®]-capable processor or any ES/9000[®] or S/390 parallel server within a parallel sysplex
- Manage several operating systems: MVS[™], VM, VSE, and TPF
- Control a coupling facility as a target system with coupling links in a parallel sysplex environment
- React to errors and unscheduled events

Automate

Automate many repetitive and complex tasks:

- Start/shutdown software resources
- Start/shutdown hardware resources
- Control channels and channel paths
- Control availability of I/O devices
- Control switching of I/O device ports
- Detect and respond to system messages
- Perform initial program load (IPL)
- Perform system power-on reset (POR)
- Synchronize clocks
- Build automation policy for your enterprise
- Extend the built-in automation routines by writing your own automation policies

You monitor and control hardware and software resources from an NMC workstation or from a NetView console.

Component Description

System Operations

System operations monitors and controls system operations applications and subsystems such as NetView, SDSF, JES, RMF[™], TSO, RODM, ACF/VTAM[®], DB2[™], CICS[®], IMS[™], and OPC.

With system operations, you can automate parallel sysplex applications. SA OS/390 can automate applications distributed over a sysplex by virtually removing system boundaries for automation through its automation manager/automation agent design exploiting MQSeries[®] technology. SA OS/390 reduces the complexity of managing a parallel sysplex through its goal driven automation and its concepts such as grouping and powerful dependency support which enable you to model your configuration. Single systems are also fully supported; the automation scope is then just one system.

Enterprise monitoring is used by SA OS/390 to update the NetView Management Console (NMC) resource status information which is stored in the Resource Object Data Manager (RODM).

Processor Operations

Processor operations monitors and controls processor hardware operations. It provides a connection from a focal point processor to a target processor. With NetView on the focal point system, processor operations automates operator and system consoles for monitoring and recovering target processors.

Processor operations allows you to power on and off multiple target processors and reset them, perform IPLs, set the time of day clocks, respond to messages, monitor status, and detect and resolve wait states.

I/O Operations

I/O operations provides a single point of control for managing connectivity in your active I/O configurations. It takes an active role in detecting unusual I/O conditions and lets you view and change paths between a processor and an input/output device, which can involve using dynamic switching (the ESCON[®] switch).

I/O operations changes paths by letting you control channels, ports, switches, control units, and input/output devices. You can do this through an operator console or API.

Hardware System Overview

Figure 1 on page 6 illustrates a basic hardware system and some of the types of hardware resources that can be attached.

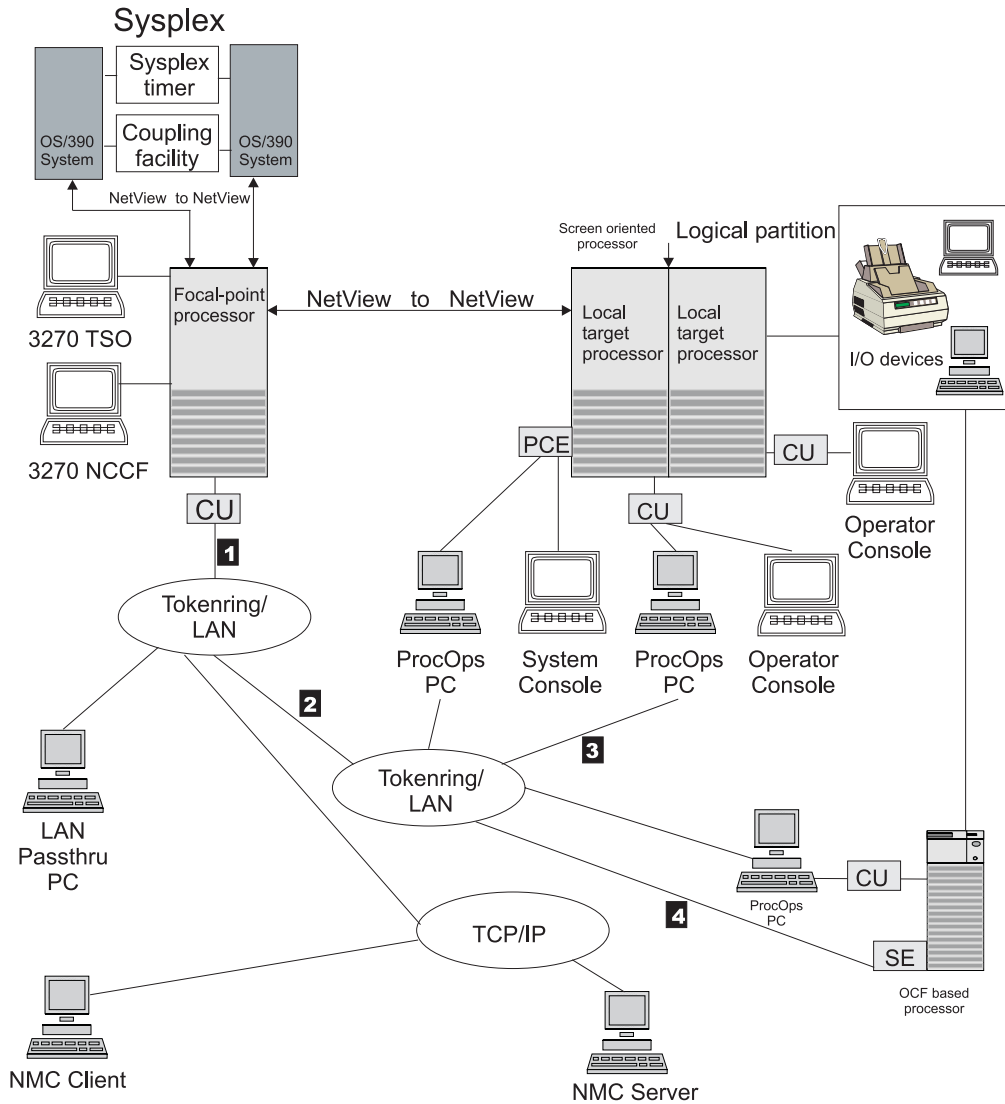


Figure 1. A Basic Hardware System

SA OS/390 Resources

The following table describes the functions and resources used by SA OS/390 and its components.

Focal point processor

In a multi-system environment, the primary (or *issuing*) host processor has SA OS/390 installed. You might think of it as SA OS/390's *command center*. This is where you enter commands you want to process. It includes a central processor complex which is a collection of hardware that consists of central storage, one or more central processors, timers, and channels. NetView and SA OS/390 are installed on this processor.

Target processor	The processor that is controlled by a focal point processor. It can be a local or remote processor, or a logical partition of a processor. When you send a command from a focal point system, the target is the processor you want the command to affect. The operating system can be OS/390, VM, TPF, VSE, or a coupling facility. If the operating system is OS/390, SA OS/390 should be installed on the target processor for full SA OS/390 functionality. If the operating system is VM, TPF, VSE, or if the target processor is a coupling facility, only SA OS/390 processor operations functions are available for the target.
OCF-based processor	A central processor complex that uses an operations command facility (OCF) for interacting with human operators or external programs to perform operations management functions on the central processor. The HWMCA workstation (described on page 15) uses OCF to process commands.
Screen-oriented processor	A central processor complex that interacts with human operators through line-mode display consoles. For System/390® and System/370™ processors, the display consoles use either an IBM 3270 data stream or an ASCII data stream. Contrasts with <i>OCF-based processor</i> .
Sysplex	<p>A set of OS/390 systems communicating and cooperating with each other through certain multi-system hardware components (coupling devices and sysplex timers) and software services (couple data sets). In a sysplex, OS/390 provides the coupling services that handle the messages, data, and status for the parts of a multi-system application that has its workload spread across two or more of the connected processors. Sysplex timers, coupling facilities, and couple data sets containing policy and states for basic simplex functions are all parts of a sysplex.</p> <p><i>A parallel sysplex</i> is a sysplex that includes a coupling facility.</p> <p>An OS/390 sysplex can be viewed and managed as a single system image on the NMC workstation.</p>
Logically Partitioned (LPAR) mode	<p>A processor with the PR/SM feature that can be divided into partitions with separate logical system consoles that allocates hardware resources among several logical partitions. (It is called <i>logical</i> because the processor is not physically divided, but divided only by definition.) The partitions are defined, monitored, and activated separately by processor operations.</p> <p>A processor that does not use logical partitions is in “basic mode”.</p>

Images	<p>Processors can operate as <i>single images</i> or <i>partitioned images</i>. A single image allows a multiprocessor system to function as one central processor complex.</p> <p>A multiprocessor system that functions as two or more independent processors (with separate power, water, and maintenance boundaries) is a <i>physically partitioned configuration image</i>.</p>
Communications paths	<p>Paths that connect the focal point system processor to target processors so that commands, messages, and alerts can flow.</p> <p>A type of network-accessible port — also called a VTAM® or <i>NetView connection</i> (NVC) — LU 6.2 permits communication between the focal point system to the OCF. It enables end users to gain access to SNA network resources and communicate with each other.</p>
Communications Task	<p>An SA OS/390 user task responsible for all communications with a number of personal computers. Communications tasks receive commands from target control tasks and send inbound messages to the message monitoring task. There can be many communications tasks. Communications tasks are defined using the customization dialog.</p>
Processor Operations PC port	<p>On a processor operations PC, a cable connector on a 3270 or ASCII logic card that attaches it to a processor. The port is associated with the screen handler for the processor operations PC and identified by a port letter. The screen handler sends commands, messages, and status between the target processor and processor operations.</p>
OSA	<p>I/O operations can display the open system adapter (OSA) channel logical definition, physical attachment, and status. You can configure an OSA channel on or off.</p>
ESCON Director	<p>The enterprise systems connection (ESCON) Directors (also known as <i>switches</i> or <i>dynamic switches</i>) are hardware electronic switching units with ports that dynamically switch to route data to input/output devices. Each port on the switch is an addressable connection, controlled by I/O operations commands. Two switches (one dynamic and one static) can be linked or chained together to increase the path length.</p>
Ports	<p>On an ESCON switch, a port is an addressable connection. The switch routes data through the ports to the channel or control unit. Each port can be given a name that can be entered into a switch matrix, and you can use commands to change the switch configuration.</p>

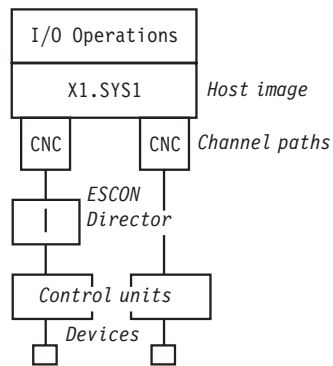
Control units	Control units are hardware units that control input/output operations for one or more devices. You can view information about control units through I/O operations, and can start or stop data going to them by blocking and unblocking ports. For example, if a control unit needs service, you can temporarily block all I/O paths going to it.
Coupling Facilities	A hardware storage element with a high-speed cache, list processor, and locking functions that provides high performance random access to data for one system image or data that is shared among system images in a sysplex. With I/O operations you can see stand-alone coupling facilities. It handles them as control units with up to eight devices, all defined by the user. With SA OS/390 system operations, you can display the status of coupling facilities from a single system's point of view or you can display sysplex-wide status.
Devices	Input/output devices include hardware such as printers, tape drives, direct access storage devices (DASD), displays, or communications controllers. You can access them through multiple processors. You can see information about all devices and control paths to devices. You can vary devices—or groups of devices—online or offline.
Sysplex Timer	An IBM unit that synchronizes the time-of-day (TOD) clocks in a multiprocessor or in processor sides. External Time Reference (ETR) is the generic name for the IBM Sysplex Timer (9037).
NMC Workstation	A NetView feature running on a personal computer that provides a graphic series of windows controlled by NetView allowing you to monitor the SA OS/390 enterprise graphically.
Automation policy	Operations and procedures (or <i>policy</i>) information is kept in files that describe routine repetitive procedures, as well as the resources in your enterprise and their relationships. Automation automatically starts, restarts, monitors, or stops resources. You define the policy using the customization dialog. The resulting files are the system operations control files (automation control file and automation manager configuration file) (see also "Automation Policy" on page 12).

Channels

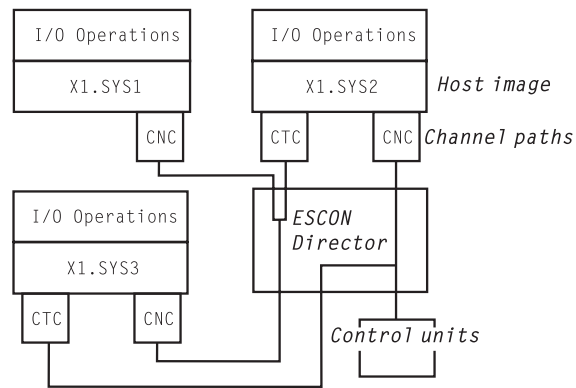
A channel is a path that transmits signals and data. It can be a standard channel or a special purpose channel such as OSA (open system adapter) or a coupling facility sender or receiver channel. For channels operating in block mode, you can display and change the state of the channels. The types of channels with ESCON switches supported by I/O operations are shown in the following list:

CNC A channel path that transfers data between a host processor image and an ESCON control unit. This path from a channel to a device may be point to

point or switchable.

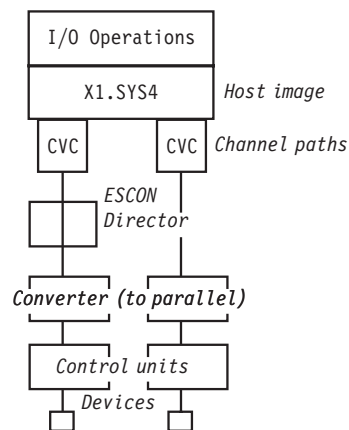


CTC The channel-to-channel (CTC) channel can communicate with a CNC on another host for intersystem communication.



CVC and CBY

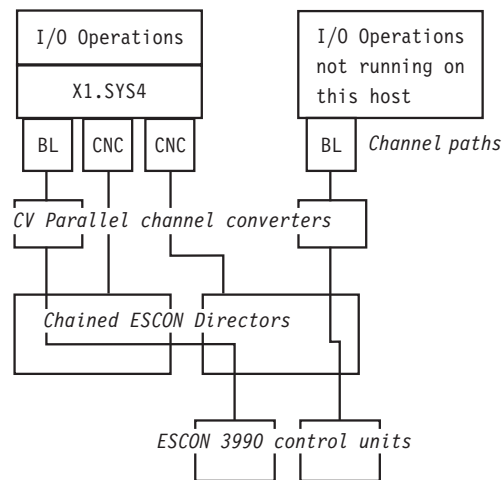
A channel operating in converted (CVC) mode transfers data in blocks and a CBY channel path transfers data in bytes. Converted CVC or CBY channel paths can communicate with a parallel control unit. This resembles a point-to-point parallel path and dedicated connection, regardless of whether it passes through a switch.



Parallel

Parallel channels operate in either byte (BY) or block (BL) mode. You can

change connectivity to a parallel channel operating in block mode.



CFR/CFS and ISC/ISR

The I/O operations component of SA OS/390 can display connectivity data and control connectivity for integrated system channels (ISC) connected to a coupling facility. This includes coupling facility receiver (CFR) channels and coupling facility sender (CFS) channels.

Processors, Systems

The SA OS/390 processor operations component monitors the status of target processors (including logical partitions) and target systems. The status is determined based upon messages and alerts from the target hardware that processor operations has received at the focal point system.

Alerts are high-priority events that require operator action. Alerts are issued for situations in the target hardware and target system, and also for situations in the supporting processor operations environment. The following alerts will result in a status change of a resource, which will in turn cause a change in the representation of that resource in the SA OS/390 displays, thus alerting you to a potential problem.

- Target hardware problem
- Wait state detected
- Disabled Console Communication Facility (DCCF) message detected
- Console lost
- Console access lost
- Communications task failed
- PC session lost
- System console could not be obtained

For OCF-based processors, processor operations automates support element-generated alerts to update status of resources viewable on SA OS/390 panels and graphic displays.

Messages received by processor operations at the focal point system allow processor operations to update the status of a target system as it initializes. You can view the initialization status of a target system using processor operations panels. Examples of some of the initialization statuses which can be seen are: Stage-1 Activate complete, IPL complete, IPL failed, Load failed, Waiting for IEA101A Start Message (OS/390 target systems), and Waiting for VM Start Message (VM target systems).

I/O Devices

On a dynamically updated resource display, the status of an I/O device is updated when a message to the operator console or to the OS/390 system log is trapped at the target system.

Automation Policy

Resource

Any target system, application, job, or associated hardware capable of being monitored or automated by SA OS/390.

Automation operators

Autotasks or unattended NetView tasks that do not require a terminal or logged-on operator. Automation operators may receive messages and process automation procedures.

(NetView) automation procedures

A sequence of commands, packaged as a NetView command list, a REXX procedure, or a command processor written in a high-level language. An automation procedure performs automation functions and runs under the NetView program. Automation procedures may exploit SA OS/390 generic routines.

NetView message automation table

A table against which the NetView program compares incoming messages. A match with an entry triggers the specified response.

Command processor

A module designed to perform a specific function. Command processors (which can be written in assembler or a high-level language) are invoked as commands.

Command list (CLIST)

A list of commands and statements written in the NetView command list language or REXX. The list performs specific functions for a user. It may be as simple as a list of commands, or complex and include variable substitution and conditional logic (more like a conventional program). Command lists are typically interpreted rather than compiled.

REXX procedure

A command list written with the Restructured Extended Executor (REXX) which is an interpretive language.

Policy database

The automation definitions (the automation policy) that the automation programmer specifies using the customization dialog is stored into the policy database. Also, using some function of the customization dialog, the automation programmer builds the system operations control files (ACF and AMC file) from the policy database. Another file built from the information contained in the policy database is the processor control file. These files derived from the policy database define how SA OS/390 applies automation to the resources.

Applications

In SA OS/390, applications refer to OS/390 subsystems, started tasks or jobs automated and monitored by SA OS/390. On SNMP-capable processors, "application" may be used to refer to a subsystem or process.

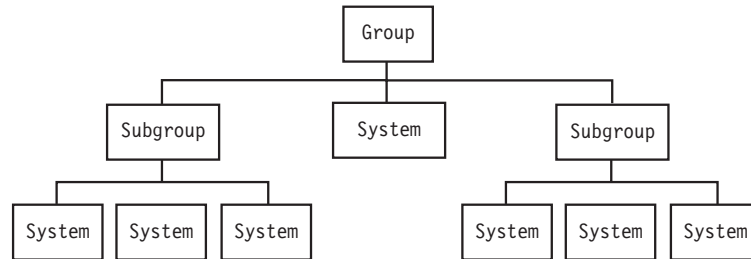
Application groups

Using the SA OS/390 customization dialog, you can group applications

into application groups. Application groups are linked to a system. Thus you can have SA OS/390 automate applications that belong or depend on each other in one unit.

Grouped resource objects

Systems can be organized into groups or subgroups to simplify working with them and displaying them on panels. They can be grouped this way:



System groups can either be *standard* or *sysplex*, but processor operations treats them both the same. Applications can be grouped for being automated as an entity.

Status display facility (SDF)

An SA OS/390 facility that provides a 3270-based display of automated systems and resources using assigned status colors. An operator can monitor the status of automated systems and resources by viewing the SDF main panel.

Workstations and Consoles

You control your systems using SA OS/390 on NetView consoles or from the NMC workstation.

Some workstations are attached directly to the processor, some through a control unit (CU), and some through the local area network (LAN) as illustrated in Figure 2 on page 14.

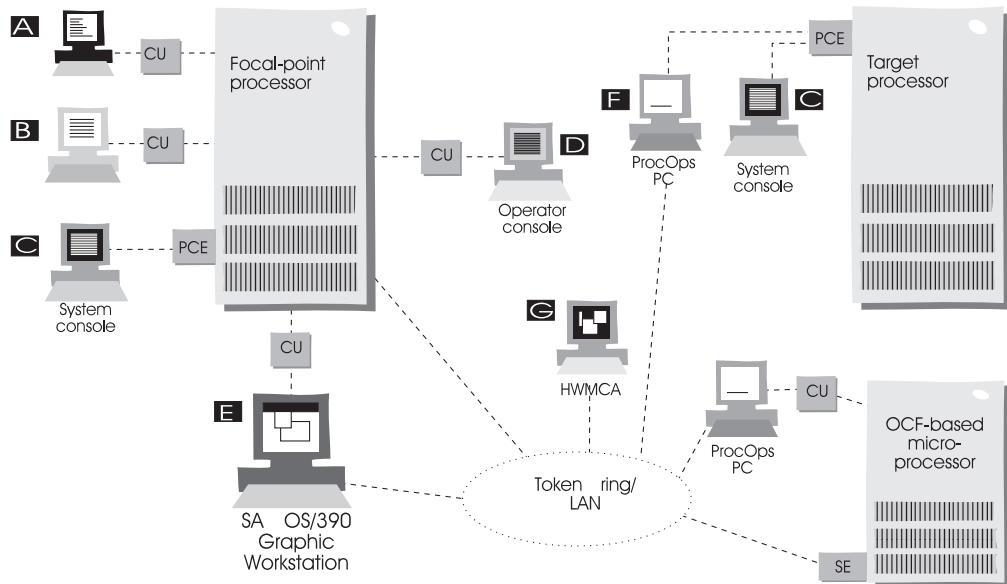


Figure 2. SA OS/390 Workstations and Consoles. The workstations are attached to processors either directly through a processor controller element (PCE), a control unit (CU), or a local area network (LAN).

- | | |
|--------------------------------------|---|
| TSO or ISPF | A Use this 3270-type console for TSO or ISPF, to use the runtime panels for I/O operations, and for the SA OS/390 customization dialog. |
| NetView (NCCF) | B Use this 3270-type console for NetView commands and runtime panels for system operations and processor operations. |
| System console | C Use the 3270-type system console to communicate with a system; to initialize, reconfigure, and monitor hardware resources within the central processor complex itself. For example, you can initiate an IPL at the system console. The system console attaches directly to a processor through the processor controller (PC) for screen-oriented processors. You can use the NMC workstation also as a console to issue system operations and processor operations commands. |
| Operator console | D Use the 3270-type operator console to control the tasks to start, stop, and run software — the operating system, subsystems, and applications of a data processing enterprise. It attaches to the processor by way of a control unit. Operator consoles are also called OS/390 master consoles or VM operator consoles. You can also use the NMC workstation as an operator console. |
| SA OS/390 graphic workstation | E This workstation is referred to as NMC workstation. As an operator, the NMC workstation is the best way to dynamically monitor your systems. From the windows, you see messages, monitor status, and react to changes before they cause problems for end users. You can use multiple windows to monitor multiple views of the system. |

Processor Operations PC **F** This 3270-type display supports target processor operations. It echoes commands run by automation and relays commands from the focal point system to the processor and messages from the processor to the focal point system.

The display can be used as both a hardware system console (as shown in the upper right in Figure 2 on page 14) or as an operator console (shown in the lower right). The workstation attaches to a screen-oriented processor through the processor controller. It attaches to an OCF-based processor through a control unit.

Note:

Throughout this publication the term *processor operations PC* (*ProcOps PC*) is used to refer to the personal computer (PC) that is connected to one or more target systems and which contains the processor operations distributed feature code. In the worksheets and SA OS/390 panels, the terms "PC", "PS/2" or "ProcOps PS/2" are used to refer to this workstation. The workstation may be a Micro Channel[®] Architecture (MCA) bus personal computer, a PCI bus personal computer, or an IBM-compatible ISA bus personal computer.

HWMCA

G The hardware management console (HWMCA) monitors and controls a central processor complex with a graphic interface. It attaches to a target processor (a S/390 microprocessor cluster) as a dedicated system console. The HWMCA workstation uses the Operations Command Facility (OCF) to process commands.

Chapter 2. Concepts

This chapter contains information that you need to know while working with SA OS/390. The following topics are discussed:

- “Automation Concepts”
- “SA OS/390 Automation Flags” on page 32
- “Statuses Supplied by the Automation Manager” on page 34
- “Statuses Supplied by Automation Agents” on page 38
- “Using SA OS/390 for Monitoring” on page 53

Automation Concepts

In SA OS/390, the automation function is split up:

- The observing, reacting and doing parts are located within the NetView address space, and are known as the *automation agents*. The automation agents are responsible for:
 - recovery processing
 - message processing
 - active monitoring: they propagate status changes to the automation manager
- The coordination, decision making and controlling functions are gathered into a single address space outside of NetView within each sysplex. This address space is called the *automation manager*.

You define the resources that you want to automate with SA OS/390 using the customization dialog. Thus the automation manager contains a model of all of the automated resources within the sysplex. The automation agents are the automation manager’s eyes and arms. They feed the automation manager with status information and perform the actions that the automation manager tells them to. The automation manager is the brain of automation. It does all of the decision making that involves interaction between one or more resources.

The automation manager provides *sysplex-wide* automation. So its main purpose is to provide one central point of book-keeping of all resources within a sysplex, that is, the automation manager knows:

- the grouping of resources
- the dependencies between resources
- the statuses of resources
- the goals for the resources, that is when which resources are to be made available or unavailable.

According to the available information, the automation manager makes decisions and instructs the corresponding automation agent where the resource is located to put the resource into the desired state.

The automation manager knows five different statuses from each of the resources:

- the observed status;
- the desired status;
- the automation status;

- the startability status;
- the compound status;

More detail about these statuses is provided in “Statuses Supplied by the Automation Manager” on page 34.

Decision making is done by the automation manager with the help of so called goals. Goals are defined either by the automation programmer who defines permanent automation policy using the customization dialog (see *System Automation for OS/390 Defining Automation Policy*) or they are created interactively by operators who issue commands to define goals.

In all cases, the automation manager is told about the goals of a certain application or resource, that is, when the resource should be up or down (available or unavailable). Goals also take into account the dependencies of resources as defined via relations in the customization dialog and they check whether a trigger is defined for a resource that determines whether the availability of a resource depends upon some external events outside of SA OS/390 automation.

This is why automation performed by SA OS/390 is also called *goal driven automation*.

Information about goals is provided to the automation manager in the following ways.

1 OPERATOR

by the operator command INGREQ (see “How Requests Become Goals” on page 23); these requests are labelled with originator OPERATOR(USERID) in the INGVOTE command dialog (see Figure 17 on page 90).

2 AUTOOPS

by the INGREQ command issued from automation procedure (REXX exec, CLIST); these requests are labelled with originator AUTOOPS in the INGVOTE command dialog.

3 EXTERNAL

by the OPC component; if the OPC product interfaces with SA OS/390, then OPC will take care of the startup of supporting resources required for applications that are scheduled with OPC; these requests are labelled with originator EXTERNAL in the INGVOTE command dialog.

4 SCHEDULE

by a resource override, that is by the operator command INGSCHED with a resource parameter, which will interactively override a service period specifically for the specified resource (see “Resource Override” on page 94); these requests are labelled with originator SCHEDULE in the INGVOTE command dialog (see Figure 17 on page 90).

5 SCHEDULE

by a schedule override, that is by the operator command INGSCHED, which can be used to kind of interactively override service periods for all resources that use this service period (see “Schedule Override” on page 93); these requests are labelled with originator SCHEDULE in the INGVOTE command dialog (see Figure 17 on page 90).

6 SCHEDULE

by means of automation policy as defined in the customization dialog. The automation programmer uses *service periods* for applications or application groups as a comfortable method to let SA OS/390

automatically schedule up and down times of these resources. So these service periods are also referred to as *schedules*. These requests are labelled with originator SCHEDULE in the INGVOTE command dialog.

For most of the methods from the previous list, you can specify one of the following priorities for a goal which is checked in the case of two conflicting goals:

1. LOW
2. HIGH
3. FORCE (not applicable for schedules)

Table 3 now shows the hierarchy of all possible requests. So you can see that the strongest goal that you can specify for a resource is to interactively issue an INGREQ command to make a resource unavailable, such as:

```
INGREQ AGFG2/APL/AOC7 REQ=STOP PRI=FORCE
```

The weakest goal you can define for a resource is to make it available with low priority according to a service period.

You see that a request to make a resource available is in most cases preferred to a request to make this same resource unavailable.

Note: However, a more recent request from the same source will always overwrite an earlier request to the same resource without regard to the earlier request's priority. For example operator JOHN can overwrite his INGREQ request with HIGH priority to make a resource available with a later request of only LOW priority to make the same resource unavailable.

Note:

For all priorities except FORCE, within the same method, the request/goal to make a resource available has a higher priority than to make it unavailable.

Why then is *FORCE UnAvailable* issued by an operator of the highest priority?

This is really the only method to beat SA OS/390's attempts to make a resource available if for any reason you want to have this resource down anyway.

The operator can easily override his or her own FORCE Unavailable request for a resource with even a LOW priority request against this same resource. Thus this implementation of priorities ensures high flexibility and quick reaction in emergency cases.

Table 3. Hierarchy of Requests

Rank	Method	Goal
FORCE Priority		
1	1 OPERATOR	Unavailable
2	1 OPERATOR	Available
3	2 AUTOOPS	Unavailable
4	2 AUTOOPS	Available
5	3 EXTERNAL	Unavailable

Table 3. Hierarchy of Requests (continued)

Rank	Method	Goal
6	3 EXTERNAL	Available
HIGH Priority		
7	1 OPERATOR	Available
8	1 OPERATOR	Unavailable
9	2 AUTOOPS	Available
10	2 AUTOOPS	Unavailable
11	3 EXTERNAL	Available
12	3 EXTERNAL	Unavailable
13	4 SCHEDULE	Available
14	4 SCHEDULE	Unavailable
15	5 SCHEDULE	Available
16	5 SCHEDULE	Unavailable
17	6 SCHEDULE	Available
18	6 SCHEDULE	Unavailable
LOW Priority		
19	1 OPERATOR	Available
20	1 OPERATOR	Unavailable
21	2 AUTOOPS	Available
22	2 AUTOOPS	Unavailable
23	3 EXTERNAL	Available
24	3 EXTERNAL	Unavailable
25	4 SCHEDULE	Available
26	4 SCHEDULE	Unavailable
27	5 SCHEDULE	Available
28	5 SCHEDULE	Unavailable
29	6 SCHEDULE	Available
30	6 SCHEDULE	Unavailable

The automation manager transforms such a goal, for example, the request that a certain resource (application) should be up, into an order to the corresponding automation agent where the application should run.

The automation agents therefore are executing the orders coming from the automation manager. While executing the automation, the automation agents also take information from the defined policy for the resources which is available in form of the automation control file on each automation agent. As an example, for an order to start a resource coming from the automation manager, the automation agents retrieve information about the appropriate startup command from the automation control file.

For enterprise monitoring, the automation manager has the task to gather and control information about which resources are available, what is the status of the resources and what status updates are occurring during automation. The SA OS/390 topology manager extracts and transfers this information into the

enterprise-wide RODM data base from where this information is picked up by the NMC workstation to display user-defined graphical views.

The communication between automation manager and automation agents is implemented with MQSeries. This allows the restart of the automation manager on a different system in case the automation manager terminates unexpectedly. This ensures that no requests are lost.

The main commands you can use to retrieve information from the automation manager are:

- INGLIST: displays detail information about one or more resources (subsystem, application group and so on)
- INGINFO: displays lots of details for an individual resource or application group
- INGVOTE: displays the requests that have been issued and are currently pending for a specified resource
- INGSCHED: displays information about the current Up and DOWN service periods for resources

With the INGREQ command, you can issue a request to the automation manager, such as the goal for the specified resource should now be: available or the goal should be changed to: unavailable.

Requests that are sent to the automation manager using the INGREQ command are persistent. That means, if the automation manager terminates and is restarted later, it then remembers all requests (goals) that were valid at termination time. The automation manager will then continue to pursue all these goals for the resources. This means that if a resource should run on a certain system, and this system fails and is restarted later, the automation manager will continue to pursue the specified goals across IPL times unless they conflict with the IPL schedule times.

Summary of terminology:

Goal: There are only two goals for a resource: available or unavailable. Note that the success of carrying out a goal is also influenced by the dependencies of resources (defined as relationships in the customization dialog) and by triggers.

Note: If no goal is explicitly specified, then the default goal is: make the resource available.

Request: If an operator specifies a goal interactively using the INGREQ command, this is called a request. According to the two goals for a resource, there are the two requests to achieve these: *MakeAvailable* and *MakeUnavailable*.

Order: An order is the result of a specified goal. An operator can specify goals interactively using the INGREQ command, or an automation programmer implicitly defines goals as automation policy by means of service periods.

The automation manager transforms such a goal, for example, the request that a certain resource (application) should be up, into an order to the corresponding automation agent where the application should run.

Vote: Resources can have relationships to other resources. As an example, a dependent resource needs a supporting resource before it can be made available. See *System Automation for OS/390 Defining Automation Policy* for information on how to define relationships. If an operator generates a request to start a dependent resource, the automation manager internally generates another request to make the supporting resource available as well. Or, alternatively in an INGREQ command to shutdown a resource, the operator can also request the shutdown of the dependent resources, which internally generates a request on these dependent resources. Such an internally generated request is called a *vote*.

It may happen that votes conflict or compete with each other. Such a scenario is illustrated in "Conflicting Relationships and Requests" on page 24. In such a case, the vote with the highest priority will win. If votes/requests even with the same priority come into conflict, then the requested action decides which request will win: the request to make a resource available is higher than the request to make that resource unavailable. To make a resource unavailable when it has the request to make it available, you must send it a higher priority request or revoke the *MakeAvailable* request.

Using the INGVOTE command, you will see all currently active requests with their priorities, may they have been generated explicitly by an operator, implicitly because of the automation policy or internally as a consequence of relationships.

One automation manager must exist on each sysplex and one on each stand-alone system. In a sysplex, you can have one or more secondary automation managers (SAM) for backup purposes. That is, if the system on which the primary automation manager (PAM) runs, abends or if the automation manager itself abends, the first secondary automation manager recognizing this, will become the

new PAM and will take over all current requests from the former PAM. The automation agents in the sysplex will not notice the switch from one automation manager to the other.

Note:
No request will be lost.

How Requests Become Goals

A request asks that one specific resource (its *target resource*) should be moved to a specific state (its *goal*). A resource may, for example, be an application that should run on a certain system.

Example:

```
INGREQ abc REQ=START
```

specifies that SA OS/390 should start the resource called *abc*, that is, SA OS/390 should set the desired status of this resource to AVAILABLE on a system.

Now, SA OS/390 knows the dependencies for each of the actions that can be taken against the resource through the resource's relationships with its supporting resources. Using these, it propagates the request onto those resources. These internally created requests are called *votes*. Let us have a look at a CICS scenario: It makes sense to start a *Terminal Owning Region* (TOR_1) only after an *Application Owning Region* (AOR_1) is up. So you could define TOR_1 (running on a certain system) in our example to become a dependent resource and AOR_1 to become the supporting resource. So if you request to start TOR_1, SA OS/390 would generate a vote to start AOR_1.

Start requests are generally propagated from dependent resources up to supporting resources so that the supporting resource is started before the dependent resource is started. Stop requests are propagated down to dependent resources in order to stop dependent resources first.

How Request Propagation Works

If the request is a higher priority than whatever request the supporting resource currently has, then the new request wins and the supporting resource's goal is changed to comply with the request. The process then repeats itself for the supporting resource to its supporting resources.

Eventually the propagation will stop either if SA OS/390 does not encounter another supporting resource or when it encounters higher priority requests. At this point, SA OS/390 knows which resources are not in their goal state. For those whose prerequisites for being started or stopped are met, SA OS/390 will issue start or stop commands.

Once a resource's goal has been set, SA OS/390 will continue trying to achieve that goal. This means that if the resource abends, and its desired status is still AVAILABLE, then SA OS/390 will try to restart it. If the goal changes to UNAVAILABLE, SA OS/390 will stop the resource. If a resource starts when its goal is UNAVAILABLE, SA OS/390 will also stop it.

Conflicting Relationships and Requests

One of the most effective automation capabilities of SA OS/390 is the concept of *dependency relationships*. Using the customization dialog, the automation programmer defines relationships and conditions between dependent resources and supporting resources. For information on how to achieve this, refer to *System Automation for OS/390 Defining Automation Policy*.

In complex environments, it may happen that relationships exist that are opposed in both direction and meaning as illustrated in Figure 3. The following abbreviations are used:

- for dependency relationships

MaWa denotes *MAKEAVAILABLE/WhenAvailable*

MuWu

denotes *MAKEUNAVAILABLE/WhenUnavailable*

- for statuses

Unav denotes *Unavailable*

Avail denotes *Available*

- for requests or votes

Av denotes a request or vote to become available

Un denotes a request or vote to become unavailable

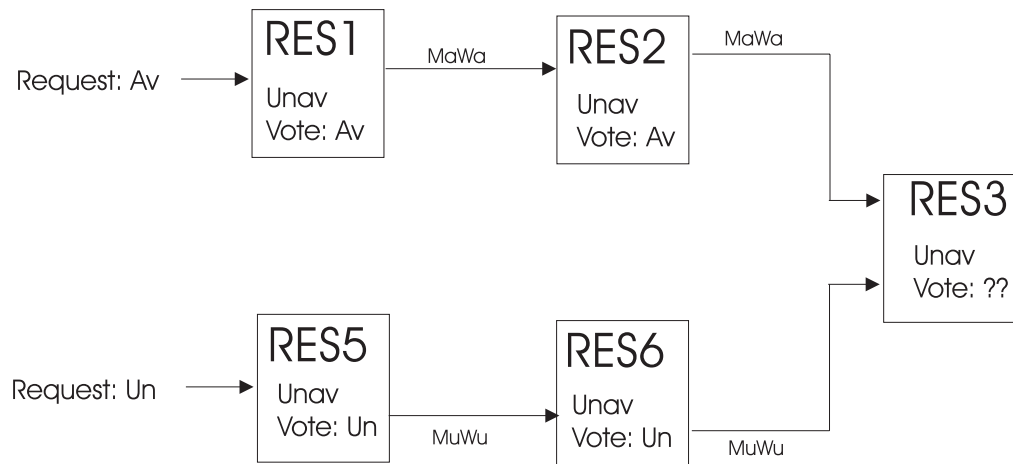


Figure 3. Conflicting Relationships and Requests

In Figure 3, **RES1** is in status Unavailable (Unav) and gets the request to become available (which internally creates the corresponding vote).

So the relationship *MAKEAVAILABLE/WhenAvailable* propagates requests to make resources available and the relationship *MAKEUNAVAILABLE/WhenUnavailable* propagates requests to make resources unavailable.

Note: The first part of a dependency relationship always applies to the resource where the arrow starts, and the condition always applies to the resource where the arrow ends.

As requests are internally stored and propagated as votes, in Figure 3, you see two conflicting votes that would be propagated to **RES3**. From **RES1** we have the vote

to be available while from *RES5* we have the vote to be unavailable. *RES3* has received both of these votes, but cannot satisfy them at the same time. You could see the conflicting votes for *RES3* by issuing the *INGVOTE* command against this resource.

In cases when two separate streams of propagation meet, the priority of votes/requests is evaluated and used to determine the winning vote. A priority is assigned to a request either by the operator interactively using the *INGREQ* command or by the automation programmer setting priorities for service periods.

A request to make a resource available wins over a request to make it unavailable with the same priority. This is only valid due to the *propagation* of requests. However, if an operator sends a request to start a resource, and the same or another operator later sends another request to stop this resource, the latter one will win. The difference is, that this is not a *propagation* of requests.

How the Automation Manager and Automation Agents Cooperate in a Sysplex

As described in “Automation Concepts” on page 17, SA OS/390’s automation logic in a sysplex is split up between the automation agents and the automation manager.

Also, for reasons of high availability, SA OS/390 offers the concept of the primary and secondary automation manager (PAM and SAM), where the SAM can take over the work of the PAM without loss of any information or without any requests being processed twice.

In a sysplex, the automation agents communicate with each other exploiting XCF. Automation managers communicate with the automation agents exploiting MQSeries.

Figure 4 on page 26 shows a typical configuration in a sysplex, showing the communication paths and methods between its members. Automation managers and automation agents communicate via MQSeries using the coupling facility. Automation agents communicate via XCF. XCF is only used at initialization time or to determine if an automation agent leaves or joins the sysplex. For more detailed information on how MQSeries queues are used to perform the communication refer to *System Automation for OS/390 Planning and Installation*.

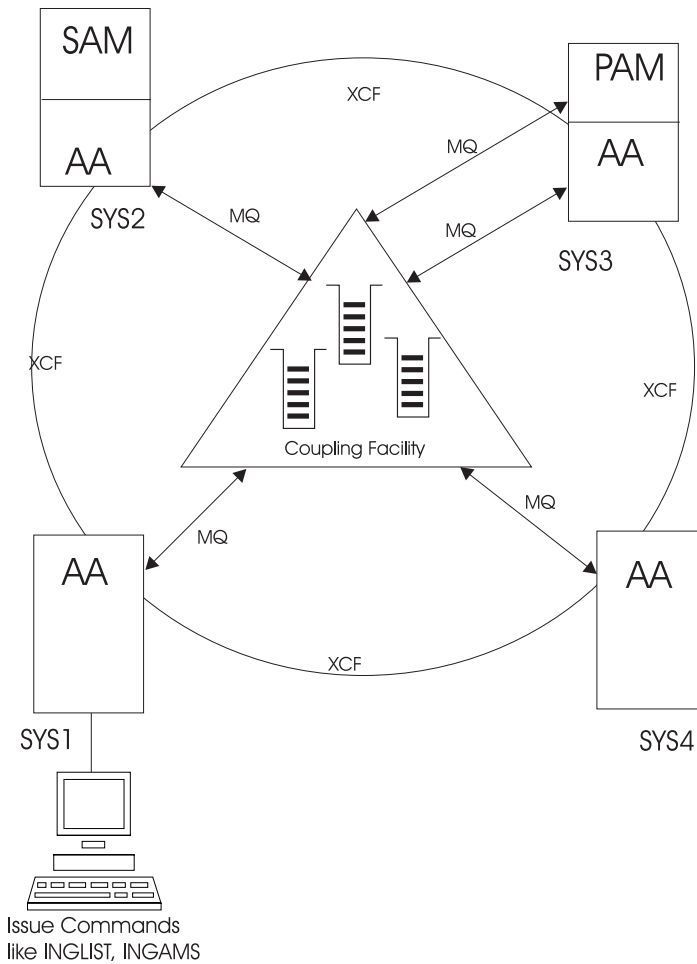


Figure 4. Automation Manager and Automation Agents Cooperation in a Sysplex

Controlling Application Move and Server Management

Application move refers to the process of stopping an active set of resources and starting an alternative set in a coordinated fashion.

Server management refers to the starting and stopping of equivalent resources to maintain a desired level of server capacity. Although it will work with any type of resource, it is designed to work with servers that are loosely coupled to the applications using them. Loosely coupled in this sense means that applications using the servers will not be adversely impacted if one instance of the server group is stopped and another one is started.

SA OS/390 uses the mechanism of grouping resources as described in *System Automation for OS/390 Defining Automation Policy* to implement the move mechanism, namely the groups of nature MOVE and SERVER obey all move instructions described later in this section, along with an availability target instruction that specifies, how many members of a group should be available, if not all are required.

Move Functions

The move functions that you can specify against a group are:

- Automatic group management to maintain application availability. This includes the activation of backup/alternate resources in response to resource or system failure.
- The ability to move resources away from a system en masse, on either a group/subgroup level or a system level.
- The ability to query and dynamically change a group's policy so as to cause one instance of a resource to be stopped and another started.
- The ability to estimate the impact of those changes before committing them.
- The ability to perform actions resulting from the above in a delayed, non-disruptive fashion.
- The ability to return resources to their normal systems in a delayed, non-disruptive fashion.

The INGGROUP command offers the following methods to apply move functions to a group:

EXCLUDE/AVOID/INCLUDE

This indicates that you want to remove movable members from a system (exclude), prohibit SA OS/390 from activating movable members on a system (avoid) or that you wish to undo either of the other two actions (include).

Availability Target (AVTGT)

This specifies the availability target that is to be set for the group. The value is the number of the group members that should be made available when the group has to be available. You can dynamically overwrite a group's availability target which is statically defined in the automation policy.

Preference (PREF)

This parameter specifies preference values for being available for the members of a group. You can dynamically overwrite the preference values which are statically defined in the automation policy for each member. More information about the preference value is provided in "Controlling Application Move with Preference Values".

Controlling Application Move with Preference Values

Controlling application move and server management is done by means of preference values. Preference values are numbers between 0 and 1000. They express the importance of each individual member of the group.

Note that only MOVE groups and SERVER groups support preference values. With BASIC groups you cannot specify preferences, as all members need to be available. For MOVE and SERVER groups, the preference defines which of the resource members of the group should preferably run. Remember that a MOVE group is designed for backup solutions. A MOVE group can have many components, but one and only one is supposed to be active. All other components are for backup only. Thus MOVE groups usually contain members of one kind (where one application can replace the others).

SERVER groups are created when not all but only a certain number of their resources need to be available in order to consider the application group as being available. The number of desired available resources is controlled by the

Availability Target parameter in the customization dialog. And once again, with the preference value in the customization dialog, you control which resources you prefer to be available and which you want to keep as backups.

Note that preference values are statically defined with the automation policy defined in the customization dialog for the groups. Using the INGGROUP command, operators can interactively change the preferences of group members. This new preference adjustment replaces the value defined in the customization dialog.

A special threshold preference value is 600. This acts as a divider between resources that are available for normal startup (primary instances) and resources with lower preferences that are only available for startup during recovery situations (backup instances).

Four preference values are maintained by SA OS/390 for each member in a group:

1. The *base preference* which is specified in the customization dialog.
2. A *preference adjustment* which is dynamically set via the INGGROUP command.
3. Its *calculated preference* which is the sum of its base preference and its preference adjustment.
4. Its *effective preference* which is the sum of its calculated preference and some modifications that the automation manager applies.

The value of the *effective preference* will be visible in the INGGROUP command dialog as shown in Figure 31 on page 106.

The automation manager applies the following modifications to the preference values:

- If the resource observed status is Unknown, SysGone, HardDown or Problem its effective preference is always 0 and the manager will never attempt to start it.
- If the resource requires an excluded system, its effective preference is always 0, because it will not be able to receive requests anyway.
- If the resource requires an avoided system and it is not available, then its effective preference has a maximum value of 100 and it can only be picked in recovery mode (see "Recovery Mode").
- If the resource is Available or WasAvailable, its effective preference is increased by 250.
- If the resource is Starting or Degraded, its effective preference is increased by 225.

This lets the automation manager calculate an effective preference for each member that reflects both the users preference and the current state of the member.

Note: If a base preference 0 has been specified for a resource of a SERVER or MOVE group in the customization dialog, and it is in one of the observed statuses: *Available*, *WasAvailable*, *Degraded*, *Starting* then SA OS/390 grants an effective preference of 1250 upon this resource.

Recovery Mode

In this context, the concept of the recovery mode is of importance. Recovery mode is entered when a previously available member of the group goes into an unavailable status and the group is unable to find enough members with a

calculated preference greater than 600 to make the group available. When this happens it enters recovery mode and is allowed to start members with a calculated preference of less than 600.

Initially, when the group is not in recovery mode, only members with a calculated preference of greater than 600 will be started. Once the group is available, it will try to maintain its availability by using only members with a calculated preferences of greater than 600. If it cannot, then it will enter recovery mode and use the lower preference members to bring the group back to availability.

The preference value and recovery mode interact to allow you to specify the behaviour of members of the group.

Note: Recovery mode is automatically entered if an EXCLUDE list is used with the INGGROUP command (see also “Move Functions” on page 27).

Available Preference Values

See Table 4 for available preference values. Preferences other than listed are also accepted to define your own fine-tuning.

Note:
The preference values listed in the following are *calculated preferences*.

Table 4. Preference Values and Behaviour of Members

Calculated Preference	Resulting Behaviour
Values for Primary Resources	
1000	The member is always selected when the group has been started and the system associated to this member comes up. Other resources from the same group with preference 700 are stopped in favour of this member.
900	The member is always selected when the group has been started and the system associated to this member comes up. Members with preference 500 will be stopped in favour of this group.
700	The member is always selected when the group has been started and the system associated to this member comes up. Members with preference 300 will be stopped in favour of this group. It is not stopped unless a very high preference (1000) alternative becomes available. This value is the default. Use it in a MOVE group for the resource that normally runs.
600	This value is used as a threshold. A resource with preference 600 and lower will not be started at group start up.
Values for Backup Resources	
500	This resource is not selected but will be selected when the group enters recovery mode. Once the problem is over, it will be stopped as soon as a primary member with a calculated preference > 750 is available.
300	This resource is not selected but will be selected when the group enters recovery mode. Once the problem is over, it will be stopped as soon as a primary member with a calculated preference > 550 is available.
100	This resource is not selected but will be selected when the group enters recovery mode. As soon as a preference 500 backup member is available, it will be stopped in favour of the backup member.

Table 4. Preference Values and Behaviour of Members (continued)

Calculated Preference	Resulting Behaviour
1	A resource with this preference will never be selected by SA OS/390 automation. If it is available, it will be used, but automation will never ask for it to be started if it is unavailable. Operators may make such resources available interactively by using the INGGROUP command and give it a higher preference. Use this value to provide completely manually controlled application availability.
0	This value indicates that the member is passive and that no requests should be sent to it. If a member is made passive, then any requests that have been previously sent will be withdrawn.

Preference Scenarios

To understand the interactions of the various flavours of preference values and the concept of the recovery mode, the following sections describe some scenarios of how SA OS/390 reacts according to the specified and automatically applied preferences.

Backup with Non-Disruptive Restoration: In this scenario you have an application *ABC* which can run on one of two systems - *SYS1* and *SYS2*. Only one instance of the application should normally be active. The instance on *SYS1* is the primary instance (set preference 700), while the instance on *SYS2* is the backup instance (set preference 500).

The preferences 700 and 500 mean that the applications will behave as follows:

1. If *SYS2* is IPLd first, then the application will not be started (preference 500, not in recovery mode).
When *SYS1* is IPLd, its instance of the application will be started (preference 700, highest startable instance).
2. If *SYS1* should fail, the instance on *SYS2* will be started (preference 500, in recovery mode, highest startable instance).
3. When *SYS1* is IPLd again, it will not start its instance (preference 700, but active instance with preference 750 (500 + 250 for being available)).
4. At the end of the service period the instance of *SYS2* will be stopped.
5. At the start of the next service period, the instance of *SYS1* will be started (preference 700, highest startable instance).

Backup with Disruptive Restoration: This scenario is like the above, but you want the application to return to *SYS1* as soon as *SYS1* is available, even if this causes an additional service interruption. You can use preferences of 700 for *SYS1* and 300 for *SYS2*, or 900 for *SYS1* and 500 for *SYS2*. As these are the only two applications involved, either combination will work (the important thing is that they are more than 250 apart). The example uses the 700 and 300 values.

1. If *SYS2* is IPLd first, then the application will not be started (preference 300, not in recovery mode).
When *SYS1* is IPLd, its instance of the application will be started (preference 700, highest startable instance).
2. If *SYS1* should fail, the instance on *SYS2* will be started (preference 300, in recovery mode, highest startable instance).
3. When *SYS1* is IPLd again, its instance will be started (preference 700, highest startable instance) and the *SYS2* instance will be stopped (preference 550 (300 +

250 for being available), lower than 700). This causes a short service interruption as the application moves back to *SYS1*.

4. At the end of the service period the instance of *SYS1* will be stopped.
5. At the start of the next service period, the instance of *SYS1* will be started (preference 700, highest startable instance).

Figure 5 illustrates the difference of non-disruptive and disruptive restoration between the steps 2 and 3 in each scenario: in the non-disruptive scenario, the application *ABC* continues to run on *SYS2* until the end of the service period for the group, because this resource now has a higher priority of 750 than the resource on *SYS1* which would only have priority 700. In the disruptive restoration on the other hand, *SYS1* takes over for the rest of the service period after the problem has been fixed.

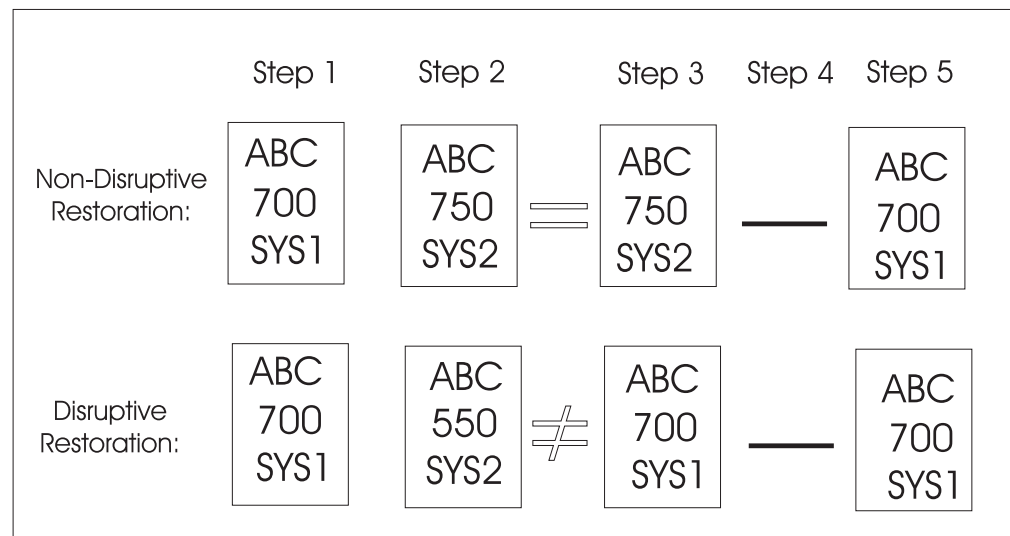


Figure 5. Non-Disruptive and Disruptive Restoration

Real Hierarchy of Preferences: In this scenario, you have three systems where the application can be run. *SYS1* is where you normally run it, *SYS2* is a back up and *SYS3* is where it can run in extreme emergency only. You would specify preferences as 700, 500 and 100.

1. If either *SYS2* or *SYS3* are IPLd first, their instances will not be started (preferences 500 and 100, not in recovery mode). The operator can, of course, explicitly request one of the instances to be started (which should be done if they want the application to be available and know that *SYS1* will not be IPLd for a while).
2. When *SYS1* comes up its instance will be started (preference 700, highest startable instance).
3. If *SYS1* fails, the *SYS2* instance will be started (preference 500, in recovery mode, highest startable instance).
4. Now, if *SYS1* were to return at this point, we would be back in the first scenario - non-disruptive backup.
5. Instead, let us suppose that *SYS2* now fails. This causes the instance on *SYS3* to be started (preference 100, in recovery mode, highest startable instance).
6. Now if either of the other two systems came back (let us assume it is *SYS2*), then its instance will be started (preference 500, in recovery mode, highest preference instance) and the instance on *SYS3* will be stopped (preference 350

(100 plus 250 for being available), lower than 500). This would cause an application outage, but would get the application off *SYS3*.

7. If *SYS1* then comes back, its instance will not be started (preference 700, lower than 750 (500 + 250 for being available)).
8. After the next service period stop, we would be back to running the instance on *SYS1*.

Note: If *SYS1* was down at the end of the start of the next service period, then the application would not be restarted. Using preferences of 900, 700, 100 (or 300) would get around this, but also means that the application could be automatically started on *SYS2* if it was IPLd before *SYS1*.

Server Battery with Backups: In this scenario your sysplex consists of four systems (*SYS1*, *SYS2*, *SYS3* and *SYS4*). You defined a Sysplex Application Group of nature *SERVER* with an availability target of 3 that should normally run on systems *SYS1*, *SYS2* and *SYS3*. A backup resource is defined on *SYS4*, but it should only be used when one or more of the main servers is unavailable. Preference of 700 should be used for the resources on *SYS1*, *SYS2* and *SYS3*, while the backup resource on *SYS4* should have a preference of 300.

1. When all systems are IPLd, the resources on *SYS1*, *SYS2* and *SYS3* will be started (preference 700, 3 highest startable resources). The resource on *SYS4* will not be started (preference 300, not in recovery mode).
2. If either *SYS1*, *SYS2* or *SYS3* should fail, then the resource on *SYS4* will be started (preference 300, now in recovery mode).
3. When the failed system is restored, its resources will be restarted (preference 700, three highest startable resources) and the resource on *SYS4* will be stopped (preference 550 (300 + 250 for being available)).

Note: Setting a preference of 500 for the resource on *SYS4* would cause it remain running when the failed system returned, effectively turning the resource on the returned system into the back up. It is also possible to set the preferences as 700, 700, 700, 690 which will let automation start the resources on which ever systems it needs to make the application available, but to prefer not to use the *SYS4* resource if the other three are available (which they may not be at IPL time).

SA OS/390 Automation Flags

Automation flags are automation policy settings defined in the customization dialog that specify whether certain types of automation are on or off for a resource. For information on how to set automation flags, refer to *System Automation for OS/390 Defining Automation Policy*.

Automation Agent Flags

If an event occurs that triggers automation, SA OS/390 checks the appropriate flag to determine if automation is currently on. If it is, SA OS/390 proceeds with the automation actions associated with the flag. For example, if TSO fails and the Restart flag is on for TSO, SA OS/390 restarts TSO according to the policy specified in the customization dialog.

There is one flag that controls all the other flags. This is:

Automation

If this flag is set to N (No), no automation is allowed, regardless of how

the other flags are set. If this is set to Y (Yes), SA OS/390 checks each of the other flags to see if they are set to Y or N.

The other flags which apply to each resource are:

Initstart

If this flag is turned on and the SA OS/390 automation status for a subsystem is DOWN, SA OS/390 can try and start the subsystem when all other conditions necessary for its startup (as defined in your automation policy) are met.

Start If this is on, automation manages and completes the startup process of the subsystem.

Recovery

If this is on, automation takes the specified action for any MVS message that is not associated with the initialization, startup, shutdown, or restart of a subsystem. For example, if this flag is on, automation takes corrective actions in response to messages that indicate shortages of WTO buffers and JES spool space. Automation also invokes offload routines when the following MVS data sets are about to fill up: SYSLOG, LOGREC, SMF, MVS dump.

Shutdown

If this flag is turned on, SA OS/390 can process automated shutdown requests for this subsystem. The setting of this flag can be overridden when the shutdown is requested. Also, the flag can be used to control secondary automation that occurs during the shutdown process. Secondary automation covers things such as replying asynchronously to WTORs and issuing commands in response to messages from the subsystem.

Restart

If this flag is turned on and the SA OS/390 automation status for a subsystem is RESTART, SA OS/390 can try and start the subsystem when all other conditions necessary for its startup (as defined in your automation policy) are met.

When you set an automation flag to Y in the customization dialog, that automation flag is on all the time, unless someone does one of the following:

- Turns the flag off for a period by scheduling an override in the customization dialog. For example, you could schedule an override that turns initialization and shutdown automation off on Sundays from 12:00 to 16:00, so you can do your system backups.

You can display these scheduled overrides using the DISPSCHD command dialog, as explained in “Displaying Automation Agent Flag Override Settings” on page 101.

- Turns the automation off using the INGAUTO command dialog. These command dialogs are discussed later in the chapter.
- Causes a higher level flag to be turned off, for example the subsystem’s Automation flag or the SUBSYSTEM Restart flag.

If a flag is set to N, you cannot schedule an override in the customization dialog to set it on for a particular time. You must use the INGAUTO command dialog.

If a flag is set to E, then an exit is executed to determine whether or not automation is allowed. See *System Automation for OS/390 Customizing and Programming* for details of flag exits.

The Automation Manager Global Automation Flag

Using the INGLIST or the INGSET command (see *System Automation for OS/390 Operator's Commands*) you can set an automation flag for the individual resources, which is checked by the automation manager before it sends any order to the automation agent to start or stop the specific resource.

The purpose of this flag is to prevent (if flag is set to NO) or enable (YES) the starting or stopping of resources from the point of view of the automation manager. This can be done for resources that reside on systems that are currently inactive, for example, to prevent the startup of the resource at IPL time of the system.

The Hold Flag

As the default for all resources is to be available, you can use the *hold flag* for resources to prevent their startup at IPL time of the system.

The hold flag is primarily used for the NOSTART reply to the AOF603D WTOR.

You can manipulate the hold flag with the INGLIST or the INGSET command or just view it with INGINFO.

Statuses Supplied by the Automation Manager

The automation manager is keeping track of five different statuses for each resource:

Observed Status

This indicates the current status of the resource, as reported by the automation agent.

Automation Status

The automation status of a resource tells the automation manager in which automation status a resource currently resides. If a resource's automation status currently is *idle*, this means that the automation agent does nothing for automation, or conversely, if the automation status is *denied*, this means that automation is currently not allowed, possibly because the automation flag has been set off.

Desired Status

This status reflects the goal of a resource. The automation manager will be continuously trying to place the resource into this status unless the goal is revoked or changed. This status can be either *Available* or *Unavailable*. If it is *Available*, the automation manager will try and start the resource. If it is *Unavailable*, the automation manager will try and stop the resource. The default is to try and make the resource available.

Startability Status

This is a calculation as to whether or not it is possible to start the resource if this is requested. It includes the startability of all inactive start dependent resources. This status is mainly used as input for Compound Status calculations and by groups to prevent them from selecting members that cannot be started.

Compound Status

This status is the composition of the other statuses to give the operator a chance to check from the automation manager if a resource is currently OK concerning the automation.

The operator can retrieve the status using two commands:

- INGLIST command: provides some main attributes of a resource, for example a resource's different statuses.
- INGINFO command: provides information about a resource from the point of view of the automation manager.

Two of these statuses, the observed status and the automation status, are supplied by the automation agent responsible for running the resource. The desired status is derived through the request propagation mechanism. The startability status is derived through status propagation. The final status, compound, is a summary of all of the other statuses and a number of other values. The compound status is made visible through INGLIST or INGINFO and, eventually, placed into RODM and made visible on the NMC workstation.

Observed Status

This represents the current status of the resource and is provided by the related automation agent.

Possible values are:

Unknown (Assumed unavailable)

The automation manager has no observed status information about the resource. To be on the safe side, the automation manager will assume that the resource is unavailable and will try to make it available if this is the desired status. On the other hand, this assumption allows the automation manager to process shutdown requests for supporting resources which can only be made unavailable if this resource is unavailable.

SysGone (unavailable)

The system on which the resource is defined is no longer a member of the sysplex.

SoftDown (unavailable)

The resource is unavailable and automation may restart it.

HardDown (unavailable)

The resource is unavailable and automation will not restart it.

Starting (available)

The automation agent is either in the process of making the resource available or has detected actions from some outside command to make the resource available.

Available

The resource is ready for use.

Degraded (available)

The resource is available but not all required members in the server group are available.

Standby (available)

The resource has a primary/secondary system association defined. The automation agent posts this status to the automation manager when setting the automation agent status to MOVED or FALLBACK.

Note: The automation manager treats STANDBY like a HARDDOWN status except that it is not considered that this indicates an error condition.

Problem (available)

The resource is available but has a serious problem, probably making it unusable.

Stopping (available)

Either the automation agent is in the process of stopping the resource, or it has detected that some outside command is doing so.

WasAvailable (Assumed available)

The automation manager has lost contact with the automation agent responsible for the resource, however the resource was available when contact was lost and the system it is on still appears to be running. The resource will be treated as being available. This is primarily to prevent inappropriate recovery actions from being initiated whenever an SA OS/390 NetView is recycled.

Observed Status Transitions

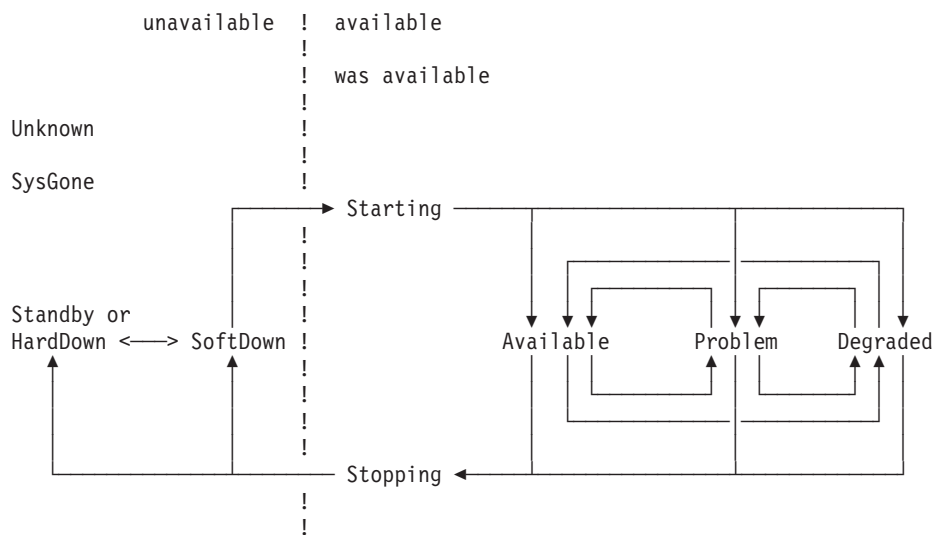


Figure 6. Observed Status Transitions

Automation Status

This indicates the status of the automation for the resource. It is provided by the related automation agent.

Possible values are:

Unknown

No connection with the automation agent.

Idle

No orders have been sent; the automation agent is not doing anything. The manager may send the automation agent new orders.

Ordered

Orders have been sent. This status is only posted within the automation manager.

Busy

The automation agent is processing the orders, or observing/assisting a start or stop process initiated by some outside command. This status is entered when a resources status becomes Starting or Stopping and the previous Automation Status was Idle or Ordered. This status is changed to

Idle if the resource achieves an observed status other than Starting or Stopping. This status may be posted directly by the automation agent.

Denied

The automation agent was not allowed to process the last order it received. This status is changed to Idle if the resource achieves an observed status of HardDown, SoftDown or Available. This status is posted directly by the automation agent.

Problem

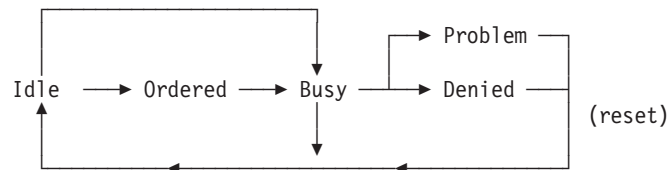
The automation agent encountered a problem while processing for the resource. This status is changed to Idle if the resource achieves an observed status of HardDown, SoftDown or Available. This status is posted directly by the automation agent.

Internal

This means that the automation of the resource is being handled internally.

Automation Status Transition

Unknown



Internal

Figure 7. Automations Status Transitions

The automation manager may only send orders to an idle automation agent.

Transition from Idle to Busy occurs when the automation agent detects a third party (such as an operator or ARM) starting or stopping a resource.

Desired Status

You set the desired status of a resource either:

- by an INGREQ command
- by a service period
- by a schedule/resource override (INGSCHED)
- or indirectly through a vote which stems from the request propagation.

It's possible values are:

Available

The resource should be started (made available).

Unavailable

The resource should be stopped (made unavailable).

Startability Status

The startability status is calculated from the resource's current status, its automation status, its automation and hold flags and the startability of its supporting resources.

Possible values are:

Yes The resource is either startable or already started.

No The resource cannot be started due to a problem with the resource itself.

Inhibited

The resource cannot be started because of either a problem with one of its supporting resources or because automation has been prohibited.

Compound Status

The Compound status is a summary of all the statuses of a resource. It considers elements of the four other statuses as well as a number of other values.

Possible values are:

Problem

There is a problem with this resource that automation cannot solve. Operator intervention is required.

Denied

The resource is not in its desired state and automation is unable to proceed because either the automation flag has been turned off or the automation manager hold flag for the resource is set to YES.

Inhibited

The resource is not in its desired state and automation is unable to proceed because of a problem with a supporting resource. Operators should try to fix supporting resources with compound status *Problem* and *Denied*.

Awaiting [Automation]

The resource is not in its desired status and SA OS/390 is waiting for its supporting resources to reach the appropriate state.

InAuto[mation]

SA OS/390 is in the process of starting or stopping the resource.

Degraded

For a group it means that it is partially running, but not at full capacity. For normal resources, it can mean that the resource is Starting or Stopping, or that the application is suffering from a performance or throughput problem (corresponding to automation agent status HALTED).

Satisfactory

The resource's desired and observed statuses are corresponding; no further automation or operator activity is required.

Statuses Supplied by Automation Agents

There are different types of statuses that may be applied to an application. They are all retrieved on the side of the automation agent. These are:

- "Automation Agent Statuses" on page 39
- "Application Monitor Status" on page 48
- "Automatic Restart Manager Statuses" on page 48

Furthermore, this chapter discusses the following related topics:

- "Mapping the Automation Agent Statuses to the Automation Manager Observed Status" on page 50
- "SA OS/390 Processes Involved in Status Determination" on page 51

Automation Agent Statuses

SA OS/390 defines different automation agent statuses that it applies to automated resources. The automation agent status of a resource is determined from a combination of its application monitor status, its desired status, recent history, and intended action.

These statuses are used on the automation agents to control the automation. They are translated to *observed statuses* (see “Mapping the Automation Agent Statuses to the Automation Manager Observed Status” on page 50) and then sent to the automation manager.

On the automation agent you can use the DISPSTAT and DISPINFO commands to see the automation statuses.

Following is a brief description of each automation agent status.

Value	Meaning
ABENDING	<p>The application is undergoing a recoverable abnormal end. This status is entered when a TERMINATION message with the ABEND=YES attribute is received. It remains in ABENDING until its final termination message is received. If the application is defined to Automatic Restart Manager it may be posted to EXTSTART when Automatic Restart Manager attempts to recover it. If the application has not exceeded its critical threshold, SA OS/390 posts the application to RESTART and attempts to restart it. If it has exceeded its critical threshold it is put into BROKEN status when it has been cleaned up, and SA OS/390 does not attempt to start it. If it is slow to leave the system after its FINAL message is received it may go to ZOMBIE status.</p> <p>If the application is undergoing a normal shutdown by SA OS/390 no further shutdown commands are issued. The shutdown may be resumed by using the INGREQ command with a stronger type.</p>

Value	Meaning
ACTIVE	<p>The application is running, but is not yet ready for work. An application can be put into ACTIVE status in response to the following conditions:</p> <ul style="list-style-type: none"> (i) SA OS/390 has received an ACTIVE message for the application. (ii) The SA OS/390 startup checker has run for the application when its automation status was STARTED. The startup checker found the application monitor status for the application to be ACTIVE. (iii) During routine status checking the application monitor status for the application was found to be ACTIVE when its automation status indicated it should be otherwise. (iv) SA OS/390 attempted to start the application, but found that its application monitor status was ACTIVE. (v) SA OS/390 found that the Automatic Restart Manager status for the application is STARTING, but has not received any messages concerning the application status. (vi) SA OS/390 checked an attempt by Automatic Restart Manager to restart the application and found that its Automatic Restart Manager status is UNREGISTERED, but the application monitor status for the application is ACTIVE. <p>An application remains in ACTIVE status until its UP message is received. If the application is starting or restarting, an SA OS/390 monitoring check for the application is done after its start delay time. If the application is not found it is put into INACTIVE status. If it is found, but is not yet UP, it is put into STARTED2 status.</p>
ASSIST	<p>This is an unusual status. When an application has ASSIST=DISPLAY coded for one or more of its automation flags, SA OS/390 puts the application into ASSIST status whenever it wants to issue a command that is controlled by that automation flag. ASSIST indicates that SA OS/390 is ready to take an action which will affect an application, but that you must approve the action before it occurs. An application can enter ASSIST status when SA OS/390 is going to start it, stop it, or perform secondary automation for it.</p> <p>When an application is in ASSIST status you can access an ASSIST panel using SDF. This panel is used to tell SA OS/390 to issue the command where it should be issued, to issue the command on the your account, or to ignore the command. The regular monitor ignores applications that are in ASSIST status, and most command dialogs will not process them.</p> <p>To get an application out of ASSIST status you must respond to all the ASSIST panels that are present in SDF for the application. If the commands are issued in the correct place, the application should come up. You can use the DISPASST command dialog to see assist settings, and the SETASST command dialog to change them dynamically.</p>

Value	Meaning
AUTODOWN	<p>The application is shut down. SA OS/390 may restart it to comply with an operator request. If the shutdown specified that the application was to be restarted, it is put into RESTART status when the shutdown is complete.</p> <ul style="list-style-type: none"> <li data-bbox="630 323 1458 380">(i) SA OS/390 has shut the application down at the request of an operator. <li data-bbox="630 401 1458 512">(ii) When SA OS/390 initialized, the operator replied NOSTART to the AOF603D WTOR. Any applications which would have been put into the DOWN status during initial status determination have instead been put into the AUTODOWN automation status. <p>You can use the SETSTATE command to change the application status to either RESTART or CTLDOWN.</p> <p>SA OS/390 may attempt to restart an application in AUTODOWN status when SA OS/390 is reloaded, or when an operator requests SA OS/390 to start one of the application descendents. In both cases, the application goes to RESTART status.</p>
AUTOTERM	<p>SA OS/390 is in the process of shutting the application down. The shutdown is in response to a INGREQ REQ=STOP command. This status persists until SA OS/390 is sure that the application has been cleaned up.</p> <p>Many things may happen to an application that is being shut down. If the shutdown is successful, the application is placed in either AUTODOWN or CTLDOWN status. If the shutdown specified that the application should be restarted it goes through AUTODOWN to RESTART status.</p> <p>If the application abnormally ends while it is being shutdown it may go into either ABENDING or BREAKING. A normal shutdown will stop processing an application that abends, but other shutdowns will continue. If the shutdown runs out of commands to issue, the application is placed into STUCK status. If it has problems shutting down, the application may be placed into ZOMBIE status.</p>
BREAKING	<p>The application is undergoing a non-recoverable abend; that is, it has received a termination message specifying BREAK=YES. If the application is undergoing a normal shutdown by SA OS/390 no further shutdown commands are issued. The shutdown may be resumed by using the INGREQ REQ=STOP command. This status persists until SA OS/390 receives its final termination message and is sure that the application has been cleaned up. If the termination experiences difficulties, the application may be posted to ZOMBIE status.</p>
BROKEN	<p>The application has suffered a non-recoverable abend. SA OS/390 will not restart it. An application can be put into BROKEN status in response to the following conditions:</p> <ul style="list-style-type: none"> <li data-bbox="630 1520 1458 1604">(i) The application has suffered a non-recoverable abend, indicated by the reception of a TERMINATION message with the BREAK=YES attribute. <li data-bbox="630 1625 1458 1682">(ii) The application has suffered sufficient recoverable abends to exceed its critical threshold. <p>This status is preserved across a recycle of SA OS/390 or a re-IPL of the processor, unless the application has its Start on IPL/RECYCLE Option set to YES.</p>

Value	Meaning
CTLDOWN	<p>The application is shut down and SA OS/390 is not allowed to restart it.</p> <ul style="list-style-type: none"> <li data-bbox="594 264 1419 327">(i) An operator asked SA OS/390 to shut the application down and not to restart it until authorized to do so by an operator. <li data-bbox="594 338 1419 422">(ii) An operator used a SETSTATE command to tell SA OS/390 that an application should not be restarted until an operator authorizes SA OS/390 to do so. <li data-bbox="594 432 1419 495">(iii) SA OS/390 was recycled, the application monitor status is INACTIVE, and its Start on RECYCLE Option is NO. <li data-bbox="594 506 1419 569">(iv) SA OS/390 was started for the first time, the application monitor status is INACTIVE and its Start on IPL Option is NO. <li data-bbox="594 579 1419 737">(v) SA OS/390 was recycled while the application was in a CTLDOWN status. If the AOFCTLOPT advanced automation option is set then the application status remains CTLDOWN regardless of all other settings, parameters, and options, providing its application monitor status remains INACTIVE. <p>You can use the SETSTATE command to change an application status from CTLDOWN to RESTART or AUTODOWN, in which case SA OS/390 will attempt to restart it.</p>
DOWN	<p>The application has not been started during the lifetime of this SA OS/390.</p> <p>The DOWN status is set only during initial status determination and is possible only if the application monitor status is INACTIVE. The automation status of the application when SA OS/390 was last shut down on this system is used in the following manner to determine if it is to be placed into the DOWN status.</p> <ul style="list-style-type: none"> <li data-bbox="594 1073 1419 1136">(i) The previous automation status was not one of STOPPED, CTLDOWN or BROKEN. <li data-bbox="594 1146 1419 1293">(ii) The START on IPL option for the application is YES and this is the first time that SA OS/390 has been started since MVS was last IPLed. If the previous automation status was CTLDOWN and the AOFCTLOPT advanced automation option is set then the automation status remains as CTLDOWN. <li data-bbox="594 1304 1419 1451">(iii) The START on RECYCLE option for the application is YES and this is not the first time that SA OS/390 has been started since MVS was last IPLed. If the previous automation status was CTLDOWN and the AOFCTLOPT advanced automation option is set, then the automation status remains as CTLDOWN. <li data-bbox="594 1461 1419 1524">(iv) The application does not have a Start on IPL Option of NO. If it does, its status is set to CTLDOWN. <li data-bbox="594 1535 1419 1598">(v) The application does not have a Start on RECYCLE Option of NO. If it does, its status is set to CTLDOWN.
ENDED	<p>This status is used for transient applications only, and indicates that the job for the application has finished and left the system without any errors. Any start-dependent resources for the application will be started as though it were a normal OS/390 subsystem that was UP.</p> <p>If the transient application can be re-run, you can use the SETSTATE command to restart it. If the transient application cannot be re-run, it will remain in ENDED status.</p>

Value	Meaning
ENDING	<p>A transient application is in the process of terminating. A transient application goes to ENDING status when a termination message is received for it, and it is not being shut down by SA OS/390. This status shows that the application is terminating, but that this is expected. A transient application may also go to ENDING if an operator is shutting it down outside SA OS/390 control, or if it has abnormally ended, but the abend messages are being treated as normal termination messages.</p> <p>The application remains in ENDING status until either:</p> <ul style="list-style-type: none"> • an abend message is received, which will put it into either ABENDING or BREAKING status. If the application abends then either SA OS/390 or Automatic Restart Manager can restart it. • the application final termination message is received, at which point the RESTARTOPT for the application is checked. If it is ALWAYS then the application is put into RESTART status and SA OS/390 will attempt to restart it. If it is anything else, the application go to ENDED status. It is assumed that if a transient application ends normally then it will deregister from Automatic Restart Manager. If it is slow to clear the system after its FINAL message is received it may go to ZOMBIE status. <p>If an ACTIVE or UP message is received for the application, its automation status is changed to either ACTIVE or UP, as appropriate.</p>
EXTSTART	<p>SA OS/390 has determined that the application is being started or restarted by an agent external to SA OS/390. In situations where SA OS/390 is able to identify the external agent (such as Automatic Restart Manager), it takes appropriate steps to monitor that agent's actions and, if necessary, step in to assist it. An application can be put into EXTSTART status in response to the following conditions:</p> <ul style="list-style-type: none"> (i) SA OS/390 is unable to identify the external agent. (ii) Automatic Restart Manager is in the process of restarting the application.
FALLBACK	<p>The application is not running on the primary system where it should run, but this status has been encountered for this application on one of its secondary systems. It should be active on another system. If the other system fails, the application can fall back to this system, where it could possibly be restarted. However, SA OS/390, will not perform the restart on the fallback system, but this may be done by an operator request. This is implemented to leave the decision of restarting the application on the fallback system to the operator.</p> <p>An application can be put into FALLBACK status in response to the following conditions:</p> <ul style="list-style-type: none"> (i) It is defined with a secondary association on this system. (ii) An operator has used the SETSTATE command to put the application into the MOVED status. If this is one of the secondary systems for the application it will go to FALLBACK instead.
HALFDOWN	<p>SA OS/390 was in the process of shutting the application down, but the stop request was canceled while it was in progress. The application shutdown did not complete (for example, ASCBs may still be active). You may sometimes find that some, but not all, of the shutdown commands have been issued. To recover an application from HALFDOWN status you must determine where it is in its shutdown process and complete the shutdown manually. Applications go into HALFDOWN only when you cancel a stop request. Alternatively, you can use SETSTATE to put the application back into UP or RUNNING status.</p>

Value	Meaning
HALTED	<p>The application is still running, but something has happened which may have severely impacted its capabilities.</p> <ul style="list-style-type: none"> <li data-bbox="594 296 1360 329">(i) SA OS/390 has received a HALT message for the application. <li data-bbox="594 338 1365 401">(ii) SA OS/390 has detected that the application represents a JES2 application which is running short of spool space. <li data-bbox="594 409 1414 499">(iii) The Automatic Restart Manager status for the application is ELSEWHERE, but SA OS/390 found its application monitor status to be either STARTING or ACTIVE. <p>An application is taken out of HALTED status if its UP message is received. Also, operators may use the SETSTATE command to put the application into UP/RUNNING status.</p>
INACTIVE	<p>At some point in monitoring, the application monitor status was INACTIVE when the automation status indicated that it should be either ACTIVE or STARTING. An application can be put into INACTIVE status in response to the following conditions:</p> <ul style="list-style-type: none"> <li data-bbox="594 758 1419 814">(i) The application monitor routine found the application's status to be INACTIVE. <li data-bbox="594 823 1406 886">(ii) The startup checker found that the application monitor status was INACTIVE. <p>If the application RESTART option is ALWAYS, the application is restarted rather than put into INACTIVE status.</p>
MOVED	<p>The application is not running: this is one of its primary systems: it should be active on another system. An application can be put into MOVED status in response to the following condition:</p> <ul style="list-style-type: none"> <li data-bbox="594 1087 1360 1178">(i) An operator has used the SETSTATE command to put the application into the MOVED status. This is possible only on a primary system.
RESTART	<p>The application is ready to be started. It has been previously active in the system. An application can be put into RESTART status in response to the following conditions:</p> <ul style="list-style-type: none"> <li data-bbox="594 1289 1295 1346">(i) The application abended and, after checking thresholds, SA OS/390 is allowed to restart it. <li data-bbox="594 1354 1344 1417">(ii) SA OS/390 has shut the application down in response to an operator request and is now preparing to restart it. <li data-bbox="594 1425 1403 1495">(iii) An operator has used the INGREQ REQ=START command to ask SA OS/390 to restart the application. <li data-bbox="594 1503 1403 1745">(iv) SA OS/390 checked an attempt by Automatic Restart Manager to restart the application and found that its Automatic Restart Manager status is UNREGISTERED and the application monitor status for the application is INACTIVE. This implies that the attempt by Automatic Restart Manager to restart the application timed out while the application was in RESTARTING status. SA OS/390 changes the automation status of the application to RESTART and attempts to start the application itself. <p>During restart processing, the application RESTART automation flag is checked. If it is turned on, the application start commands are issued and the application is put into STARTED status. If the RESTART automation flag is off, the application remains in RESTART status and the startup monitor cycle initiates the start up process each time it runs.</p>

Value	Meaning
RUNNING	<p>This status is equivalent to UP, but is used for transient applications. It indicates that the UP message has been received for the transient application, or an operator has used the SETSTATE command to change the status of a transient application to RUNNING. A transient application is one which SA OS/390 expects to terminate on its own. When the job finishes the application goes through ENDING status to ENDED, at which point its descendants are started. Unlike the UP status, the descendants of a transient application are not started until it has terminated.</p> <p>A transient application should leave RUNNING status on its own. If it gets stuck, you should use investigate it. You can use the INGREQ REQ=STOP command to put it into AUTODOWN status.</p>
STARTED	<p>The commands to start the application have been issued, but it has yet to start running. An application can be put into STARTED status in response to the following conditions:</p> <ul style="list-style-type: none"> <li data-bbox="626 680 1349 711">(i) SA OS/390 has issued, or will soon issue, the commands. <li data-bbox="626 726 1435 785">(ii) When SA OS/390 attempted to start the application it found that the application monitor status for the application was STARTING. <li data-bbox="626 800 1398 858">(iii) During initial status determination, SA OS/390 found that the application monitor status for the application was STARTING. <li data-bbox="626 873 1435 989">(iv) SA OS/390 checked an attempt by Automatic Restart Manager to restart the application and found that its Automatic Restart Manager status is UNREGISTERED, but the application monitor status for the application is STARTING. <p>Note that the relevant automation flag, Initstart or Restart, must be on. The application startup commands as defined in the automation control file are issued after the application is placed in STARTING status.</p> <p>An application remains in STARTING status until either its ACTIVE or its UP message arrives. After the application start delay time, an SA OS/390 monitoring check is issued for it. If it is not found, it is put into INACTIVE status. If it is found, but is not yet UP, it is put into ACTIVE status.</p>

Value	Meaning
STARTED2	<p>The application has become active, but has not indicated that it is ready to accept work within its start delay. An application can be put into STARTED2 status in response to the following conditions:</p> <ul style="list-style-type: none"> (i) The startup checker found that the application monitor status was still STARTING. (ii) The startup checker was called for an application whose automation status was ACTIVE. (iii) SA OS/390 found the Automatic Restart Manager status for the application to be AVAILABLE-TO. (iv) SA OS/390 checked an attempt by Automatic Restart Manager to restart the application and found that its Automatic Restart Manager status is one of AVAILABLE-TO, RESTARTING or RECOVERING. (v) SA OS/390 checked an attempt by Automatic Restart Manager to restart the application and could not find a better status to put it into. Its application monitor status is ACTIVE. This covers situations where the restart checker is unable to determine the Automatic Restart Manager status for the application, or its status is FAILED. <p>An application remains in STARTED2 status until either its UP message arrives or an operator uses the SETSTATE command to change the application status to UP/RUNNING.</p>
STOPPED	<p>The application has been shut down by an external agent, such as an operator cancel. SA OS/390 is not permitted to restart it and will not allow Automatic Restart Manager to restart it. This status is preserved across a recycle of SA OS/390 or a re-IPL of the processor unless the application has its Start on IPL/RECYCLE Option set to YES.</p> <p>An application remains in STOPPED status until an operator uses the SETSTATE command to change its status to either RESTART or CTLDOWN.</p> <p>An application may also leave STOPPED status if it is restarted outside the control of SA OS/390. In this case, it goes to either the ACTIVE or the UP status, depending on which message is received.</p>

Value	Meaning
STOPPING	<p>The application is being shut down by an external agent. This status is entered when a TERMINATION message is received while SA OS/390 is not in the process of shutting the application down. It may also indicate that the application is abending, but the abend messages issued are being treated as normal termination messages by automation.</p> <p>An application that is STOPPING remains in that status until either an abend message is received which puts it into ABENDING or BREAKING status, or the final termination message for the application is received, at which point the application RESTART option is checked. If RESTART is ALWAYS, the application is put into RESTART status and SA OS/390 attempts to restart it. Otherwise, the application goes to STOPPED status. If it is slow to clear the system after the final message is received, it may be placed into ZOMBIE status.</p> <p>If an ACTIVE or UP message is received for the application, its automation status is changed to either ACTIVE or UP, as appropriate.</p> <p>Automatic Restart Manager interaction with this status depends on a number of factors. If the application is deregistered then there is no interaction. If the application is registered then Automatic Restart Manager will attempt to restart it. If the application goes to STOPPED status before the SA OS/390/Automatic Restart Manager exit is invoked then SA OS/390 will tell Automatic Restart Manager not to restart the application. If it does not, then SA OS/390 will tell Automatic Restart Manager that it can restart the application.</p>
STUCK	<p>An application can get STUCK when it is being shut down. This is because SA OS/390 has run out of NORM, IMMED, or FORCE shutdown commands.</p>
UP	<p>The application has finished initializing and is ready for work. An application can be put into UP status in response to the following conditions:</p> <ul style="list-style-type: none"> (i) SA OS/390 has received an UP message for the application. (ii) An operator has used the SETSTATE command to change the application automation status. In this case, SA OS/390 assumes that the operator has ensured that the application is actually UP. (iii) During initial status determination the application monitor status was found to be ACTIVE. (iv) SA OS/390 found the Automatic Restart Manager status for the application to be AVAILABLE. <p>There are a number of ways for an application to leave the UP status:</p> <ul style="list-style-type: none"> • If it is shutdown with the INGREQ REQ=STOP command, it goes to AUTOTERM status • If it is shutdown outside SA OS/390, it goes to STOPPING status • If it abends, it might go to STOPPING, ABENDING or BREAKING status • If it has problems, it may go to HALTED status • If the regular monitor cannot find it, it will go to INACTIVE status • If the application abends, SA OS/390 does not pick up the abend messages, and Automatic Restart Manager detects that the address space has ended, the application may go to EXTSTART.

Value	Meaning
ZOMBIE	<p>When an application is leaving the system it can get into ZOMBIE status. This indicates that the final termination message for the application has been received but that SA OS/390 monitoring in TERMMSG still finds the application. The application is put into ZOMBIE status if this situation persists for more than twice the application termination delay time.</p> <p>There are three ways in which an application can get into ZOMBIE status:</p> <ul style="list-style-type: none"> • If MVS is slow in clearing the application and the termination delay time is short. • If there are two jobs with the same name in the system, one of which is the application. When either of them terminates SA OS/390 assumes that the application has stopped, but SA OS/390 monitoring will find the other job. To change the status to UP, either manually shut the other job down, or use the SETSTATE command to change the application status back to UP. • The job may have become stuck in the system after issuing its final message. <p>From ZOMBIE status, if the application suffers an unrecoverable abend it will go into BREAKING status.</p> <p>Note: The START ON IPL and START ON RECYCLE options of the customization dialog may override these resource statuses at SA OS/390 IPL or RECYCLE, resulting in SA OS/390 starting the subsystem. If either START ON IPL or START ON RECYCLE are set to NO, the application is placed in CTLDOWN status.</p>

Application Monitor Status

SA OS/390 determines the application monitor status of an application by running a routine that you specified in the customization dialog. You can specify the routine for an individual application, and you can specify a default application monitor routine for applications on an entire system. For further information on application monitor routines, refer to *System Automation for OS/390 Defining Automation Policy*.

Table 5. Regular Monitoring: Automation Status Determination

Application Monitor Status	Automation Status Change
ACTIVE	The application automation status is changed to ACTIVE.
STARTING	The application automation status is changed to STARTED and a startup checker is scheduled for it.
INACTIVE	If the application is defined with a RESTART option of ALWAYS, the automation status is changed to RESTART and the restart process is invoked. If its RESTART Option is not ALWAYS, its automation status is changed to INACTIVE.

Automatic Restart Manager Statuses

The OS/390 Automatic Restart Manager statuses are determined by SA OS/390 and are used to help determine automation statuses. These statuses are included here as background information so that you can better understand the SA OS/390 automation statuses. They are a superset of the statuses that Automatic Restart Manager uses, the added statuses being ELSEWHERE and UNREGISTERED. Possible values for the Automatic Restart Manager status are:

Value	Meaning
AVAILABLE	The element name is registered with Automatic Restart Manager, the job is running on this system and the Automatic Restart Manager status for it is AVAILABLE.
AVAILABLE-TO	The element name is registered with Automatic Restart Manager and the job is running on this system. The job has been restarted by Automatic Restart Manager, has issued its IXCARM REGISTER call, but did not issue its IXCARM READY call within the ready timeout defined to OS/390 for it.
STARTING	The element name is registered to Automatic Restart Manager and the job is running on this system. The job was started by an agent external to MVS, has issued its IXCARM REGISTER call, but has not yet issued its IXCARM READY call. Unlike the RECOVERING status, this status does not time out to the AVAILABLE-TO status.
RECOVERING	The element name is registered to Automatic Restart Manager and the job is running on this system. Automatic Restart Manager has issued the restart command for the application, it has issued its IXCARM REGISTER call, but has not yet issued its IXCARM READY call. If it takes too long to do this, it is placed in the AVAILABLE-TO status.
FAILED	The element name is registered with Automatic Restart Manager, the job has failed, but was last active on this system. It is unknown at this point if Automatic Restart Manager will attempt to restart the job. SA OS/390 will continue to report an elements status as FAILED until MVS either deregisters it, or is committed to restarting it. MVS query commands issued during this time will probably return a RESTARTING status, however MVS Automatic Restart Manager is still consulting its policies and exits to determine whether or not it should restart the element.
RESTARTING	The element name is registered with Automatic Restart Manager, the job has failed and Automatic Restart Manager is attempting to restart it. This status is entered very early in the restart process, before Automatic Restart Manager is committed to restarting the element. SA OS/390 continues to report the status as FAILED until Automatic Restart Manager <i>is</i> committed to issuing the restart commands. This means that MVS query commands may report a status of RESTARTING while SA OS/390 reports a status of FAILED. The RESTARTING status is exited when the job issues its IXCARM REGISTER call. If it takes too long to do this, its element name is deregistered.
ELSEWHERE	The element name is registered with Automatic Restart Manager, but is currently active on a different system. Unless that system fails, Automatic Restart Manager will not move the application to this system.
UNREGISTERED	The element name is not, currently, registered with Automatic Restart Manager. This may mean that the application has never been active within the sysplex, or it may mean that it failed and Automatic Restart Manager could not recover it. If the SA OS/390 routine to determine an Automatic Restart Manager status finds that Automatic Restart Manager recovery is inactive, the UNREGISTERED Automatic Restart Manager status is returned for all enquiries. This means that SA OS/390 effectively ignores Automatic Restart Manager.

Mapping the Automation Agent Statuses to the Automation Manager Observed Status

Table 6 shows how the current resource statuses retrieved by the related automation agents are mapped to the observed status used by the automation manager:

Table 6. Automation Agent to Automation Manager Status Mapping

Automation Agent	Observed	Automation	Notes
DOWN	SoftDown	Idle	The automation agent is ready to perform an initial start of the resource.
RESTART	SoftDown	Idle	The automation agent is ready to perform a start up of the resource.
STARTED	Starting	Busy	The automation agent has issued the start commands for the resource.
EXTSTART	Starting	Busy	This means that the automation agent has detected that an external agency (probably ARM) is in the process of starting the resource.
ACTIVE	Starting	Busy	The automation agent has received some indication that the start is successful, although it is not yet complete.
STARTED2	Problem	Problem	Although the resource is still active, it does not appear to have started properly within the time period that the automation agent expected it to start within.
UP	Available	Idle	The resource has entered a stable state and is available for usage.
HALTED	Degraded	Busy	The resource has encountered a problem, but is still active. The automation agent may be attempting to return it to an UP state.
RUNNING	Starting	Busy	The resource is a transient subsystem that is currently executing.
ENDING	Starting	Busy	The resource is a transient subsystems that is terminating.
AUTOTERM	Stopping	Busy	The automation agent is in the process of stopping the resource.
STOPPING	Stopping	Busy	The automation agent has detected that the application is terminating normally outside of its control.
ABENDING	Stopping	Busy	The automation agent has determined that the application is terminating abnormally but can be recovered.
BREAKING	Stopping	Busy	The automation agent has determined that the resource is terminating abnormally in a non-recoverable fashion.
ENDED	Available	Idle	The resource is a transient subsystem that has completed successfully.
AUTODOWN	SoftDown	Idle	The resource is down and may be restarted as needed by automation.

Table 6. Automation Agent to Automation Manager Status Mapping (continued)

Automation Agent	Observed	Automation	Notes
CTLDOWN	HardDown	Idle	The resource is down and may not be restarted by automation.
STOPPED	HardDown	Idle	The automation agent has determined that the resource has been stopped normally outside the control of automation and its policy indicates that an automated restart is not allowed.
BROKEN	HardDown	Idle	The automation agent has determined that the application has failed in a non-recoverable fashion.
INACTIVE	SoftDown	Idle	The automation agent has found the resource to be 'missing'. It may be restarted by automation.
HALFDOWN	Degraded	Problem	A shutdown for the resource by the automation agent was cancelled at the users request. Although the resource is still active, it's status is indeterminate.
STUCK	Stopping	Problem	While trying to stop or start the resource, the automation agent ran out of instructions.
ASSIST	-	-	Not posted.
ZOMBIE	Problem	Problem	The automation agent believes that the resource should be inactive, but it is not.
MOVED	Standby	Idle	The automation agent has determined that the resource is active elsewhere within the sysplex. The manager may reactivate it on this system.
FALLBACK	Standby	Idle	The resource is a backup for a resource which normally runs on a different system within the sysplex. The manager may start it if it needs to.

SA OS/390 Processes Involved in Status Determination

This section describes a number of SA OS/390 processes that are involved in determining the various statuses of resources. A resource's status is determined by the automation agent and reported to the automation manager.

Initial Status Determination

This process occurs at the end of SA OS/390 initialization and after a configuration refresh. It attempts to determine a suitable automation status for each application that is defined to SA OS/390.

Subsystem Startup

This process is invoked whenever SA OS/390 is about to start an application. It checks that conditions are right for the application to be started and that SA OS/390 is allowed to start the application. If appropriate, the subsystem startup process then issues the commands to start the application and changes the application automation status to STARTED.

Startup Checker

This process is run for each application after SA OS/390 has issued the

startup commands, after the amount of time specified by the Start Timeout defined for the application. It changes the automation status from STARTED to STARTED2 if the application fails to start within its expected start delay.

Regular Monitoring

This process runs at an interval defined by the automation programmer in the customization dialog. Normally the time interval is between 30 minutes and 12 hours. The purpose of regular monitoring is to carry out a reality check to ensure that the current SA OS/390 automation status for an application is consistent with the current application status as determined by the application monitor routine.

To help determine consistency, SA OS/390 statuses are divided into four groups:

UP STATUSES

These statuses mean that the application monitor status should be ACTIVE. They include UP, RUNNING, ACTIVE, and HALTED.

DOWN STATUSES

These statuses indicate that the application monitor status should be INACTIVE. They include DOWN, RESTART, INACTIVE, AUTODOWN, CTLDOWN, BROKEN, STOPPED, ENDED, FALLBACK, and MOVED.

STARTING STATUSES

These statuses indicate that the application monitor status may be STARTING or ACTIVE. They include STARTED, STARTED2, and EXTSTART.

TRANSITIONAL STATUSES

These statuses are either a part of the shutdown process, or indicate that the application may or may not be present in the machine. ALL application monitor statuses are possible with any transitional status. They include AUTOTERM, STUCK, ZOMBIE, BREAKING, ABENDING, HALFDOWN, STOPPING, ENDING, and ASSIST.

If regular monitoring finds a status mismatch, it changes the application automation status according to Table 5 on page 48.

It should be noted that several other routines have similar status mismatch detection capabilities built in.

Secondary Monitor

This is invoked, after a small delay, from the application monitor routine. This process performs a recheck for a specific application that the application monitor routine found to be in an unusual (generally a transient) state. It is responsible for making some of the transitions outlined under the Routine Monitor process.

Shutdown

This process is normally invoked by an operator to shut down one or more applications. The shutdown process is responsible for the sequencing of the various shutdown commands. Depending on the parameters it is invoked with, the application that is shut down may be put into an AUTODOWN or CTLDOWN automation status, or it may be restarted.

Resynchronization Process (Environmental Analysis Process)

It may be invoked manually by an operator using the RESYNC command. This process assesses the current status of the various parts of the OS/390 system that SA OS/390 automates. It issues display commands to obtain information on WTORs and sysplex resources. It also invokes the Initial Status Determination process. When it runs, all previous status information is discarded.

Using SA OS/390 for Monitoring

As an operator, you can monitor and display information about the resources using two types of interfaces:

- The NMC workstation provides monitoring capability for system operations and processor operations.
- The SA OS/390 3270-type interface
 - provides monitoring capability for processor operations
 - provides monitoring capability for system operations via Status Display Facility (SDF), displaying status information (INGLIST) and detailed resource information (INGINFO and DISPINFO for the automation agent view)

You can also monitor messages and alerts. More information about this topic is given in “How to Monitor Alerts on a NetView Console” on page 139.

If SA OS/390 has been configured properly, status mismatches between the actual and the monitored status should not occur. In the customization dialog, the automation programmer can specify a monitoring interval for every resource individually. If such an individual interval is not defined for a resource, then every half hour (which is the default, but the interval is user specifiable) SA OS/390 will run a monitor routine to check the resources’ status as known to SA OS/390 versus its actual status. If the result indicates an error, its automation status will be updated.

In the customization dialog, the automation programmer can define either an individual monitor routine per application or a default monitor routine for a system that will monitor all applications running on that system. You can manually invoke an application’s related monitor routine through the MONITOR command. You can use a wildcard for the applications (subsystems) that you want to be monitored, for example, use *abc* for all subsystems containing the string ‘abc’ in their names.

Resynchronization

If you believe that a lot of the status information provided by SA OS/390 is badly out of sync with reality, you can request that SA OS/390 reruns its complete subsystem resynchronization process.

This is achieved with the RESYNC command, but it should be used with care. The resynchronization can take a few minutes and during this time a lot of SA OS/390’s commands are not available.

Chapter 3. Starting and Stopping SA OS/390

This chapter contains the following sections:

- “Starting, Stopping and Maintaining the Automation Manager”
- “Starting and Stopping I/O Operations” on page 58
- “Starting NetView (System Operations)” on page 58
- “Starting and Stopping Processor Operations” on page 59

Starting, Stopping and Maintaining the Automation Manager

Normally, user interaction with the automation manager is limited to using ING... commands, for example, to send it requests to start or stop resources. In special cases, however, there may be a need to interact with the automation manager during the initial start process and when it is necessary to stop an automation manager instance.

Starting the Automation Manager - START (S)

The automation manager runs in an OS/390 address space of its own. Normally, you would add this start command into the COMMNDxx PARMLIB member so that the automation manager is automatically started at IPL time as described in *System Automation for OS/390 Planning and Installation*. Alternatively, it may be started by an MVS start command, which calls a module that initializes the automation manager.

In certain cases, you can also use the START (S) Command.

As the automation manager runs as a started task, the start command format may be modified by the installation, however a sample procedure is provided and should be usable in most installations without modification. In addition to the various data sets identified by this procedure, there are several parameter values that may be specified. None of these parameters are required due to default values and/or additional sources of the information that are provided. You can find a sample startup procedure called HSAMPROC in the SINGSAMP sample library, see also *System Automation for OS/390 Planning and Installation*.

In most cases, the parameters specified via the start command, if provided, override information obtained from the automation manager's PARMLIB member or other default value. The only exception to this is that START=HOT will be ignored when another automation manager instance has claimed primary mode.

Note:

Do not start two instances of the automation manager with the same job name on the same system. They would come up as the primary and secondary automation manager. However, if you issue a stop command with the same job name, it would be accepted by both instances.

Also you cannot start more than nine instances of an automation manager per OS/390 system within the sysplex or per single system.

To allow your installation to specify a preference as to which automation manager instance should assume PAM responsibility at sysplex IPL, each automation manager enters a DELAY state. The duration of this state is set with the DELAY parameter of the automation manager initialization member of the PARMLIB (see also the description of the HASPRM00 sample member in *System Automation for OS/390 Planning and Installation*). This allows other instances with a lower delay value to assume PAM mode if started within the difference (in seconds) between the respective delay values. This makes sense when you would prefer that the primary automation manager runs on a special powerful processor.

Stopping the Automation Manager STOP (P)

To allow an automation manager to be stopped or otherwise influenced by an operator, the automation manager "listens" for MVS MODIFY and STOP commands (see also "Making an Automation Manager the Primary One". When an MVS STOP (P *jobname*) command is received, the automation manager will be terminated. If the automation manager was the primary one, all work in process will be completed prior to actual termination.

If you try to stop the last primary automation manager, you will receive the reply HSAM1390E to which you must confirm the automation manager stop request.

Making an Automation Manager the Primary One

You can use GO subcommand of the MVS MODIFY (F) command to cancel the initial DELAY invoked when an automation manager instance is started thereby making it eligible to become the primary instance without having to wait for the delay time to complete. This is useful when it is known that a preferred primary system will not become available during a sysplex wide IPL:

```
F jobname,GO
```

Stopping the Automation Manager with Different Options

The STOP subcommand of the MVS MODIFY (F) command may be used to stop an automation manager instance in different ways:

```
F jobname ,STOP,[ NORMAL | IMMED | FORCE | DEFER ],[ NORESTART | RESTART ]
```

The available options are:

NORMAL

The instance will be stopped after all in progress work has been completed

and committed. No new work will be accepted from the automation agents, however any internally queued work will be processed. This is the default option.

IMMED

The instance will be stopped after the current work items have been completed and committed. Internally queued work may be lost.

FORCE

The instance will be stopped without waiting for in progress work to complete.

DEFER

The instance will be conditionally and normally stopped after the STOPDELAY interval has expired. Termination will occur only if another (secondary) instance is available, or if no automation agent is active.

On a secondary automation manager instance, the above variations are effectively treated as NORMAL as there is no work to be completed by SA OS/390. The second option specifies whether ARM restart processing should be attempted following the completion of the stop request.

NORESTART

The instance will be stopped as requested and no restart attempt will be made by ARM. This is the default option.

RESTART

The instance will be stopped in such a way as to cause ARM to attempt an automatic restart. Note that this will only occur if the instance is properly defined to ARM.

Getting Automation Manager Diagnostic Information

There are two methods of getting diagnostic information from the automation manager activities in case problems occur:

- You can get a snapshot of the state image queue written into a specified data set using the command:

F jobname, DIAGINFO,SNAP,data_set_name

- You can get a log of the automation manager's activities (maybe the ones to reproduce the problem) for problem reporting. You issue a command to start the log which is written to a specified data set. With a second command, you terminate the log:

– to start recording:

F jobname , DIAGINFO,RECORD,data_set_name

– to stop recording:

F jobname , DIAGINFO,ENDREC

Note: The DIAGINFO command accepts every data set name without checking if the data set exists or without checking if it is accessed by some other user. In case of conflicts, the automation manager then does not write any diagnostic information, but will not issue a message to the user.

Starting NetView (System Operations)

NetView must be started on the host before you can use the system operations and processor operations of SA OS/390. NetView can be automatically initialized when you start OS/390. For general information on initializing NetView, see *Tivoli NetView for OS/390 Installation and Administration Guide*. You may have a dual NetView environment: a Networking NetView (which runs NetView Graphic Monitor Facility and other networking facilities) and an Automation NetView (which runs SA OS/390). This topic assumes that both instances of NetView are initialized at the focal point system and that you are logged on to a NetView user ID at the SA OS/390 workstation.

The system programmer may have set up your system so that SA OS/390 is started automatically when the Automation NetView initializes. (Directions for performing this set-up are given in *System Automation for OS/390 Planning and Installation*). As SA OS/390 initializes, a multiline write-to-operator (MLWTO) message, AOF767I, is issued describing the options available and system default actions. See "Appendix A. Automation Initialization Options" on page 265 for the options that can be defined and for the details of how the MLWTO looks in various situations. To continue automation, enter

R *number*

(where *number* is the message reply number of the accompanying AOF603D message). This is the default. If you do not issue a reply within two minutes, automation continues and SA OS/390 loads automation policy from an automation control file.

Note: Using the AOFINITREPLY variable you can suppress the issuing of the AOF603D message and have SA OS/390 initialize with the default settings (see also *System Automation for OS/390 Customizing and Programming*).

Starting and Stopping I/O Operations

It is likely that the system programmer will have customized SA OS/390 to initialize all of its components (system operations, processor operations and I/O operations) and related applications automatically. If this is not the case, you need to start the SA OS/390 I/O operations manually.

1. I/O operations is started as an application running on the Automation NetView at the focal point system and at the target systems. To start I/O operations, issue the following command from the OS/390 operator console, specifying the I/O operations procedure name that has been created as a member in your SYS1.PROCLIB or USER.PROCLIB (the location of the I/O operations procedure depends on your installation). In the following example, INGEIO is the procedure name. Optionally, you can append an MVS identifier, which is IO in the example.

```
/S INGEIO.IO,SUB=MSTR
```

You can omit SUB=MSTR, but this is not recommended. If SUB=MSTR is omitted and the JES subsystem is not running, I/O operations will neither start nor run.

2. You stop I/O operations by issuing one of the commands **/P INGEIO** or **/P IO**.

Starting and Stopping Processor Operations

1. Processor operations is started as an application running on the automation NetView at the focal point system. To start processor operations, issue the following command from a NetView operator console:

```
ISQSTART data_set_name
```

where *data_set_name* is the name of the data set containing the processor operations control file built by the customization dialog. For details on the ISQSTART command, refer to *System Automation for OS/390 Operator's Commands*.

2. You stop processor operations by issuing **ISQSTOP** from the NetView operator console.

Chapter 4. Refreshing Automation Policy

The primary method to refresh the automation policy is to issue the command:

```
INGAMS REFRESH
```

This command operates sysplex-wide: all systems in the sysplex are refreshed automatically. It supports incremental updates on a system basis, that is, only those data are refreshed that are affected by changes in the policy database.

Besides the method of using the INGAMS command with the REFRESH option, there are other ways to perform the task of refreshing the automation policy. These are described in this chapter.

To help you dynamically change policy after you have initialized SA OS/390 on your system, SA OS/390 lets you

- load a different automation control file
- reload an automation control file that you have changed
- restore an automation control file that has been previously saved into a warm start cache.

The automation control file load is normally performed at system operations initialization (NetView start). It is automatically triggered, if the automation manager configuration file (AMC file) is changed. It can also be triggered from an operator by entering an ACF LOAD/REFRESH command. You do normally not have to know the correct automation control file name. It is automatically determined by SA OS/390.

At an ACF load the automation manager is contacted and queried for the 'Configuration Token' to make sure that the ACF that will be loaded is compatible with the AMC file.

If you issue an **ACF** command and there is no automation control file that is compatible with the AMC file, the load is not performed and an error message is issued.

The ACF REFRESH is able to do incremental updates of an ACF that is either in storage or in the save/restore cache. An ACF load will normally not be necessary, in most cases an ACF REFRESH is sufficient. The initialization processes the different data on several autotasks in parallel. Therefore there is no need to disable automation during a refresh.

Note: For a description of the complete ACF syntax, refer to *System Automation for OS/390 Operator's Commands*.

To reload or replace the current NetView message automation table after making changes to it, type the following on any NetView command line:

```
autotbl member=tablename
```

where *tablename* is the name of the current NetView message automation table.

Note: If the NetView message automation table you nominate does not contain the entries that SA OS/390 needs, you will get unpredictable results.

See *Tivoli NetView for OS/390 Automated Operations Network User's Guide* for more information on the AUTOTBL command.

Refreshing an Automation Manager Configuration

The REFRESH subcommand of the MVS MODIFY (F) command may be used to initiate a configuration refresh operation, and is effective only when directed to the primary automation manager.

```
F jobname  
,REFRESH,new_data_set_name
```

The *new_data_set_name* may be specified in several forms as follows:

- dsname - This form specifies the fully qualified data set name to be used.
- gdgname(generation) - This form specifies a generation data group name and the generation group member to be used. The generation number is relative to the most recently created member, and may be 0 (for the most recent) or a negative number (-1,-2,...-n) where n is the number of generations specified when defining the GDG minus 1.
- * (Asterisk) - This specifies that the refresh operation should use the same data set (and GDG member) as was used on the last successful refresh operation or during automation manager initialization.
- *(generation) - This specification form specifies that a member of the same GDG used for the previous refresh operation is to be used. The generation number is relative to the most recently created GDG member at the time of command entry.

Use this command when no automation agent is running.

Example:

```
REFRESH,*(0) - use most recent generation of the specified GDG
```

Identifying the Current Automation Control File and NetView Message Automation Table

The automation control file and the NetView message automation table are the two files that control system-level automation. The automation control file contains SA OS/390 automation policy, which specifies what, when, and how to automate. The NetView message automation table specifies which automation procedure to run when various messages are received.

Some sites use different automation control files and NetView message automation tables for different occasions. For example, a site may use one NetView message automation table during normal operations and another during holiday weeks. If your site has more than one automation table, you may need to determine which one is active.

An automation control file and NetView message automation table are made available during SA OS/390 initialization. The NetView message automation table is loaded into NetView, and the automation control file can be either loaded into SA OS/390 or restored from a warm start cache.

The means of identifying the current automation control file is to type ACF STATUS on any command line. This gives you the following information in line mode:

```
AOF005I MEMBER ACFZ991 CURRENTLY BEING USED FOR THE CONTROL FILE
AOF006I BUILT      BY STCUSER  ON 02/29/00 AT 19:30:14
AOF006I LOADED    BY AUTO1    ON 03/01/00 AT 17:39:36
AOF006I CONFIGURATION TOKEN = 200002291930145A0345229672
AOF006I CONFIGURATION DATASET = SATEST.TEST.IPUFM.PROD.ACF
AOF002I END OF MULTI-LINE MESSAGE GROUP
```

The means of identifying the current NetView message automation table is to type AUTOTBL STATUS on any command line. This gives you the information in line mode:

```
C xxxxx AUTOTBL STATUS
- xxxxx DSI410I DSIPARM MEMBER TSTMSG01 BEING USED FOR NETVIEW AUTOMATION
- xxxxx DW0040I AUTOMATION TABLE TSTMSG01 ACTIVATED 03/07/00 14:21:27 BY TIL
```

An alternative method of determining which automation control file and NetView message automation table is currently active is to enter the **OPER** command in any command line. The resulting panel shows the current automation control file and NetView message automation table at the top of the panel as shown in Figure 8.

```
AOFK2 SA OS/390 - Operator Interface
Domain ID = IPUFM ----- Main Operator Menu ----- Date = 05/23/00
Operator ID = HUT Time = 19:08:21

AUTOMATION TABLE(s) = TSTMSG01
AUTOMATION CONTROL FILE = ACFZ991

Select information to be displayed:

 1 CROSS DOMAIN Cross Domain command entry
 2 GATEWAY Display Automation Gateways
 3 MESSAGE Display Authorized Message Receivers
 4 AUTO OPERS Display Automation Operators Status
 5 TIMER Display Automation Timers
 6 GATEWAY TRACE Trace Automation Gateway Requests

Command ==>
PF1=Help PF2=End PF3=Return PF6=Roll
PF12=Retrieve
```

Figure 8. Main Operator Menu Panel

Identifying the Current AMC File Used by the Automation Manager

To identify the current automation manager configuration file, you can use the diagnostic facilities of the INGAMS command (see also “How to Use the Diagnostic Option of INGAMS” on page 294). From the INGAMS command dialog, you can select option **B Show Details** for an automation manager. This leads you to the panel shown in Figure 134 on page 296 from which the relevant information concerning the AMC file is displayed.

```
Config dataset name : SATEST.PROD.ACF.G0045V00
Config member      : HSAZ999
                   Z999CLGC  STRUCTURE  20000512062423
                   Z999CRES  STRUCTURE  20000530111537
                   Z999CSCH  SCHEDULE   20000530111537
Config token       : 200005301115378B0213749672
Config version     : 01
```

Part 2. Using SA OS/390 on the Host

Chapter 5. Getting Started

Different sets of commands are available from host sessions:

- automation manager commands
- system operations commands (automation agent commands)
- processor operations commands
- I/O operations commands

With system operations commands, you can control and maintain all of the resources sysplexwide from a single point of control. They operate in two modes:

- fullscreen mode: If it is a command to display information and you just enter the command name, a panel is displayed showing all available resources. On this panel, you can specify further actions/commands for a special resource. If you enter a command to maintain a resource without further parameters, a fullscreen panel prompts you for more information.
- line mode: From a command line, you can enter the complete syntax of a command to receive either the desired output directly or to manipulate the resource you wanted in the way you wanted.

All system operations commands (automation agent commands) also operate in fullscreen mode and line mode unless it is stated in the reference documentation that the OUTMODE parameter is not supported.

The tasks that you can manage with the available commands are described in more detail in the subsequent chapters and sections. If you need the complete syntax of these commands, refer to *System Automation for OS/390 Operator's Commands*.

Issuing Commands

With SA OS/390, there are several ways you can issue a command:

- You can use command dialogs to enter command parameters and issue commands using 3270 panels. See "Using Command Dialogs" on page 68.
- You can use an object's pop-up menu on the NMC workstation.

SA OS/390 adds a selection of predefined processor operations commands and system operations commands to the NetView Management Console thus enabling you to use the NetView Management Console as a front end for managing your OS/390 host environment.

The sets of available commands are provided in corresponding response files. If you want to add or remove commands from the delivered sets, you can use the *Command Profile Editor (CPE)*. For information on how to use this editor, refer to *NetView Management Console User's Guide*.

For information on how to use this graphical command interface, refer to "Chapter 10. Using the NetView Management Console for SA OS/390" on page 199.

- You can enter I/O operations commands at the OS/390 operator console. See "Using the OS/390 Operator Console for I/O Operations Commands" on page 194.

- You can issue processor operations commands, system operations commands and automation manager commands from the same interface via NetView terminals as described in “Using Command Dialogs”.
- I/O operations commands can be issued from ISPF dialog panels as described in “Using the I/O Operations ISPF Dialog” on page 194.

For each method, instructions on the window or panel tell you what to do. The commands are described in greater detail in *System Automation for OS/390 Operator’s Commands*.

Using Command Dialogs

To start SA OS/390, type A0C from the NetView command line in your NetView session to reach the *System Operations MAIN MENU* shown in Figure 9.

```

AOFPOPER          SA OS/390 - System Operations
Domain ID   = IPUFM  ----- MAIN MENU -----   Date = 03/09/00
Operator ID = HUT    Time = 12:31:59

      Select          Description          Component
      1              Operator Interface      OPER
      2              Command Dialogs        CD
      3              Status Display Facility SDF
      I              IMS Automation Feature  IMS
      C              CICS Automation Feature CICS
      0              OPC Automation Feature  OPC
      L              User defined Local Functions

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Command ==>
PF1=Help    PF2=End      PF3=Return    PF6=Roll
              PF12=Retrieve
  
```

Figure 9. System Operations Main Menu

Type 2 or CD on the command line to invoke the *Command Dialogs Main Menu* (Figure 10 on page 69). Starting with this menu, you can interact with 3270-type panels to issue SA OS/390 system operations commands.

You can enter a command with two methods:

- Type the number or letter corresponding to the desired command on the command line,
- or type the name of the command. If you choose to type a command, you can add options to it.

For example, if you type number 2 into the command line of the *Command Dialogs Main Menu*, you reach the AOCTRACE command dialog which prompts you for further options.

```

AOFPOCIM          SA OS/390 - Command Dialogs          Line 1 of 19
Domain ID   = IPUFM          ----- Main Menu -----          Date = 02/16/00
Operator ID = HUT                               Time = 16:46:11

   1  AOCHHELP      Displays or executes System Operations commands
   2  AOCTRACE     Turn Debugging feature on or off
   3  DISPAUTO     Display automation statistics
   4  DISPSTAT     Display current automation status of subsystem(s)
   5  DISPTHRS     Displays/sets thresholds for resource(s)
   6  DRAINJES    Initiate DRAIN process for JES2 controlled devices
   7  INGAMS       Operate the automation manager (stop/modify op mode)
   8  INGAUTO     Turn automation on/off for resource(s)
   9  INGGROUP    Manipulate Groups
  10  INGHIST     Show history information about workitems
  11  INGNTFY     Change status of operator notifications
  12  INGRELS     Show relationships and evaluation for a resource
  13  INGREQ     Initiate shutdown or startup process for a resource
  14  INGSCHED   Display all defined schedules (service periods)
  15  INGTRIG    Display all triggers within automation manager scope
  16  INGVOTE    Display all requests and pending votes
  17  SETASST    Turn assist on/off for resource(s)
  18  SETSTATE   Change state of subsystem(s)
   X  EXIT       Leave SA OS/390 Command Dialogs

Command ==>>
PF1=Help      PF2=End      PF3=Return          PF6=Ro11
                                   PF12=Retrieve

```

Figure 10. SA OS/390 Command Dialogs Main Menu

Some of the commands operate sysplex-wide; especially those sent to the automation manager. For other commands you can specify a target system on which they should operate, for example, if you want to display the automation flags on a certain target system.

The commands present a snapshot of the data, taken at the time the command is executed. Some data may be refreshed when other commands are issued from the same panel. To force a refresh of all of the data you must press PF9.

How to Get Help

In case you need help, you have the following possibilities:

- Get dialog help: On a NetView console, type AOCHHELP or ISQHELP to see the main help panel.
- On an SA OS/390 panel, press PF1 for a description of the panel and its fields.
- Get help for a message: On a NetView console, type HELP or HM and the message identifier on a NetView console. For example, type :
HELP A0F001
- Get information about automation agent and automation manager status: Type EXPLAIN *status_name*, for example EXPLAIN UP. Or type EXPLAIN *resource_name* to get information about the automation agent status of the specified resource.
- Get command help: On the NetView console, type
HELP *commandname*

Chapter 6. How to Get Resource Information Sysplexwide

This chapter describes commands that you can use to retrieve information from all resources defined within a sysplex from a single point of control. The commands are presented here in an overview. Each command is documented with sample screens and the complete syntax in *System Automation for OS/390 Operator's Commands*.

SA OS/390 provides commands that let you look at resources from two different point of views:

- from the point of view as seen by the automation manager; this lets you see which state a resource is in or which votes are currently active against this resource. These commands are described in "Commands that are Processed by the Automation Manager"
- from the point of view as seen by the automation agents; this lets you see thresholds or startup and shutdown commands defined for the resources. These commands are described in "Commands that are Processed by the Automation Agents" on page 76.

Commands that are Processed by the Automation Manager

The automation manager decides how automation is performed for the known resources in the sysplex. To decide how to handle the requests that it receives through the various channels (for example, the defined automation policy or interactive operator requests), the automation manager uses an internal hierarchy of priorities which are listed in Table 3 on page 19.

SA OS/390 offers a series of commands with which you can find out which information the automation manager currently holds about resources, for example, relationship information or information about the status of resources and whether schedules exist for them. These commands are introduced in the following sections.

How to Use INGLIST to View Resources

This command provides the details about the resources in the sysplex from the point of view of the automation manager. The following information is displayed for a resource:

- name and type of the resource
- compound status
- current status (observed)
- desired status
- automation status
- startability status
- automation flag
- hold flag
- description
- schedule name, if any
- trigger name, if any
- start type

- stop type
- resource category and nature

```

INGKYST0                SA OS/390 - Command Dialogs                Line 1 of 284
Domain ID = IPUFM      ----- INGLIST -----                Date = 03/10/00
Operator ID = HUT      System = AOC7                        Time = 16:18:15
CMD: A Update         B Start          C Stop          D INGRELS      E INGVOTE      F INGINFO
    G Members         H DISPTRG      I INGSCHED      J INGGROUP      / scroll
CMD Name             Type System    Compound        Desired        Observed        Nature
-----
AGFG                 APL AOC7       INHIBITED       AVAILABLE      SOFTDOWN
AGFG2                APL AOC7       SATISFACTORY    AVAILABLE      AVAILABLE
AOC7                 SYG AOC7       PROBLEM         AVAILABLE      PROBLEM        BASIC
AOC7                 SYS AOC7       SATISFACTORY    AVAILABLE      AVAILABLE
APPC                 APL AOC7       SATISFACTORY    AVAILABLE      AVAILABLE
ASCH                 APL AOC7       SATISFACTORY    AVAILABLE      AVAILABLE
BATB000P100         APL AOC7       PROBLEM         AVAILABLE      HARDDOWN
BATB000P200         APL AOC7       PROBLEM         AVAILABLE      HARDDOWN
BATB000P300         APL AOC7       PROBLEM         AVAILABLE      HARDDOWN
BATB000S100         APL AOC7       PROBLEM         AVAILABLE      HARDDOWN
BATB000S200         APL AOC7       PROBLEM         AVAILABLE      HARDDOWN
BATB000S300         APL AOC7       PROBLEM         AVAILABLE      HARDDOWN
BLSJPRMI            APL AOC7       SATISFACTORY    AVAILABLE      AVAILABLE
BNK#$X$X           APL AOC7       SATISFACTORY    AVAILABLE      AVAILABLE
BNK$#$X$X          APL AOC7       SATISFACTORY    AVAILABLE      AVAILABLE
BNKBAGT             APL AOC7       SATISFACTORY    AVAILABLE      AVAILABLE
BNKCICSPA           APL AOC7       SATISFACTORY    AVAILABLE      AVAILABLE
BNKDB               APL AOC7       SATISFACTORY    AVAILABLE      AVAILABLE
BNKDEMO1            APL AOC7       PROBLEM         AVAILABLE      HARDDOWN
BNKDEMO2            APL AOC7       PROBLEM         AVAILABLE      HARDDOWN
BNKDEMO3            APL AOC7       PROBLEM         AVAILABLE      HARDDOWN

Command ==>
PF1=Help    PF2=End    PF3=Return  PF4=DISPSTAT  PF5=Filters  PF6=Ro11
PF8=Forward  PF9=Refresh PF10=Previous PF11=Next    PF12=Retrieve

```

You can see more information about the resources by scrolling horizontally using PF11. Some of this information, especially the automation status, changes in real time. By pressing PF9 (Refresh), you can obtain a new set of data for the displayed subsystems.

On this panel, you can use PF5 to invoke a filter dialog (which is equivalent to using the INGFLT command available from any command line). With this filter, you can reduce the amount of information shown in the display. It enables you to setup a specific operator view for an operator. For example, you can set up a filter that shows only certain resources in specified observed and desired states.

You can also use the INGLIST command dialog to launch other actions that are related to resources or groups, that means, you can also this command to maintain and control resources.

The CMD column on the left hand side of the screen allows you to issue any of the commands listed across the top of the screen against any of the resources that are displayed. Enter the letter corresponding to the command beside the resource you want it issued against and press enter. When you return from the command there may be a slight pause as the display refreshes itself.

The available commands are indicated at the top of the INGLIST panel:

```

A Update    B Start    C Stop    D INGRELS  E INGVOTE  F INGINFO
G Members   H DISPTRG  I INGSCHED J INGGROUP / scroll

```

On the INGLIST panel, you can use PF4 to toggle to the DISPSTAT command dialog, which gives you the automation agent view of the resources in the sysplex

(see “How to Display the Automation Agent View with DISPSTAT” on page 76). To return to the INGLIST panel press the PF3 key on the DISPSTAT panel. Note that pressing PF4 on the DISPSTAT panel displays the INGLIST panel for all resources shown in the DISPSTAT panel but this might not be the same as the original INGLIST display since the DISPSTAT display might have been modified due to filtering or suppressing of resources that the automation agent does not handle.

You can use PF5 to define a filter as described in “How to Specify Filters”.

How to Specify Filters

Figure 11 shows the INGFLT command dialog where you can specify or revise filter criteria.

```

INGKYFLT                      SA OS/390 - Command Dialogs
Domain ID = IPUFM             ----- INGFLT -----          Date = 06/19/00
Operator ID = MIK                                           Time = 15:00:36

Specify or revise the filter criteria:

Resources...                 format: name/type/system or *am*/**/*
  AGFG**/*/*_____
  _____

Observed Status ==> AV_____
Desired Status  ==> *_____
Automation Status ==> *_____
Compound Status ==> *_____

Automation flag ==> ___          Yes or No

Resource category ==> *_____
Resource subtype ==> *_____

Command ==>
PF1=Help   PF2=End   PF3=Return   PF4=Clear   PF5=Reset   PF6=Roll
           PF9=Save                                     PF12=Retrieve
  
```

Figure 11. INGFLT Command Dialog

The panel from Figure 11 shows the current INGLIST filters. The filter settings are saved, so when you next run INGLIST they will be used again. Press PF9 to save your currently displayed filter criteria.

You can specify one or more of the following filters:

Resources

is the list of resources in name/type/system format. You can also specify a wildcard.

Observed status

is the list of observed statuses. You can abbreviate the status, for example “av” for Available. Any resource whose observed status is in the list is eligible for display.

Desired status

is the list of desired statuses. You can abbreviate the status. Any resource whose desired status is in the list is eligible for display.

Automation status

is the list of automation statuses. You can abbreviate the status. Any resource whose automation status is in the list is eligible for display.

Compound status

is the list of compound statuses. You can abbreviate the status. Any resource whose compound status is in the list is eligible for display.

Automation flag

is the automation flag for the resource. Specify YES or NO.

Resource category

is the list of categories the resource belongs to. This is one of the following: CICS, IMS, DB2, OPC, JES2 or JES3.

Resource subtype

specifies the region subtype for CICS, DB2 and IMS or the controller type for OPC applications, for example, AOR for *CICS* or IRLM for *DB2*.

In order to be eligible for the display, a resource must match all filter criteria. An asterisk means that the filter is not set.

Use the PF4 key to clear the currently established filter settings. The filter will then contain an asterisk, meaning that the filter is not set, or a blank. Use the PF5 key to go back to the currently established filter settings.

Note: If INGFILT was called from INGLIST, then the filters that are displayed will take effect when you press ENTER. If you press PF9 first, then the filters will be saved.

How to Use INGINFO to View a Selected Resource

The INGINFO command displays details about a specified application or application group as seen by the automation manager. If you enter this command without parameters, a dialog prompts you for more information. For a detailed description of the command syntax refer to *System Automation for OS/390 Operator's Commands*.

Or you can issue this command for a certain resource displayed in the result panel of the INGLIST command. In the upcoming panel, you will see information about the resource's different statuses, its automation flag settings, whether dependencies are satisfied and which votes are currently active against the resource.


```

INGKYINO          SA OS/390 - Command Dialogs      Line 1 of 220
Domain ID = IPUFM ----- INGINFO -----      Date = 07/13/00
Operator ID = MIK          Sysplex = AOC7PLEX      Time = 12:53:10

Resource ==> APPC/APL/AOC7          format: name/type/system
System ==>          System name, domain ID or sysplex name

Resource      : APPC/APL/AOC7
Description   : APPC/MVS automation policy.

Status...    :
Observed Status : AVAILABLE
Desired Status  : AVAILABLE
Automation Status : IDLE
Startable Status : YES
Compound Status  : SATISFACTORY

Dependencies :
PreStart       : Satisfied
Start          : Satisfied
PreStop        : Satisfied
Stop           : Unsatisfied
Startability   : Satisfied

Current Order : -None-

Flags...     :
Automation    : YES
Hold          : NO

Commands...  :
Start type    : -None-
Stop type     : -None-

Trigger      : -None-
Schedule     : -None-

Backward Relationships :
AOC7/SYG/AOC7      HasMember
ASCH/APL/AOC7      HasParent

Forward Relationships :
VTAM/APL/AOC7      HasParent

Requests     :
Votes        :

Origin...    :
Nature       : Resource
Owner        : SA OS/390 Resources
Loaded from  : SATEST.WORK.ACF(Z995CRES)

History      :
2000-07-13 04:58:26
Workitem ID = 07D0070D023A69460001
HSAL6104I Linked to trigger: HsaNMCobserver
2000-07-13 04:54:58
Workitem ID = 07D0070D0236E53D0001
HSAL6105I Unlinked from trigger: HsaNMCobserver

Command ==>
PF1=Help      PF2=End      PF3=Return      PF6=Ro11
               PF8=Forward  PF9=Refresh      PF12=Retrieve

```

On the INGINFO panel, you can use PF4 to toggle to the DISPINFO command dialog, which gives you the automation agent point of view of the current resource (see “How to Use DISPINFO to Display Detailed Information” on page 81).

How to Display Relationship Information: INGRELS

The INGRELS command displays a panel which shows the relationships that are defined for the specified resource and the status of the current conditions (whether they are satisfied or unsatisfied).

```
INGKYRL0          SA OS/390 - Command Dialogs      Line 1   of 13
Domain ID  = IPUFM  ----- INGRELS -----      Date = 03/15/00
Operator ID = HUT   System = AOC7                  Time = 10:11:42

Resource ==> APPC/APL/AOC7
System    ==>                               System name, domain id or sysplex name

Resource  Type System  Dir Relationship
-----
AOC7      SYG  AOC7    B  HasMember
          Cond: startDependency
          Cond: stopDependency
          Cond: extStart - UNSATISFIED
          Cond: extStop - UNSATISFIED
          Cond: extStopDelayed
          Cond: prestartDependency
          Cond: prestopDependency
ASCH      APL  AOC7    B  HasParent - Strong
          Cond: stopDependency - UNSATISFIED
VTAM      APL  AOC7    F  HasParent
          Cond: startDependency
          Cond: startable
```

Figure 12. INGRELS Command Dialog

The INGRELS command dialog shows the relationships defined for the current resource (in our example from Figure 12 for resource *APPC/APL/AOC7*) in both directions. So in column *Dir* from the INGRELS command dialog shown in Figure 12, you see:

- a *B* for backward relationships; that means the relationship exists from the partner resource to the specified resource;
- an *F* for forward relationships; that means the relationship exists from the specified resource to the partner resource;

Relationship conditions are also shown (with signature *Cond:*) and whether they are unsatisfied.

Commands that are Processed by the Automation Agents

An automation agent is installed on each system upon which resources reside that need to be automated by SA OS/390. For example, automation agents are responsible for having the appropriate commands processed for subsystem startup and shutdown, reporting status updates to the automation manager and message automation. Automation agents access information for their tasks from the automation control file.

SA OS/390 offers some commands with which you can acquire information about resources running on the system where the automation agent resides.

How to Display the Automation Agent View with DISPSTAT

The DISPSTAT command displays full-screen panels showing the following information for resources defined to the current automation agent:

- subsystem name
- automation status (not dynamically refreshed)
- the system the instance of the subsystem is running on
- job name
- current automation flag settings
- the type (MVS, Transient, One Shot, or Non-MVS) of the subsystem
- which trigger, if any, is associated with the subsystem; this information can only be seen for down level SA OS/390 systems.
- which service period, if any, is associated with the subsystem; this information can only be seen for down level SA OS/390 systems.
- the date and time its automation status last changed
- the date and time its automation status was last confirmed by active monitoring
- a user supplied description of the resource

Status conditions are color-coded to make it easier to identify problems.

If you have run DISPSTAT without filtering and you did not provide any input parameters, you will be presented with a panel similar to the following:

```

AOFKSTA5          SA OS/390 - Command Dialogs          Line 1 of 441
Domain ID   = IPUFA          ----- DISPSTAT -----          Date = 03/30/00
Operator ID = MIK                               Time = 17:25:32
A ingauto B setstate C ingreq-stop D thresholds E explain F info G tree
H trigger I service J all children K children L all parents M parents
CMD  RESOURCE      STATUS      SYSTEM      JOB NAME      A I S R D RS TYPE      Activity
-----
HUGSGX      UP          AOCA        HUGSGX      Y Y Y Y Y Y MVS      --none--
HUGSHUTINIT UP          AOCA        HUGSHUTI    Y Y Y Y Y Y MVS      --none--
HUGSRVGRPT2 ENDED      AOCA        HUGSGT2     Y Y Y Y Y Y ONE SHOT --none--
HUGSRVGTTRA1 DOWN       AOCA        HUGSGTR1    Y Y Y Y Y Y MVS      --none--
HUGSTART    INACTIVE   AOCA        HUGSTART    Y Y Y Y Y Y MVS      --none--
HUGTRIG1    DOWN       AOCA        HUGTRIG1    Y Y Y Y Y Y MVS      --none--
HUGWTSO     UP          AOCA        HUGWTSO     Y Y Y Y Y Y MVS      --none--
HUGWVTAM    UP          AOCA        HUGWVATM    Y Y Y Y Y Y MVS      --none--
IRRDPATAB   ENDED      AOCA        IRRDPATAB   Y Y Y Y Y Y ONE SHOT --none--
JESWTR      ENDED      AOCA        JESWTR      Y Y Y Y Y Y ONE SHOT --none--
JES2        UP          AOCA        JES2        Y Y Y Y Y Y MVS      --none--
JLP111A     UP          AOCA        JLP111A     Y Y Y Y Y Y MVS      --none--
JLP111B     UP          AOCA        JLP111B     Y Y Y Y Y Y MVS      --none--

Command ==>
PF1=Help    PF2=End     PF3=Return  PF4=INGLIST PF5=Filters  PF6=Ro11
PF7=Back    PF8=Forward PF9=Refresh  PF10=Previous PF11=Next   PF12=Retrieve

```

Figure 13. DISPSTAT Command Dialog

The panel from Figure 13 does not show all of the data that is available. To access the next panel, press PF11. You should see something like this:

```

AOFKSTA5          SA OS/390 - Command Dialogs          Line 1 of 441
Domain ID = IPUFA ----- DISPSTAT -----          Date = 03/30/00
Operator ID = MIK                                     Time = 17:26:25
A ingauto B setstate C ingreq-stop D thresholds E explain F info G tree
H trigger I service J all children K children L all parents M parents
CMD RESOURCE      STATUS      LAST CHANGED      LAST MONITORED
-----
HUGSGX            UP            03/29/00 20:41:38 03/30/00 17:10:49
HUGSHUTINIT      UP            03/29/00 20:40:59 03/30/00 17:10:49
HUGSRVGRPT2     ENDED        03/29/00 20:29:45 03/30/00 17:10:49
HUGSRVGTTRA1    DOWN         03/29/00 20:29:45 03/30/00 17:10:49
HUGSTART        INACTIVE     03/30/00 14:46:51 03/30/00 17:10:49
HUGTRIG1        DOWN         03/29/00 20:29:47 03/30/00 17:10:49
HUGWTSO         UP            03/30/00 14:36:48 03/30/00 17:10:49
HUGWVTAM        UP            03/30/00 14:36:49 03/30/00 17:10:49
IRRDPTAB        ENDED        03/29/00 20:29:50 03/30/00 17:10:49
JESWTR          ENDED        03/29/00 20:29:50 03/30/00 17:10:49
JES2            UP            03/29/00 20:29:51 03/30/00 17:10:49
JLP111A         UP            03/29/00 20:52:17 03/30/00 17:10:49
JLP111B         UP            03/29/00 20:49:41 03/30/00 17:10:49

Command ==>
PF1=Help  PF2=End    PF3=Return  PF4=INGLIST  PF5=Filters  PF6=Roll
PF7=Back  PF8=Forward PF9=Refresh  PF10=Previous PF11=Next   PF12=Retrieve

```

In cases where a wide (132 column) display is used, all of the data can be displayed on two screens. On a smaller 80 column display there is a third screen, which displays the Trigger, Service Period and Description data. Use PF11 to cycle through this as well to see the following information.

```

AOFKSTA5          SA OS/390 - Command Dialogs          Line 1 of 441
Domain ID = IPUFA ----- DISPSTAT -----          Date = 03/30/00
Operator ID = MIK                                     Time = 17:26:51
A ingauto B setstate C ingreq-stop D thresholds E explain F info G tree
H trigger I service J all children K children L all parents M parents
CMD RESOURCE      STATUS      TRIGGER  SCHEDULE DESCRIPTION
-----
HUGSGX            UP                                     only test for RR
HUGSHUTINIT      UP                                     Application with shutinit command
HUGSRVGRPT2     ENDED        Server group with transients
HUGSRVGTTRA1    DOWN         Server group with transients
HUGSTART        INACTIVE     HUG application with prestart...
HUGTRIG1        DOWN         HUG application with triggers
HUGWTSO         UP            resource for combination move-bas
HUGWVTAM        UP            resource for combination move-bas
IRRDPTAB        ENDED        RACF dynamic parsing table init a
JESWTR          ENDED        Write SYSLOG after IPL
JES2            UP            JES2 application for each test sy
JLP111A         UP            MAWA/P
JLP111B         UP            MAWA/P

Command ==>
PF1=Help  PF2=End    PF3=Return  PF4=INGLIST  PF5=Filters  PF6=Roll
PF7=Back  PF8=Forward PF9=Refresh  PF10=Previous PF11=Next   PF12=Retrieve

```

Some of this information, especially the automation status, changes in real time. By pressing PF9 (Refresh), you can obtain a new set of data for the displayed subsystems.

You can use PF4 to toggle to the INGLIST panel to see the same resources as shown in the DISPSTAT panel but now from the automation manager point of view. To return to the DISPSTAT panel press the PF3 key on the INGLIST panel. Note, pressing PF4 on the INGLIST panel displays the DISPSTAT panel for all

resources shown in the INGLIST panel but this might not be the same as the original DISPSTAT display since the INGLIST display might have been modified due to filtering.

From the DISPSTAT display you may launch a number of other commands:

INGAUTO

This lets you change the subsystems automation flags

SETSTATE

This lets you change the subsystems automation status if it is inactive.

INGREQ - STOP

This lets you shut down the subsystem.

thresholds - DISPTHRS

This lets you review the subsystems threshold settings.

EXPLAIN

This presents an explanation of the subsystems current automation status.

DISPINFO

This presents a detailed display of the subsystem.

DISPTREE

This presents a view of the target systems parent/child graph, focused on the subsystem.

DISPTRG

This shows details of whichever trigger, if any, is associated with the subsystem.

INGSCHED

This shows details of the service period that has been defined for the subsystem.

All of these commands work in the same way as DISPSTAT - fetching it from the target system and presenting it to you on a full screen panel.

On the DISPSTAT panel, you can use PF5 to invoke a filter dialog which is equivalent to using the DISPSFLT command available from any command line (see Figure 14 on page 80). With this filter, you can reduce the amount of information shown in the display. It enables you to setup a specific operator view for an operator. For example, you can set up a filter that shows only resources of a certain name or that are in a specific state. For more information refer to *System Automation for OS/390 Operator's Commands*.

```

AOFKSTA3          SA OS/390 - Command Dialogs
Domain ID   = IPUFM   ----- DISPSFLT -----   Date = 05/23/00
Operator ID = HUT     Time = 11:21:18

Resources      ( *, *esour*, resource or jobname )
AGFG AGFG2 APPC ASCH BATB000P100 BATB000P200 BATB000P300 BATB000S100

Statuses      ( *, status or choice, leading ^ or \ negates )
*

Precoded:  1 All resources that are currently UP or ENDED
           2 All resources that are in a normal status
           3 All resources that are in a down status
           4 All resources that are in a start transition state
           5 All resources that are in a stop transition state

Target Systems ( system name , domain ID , sysplex name or * )
AOC7

Command ==>
PF1=Help   PF2=End   PF3=Return   PF4=Clear   PF5=Reset   PF6=Roll
PF9=Save   PF12=Retrieve

```

Figure 14. DISPFILT Command Dialog

The panel displays the filters that will be used for the DISPSTAT display. The filters are stored in task global variables, and you can update them by pressing PF9. When the panel is invoked from within DISPSTAT, pressing ENTER will take you to the DISPSTAT display, using the filters that are currently displayed. The filters are not saved unless you have previously pressed PF9 in the DISPSFLT command dialog.

The filters you can set are:

- **Resources:**

You can specify a list of one or more subsystem names. They can have leading or trailing wildcards (for example, *VIEW, NET* and *TVIE* are OK, but NE*EW will not work).

You can also specify a list of jobnames instead of subsystem names.

- **Statuses:**

You can specify a list of automation statuses to be included or excluded from the display. This filter is used whenever the display is refreshed.

SA OS/390 provides the following sets of pre-grouped statuses, which can be abbreviated by their numbers:

1. All resources that are currently UP or ENDED
2. All resources that are in a normal status: DOWN, STARTED, UP, AUTOTERM, AUTODOWN, ACTIVE, ENDED, ENDING, RESTART, EXTSTART, RUNNING
3. All resources that are in a down status: DOWN, INACTIVE, RESTART, AUTODOWN, CTLDOWN, STOPPED, BROKEN, MOVED, FALLBACK
4. All resources that are in a start transition state: RESTART, STARTED, STARTED2, ACTIVE, RUNNING, EXTSTART
5. All resources that are in a stop transition state: AUTOTERM, ENDING, STOPPING, ABENDING, BREAKING

- **Target Systems:**

This lets you specify the systems within the sysplex that you want data gathered from. By default it shows just your local system.

You can specify a list of one or more system and/or domain names and/or sysplex names, and the query is sent to those systems. Alternatively you can specify '*ALL', and the query is sent to all active systems within the sysplex.

In general the more specific your query and the fewer systems you send it to, the faster it will execute.

When you have updated the filters (the defaults will do for just exploring), press ENTER to go into the DISPSTAT display.

How to Use DISPINFO to Display Detailed Information

To see detailed information on a subsystem from the automation agent's, point of view, use the DISPINFO command. This will only work on one subsystem at a time. If the subsystem you specify occurs on more than one system within the sysplex, you will be prompted to select the one you would like to see information about.

The DISPINFO command displays information about the selected resource, in our following example, the APPC resource. As you can see, it displays a lot of the definitions that have been made to SA OS/390 about the subsystem. You can use PF8 to scroll down to further pages of information about this resource. And you can use PF4 to toggle to the INGINFO command display for this resource which shows the automation manager view of it.

```
AOFKINFO          SA OS/390 - Command Dialogs          Line 1    of 103
Domain ID   = IPUFM   ----- DISPINFO -----          Date = 03/13/00
Operator ID = HUT                                          Time = 16:51:25

Subsystem ==>  APPC          System ==>  AOC7          System name, domain ID
                                                or sysplex name
Subsystem   : APPC          on System : AOC7

Description  : APPC/MVS automation policy.

                The APPC/MVS address space must be operational
                before the Operations workstation can be
                fully functional. (In particular, I/O monitoring
                functions require the use of APPC/MVS.)

Class       : None
Job Name    : APPC
Job Type    : MVS

Automation status : UP
Last Monitored : 16:47:35 on 03/13/00
Last Changed  : 17:36:40 on 03/01/00
Last Message  :
                AOF571I 17:36:40 : APPC SUBSYSTEM STATUS FOR JOB APPC IS UP - AT
                SYS-OPS RECYCLE

Command ==>
PF1=Help    PF2=End      PF3=Return   PF4=INGINFO          PF6=Roll
PF8=Forward PF9=Refresh          PF12=Retrieve
```

Use PF8 to reach the following display:

```

AOFKINFO          SA OS/390 - Command Dialogs      Line 23  of 103
Domain ID   = IPUFM      ----- DISPINFO -----      Date = 03/13/00
Operator ID = HUT                               Time = 16:55:38

Subsystem ==>  APPC          System ==>  AOC7      System name, domain ID
                                         or sysplex name

Monitor           : AOFMJMON (default)
Monitor Status    : ACTIVE

Monitor Interval  : None specified

ARM Element Name  : None

Association        : Primary

WLM Resource Name : None

Managing Feature  : None

Command Prefix    : None

Flags - Automation : Yes
      Init Start   : Yes
      Start        : Yes
      Recovery     : Yes
      Shut Down    : Yes
      Restart      : Yes

Command ==>
PF1=Help  PF2=End    PF3=Return  PF4=INGINFO      PF6=Roll
PF7=Back  PF8=Forward PF9=Refresh  PF12=Retrieve

```

Use PF8 to reach the following display:

```

AOFKINFO          SA OS/390 - Command Dialogs      Line 45  of 103
Domain ID   = IPUFM      ----- DISPINFO -----      Date = 03/13/00
Operator ID = HUT                               Time = 16:56:14

Subsystem ==>  APPC          System ==>  AOC7      System name, domain ID
                                         or sysplex name

Restart after IPL      : START
Restart after Recycle  : START
Restart when Stopped   : ABENDONLY

Thresholds -          APPC    SUBSYSTEM    DEFAULTS
Critical   : Undefined  2 in 01:00  5 in 01:00
Frequent   : Undefined  3 in 05:00  3 in 05:00
Infrequent : Undefined  4 in 12:00  1 in 10:00

Start Up Mechanism    :
Scheduling Subsystem : Default

External startup      : NEVER

Prestart :
None

Startup :

Start command to be used :
MVS S APPC,APPC=07

```

Not all panels are printed here. Use PF8 until you reach a display line like the following one, which indicates the end of the display:

Data produced at 12:16:07 on 05/23/00.

If you use DISPINFO for a CICS- or IMS-controlled resource, then PF10 is active with which you can view additional CICS or IMS related information.

How to Use DISPTREE to Display Dependency Information

Generally if a resource has not been started, it will be because of a problem with one of its supporting resources. You may also wish to know which other subsystems will be impacted by problems with a particular subsystem. To find out what the problem is, use the DISPTREE command.

The DISPTREE command presents a view of the start dependencies, stop dependencies or the group membership of the specified subsystem (resource). Supporting resources are shown above and to the left of it, its dependent resources are shown below and to the right. The following screen shot shows the DISPTREE display for a start dependency for a JES2 subsystem. As you can see, JES2 in our example has no supporting resources.

```
AOFKTREE SA OS/390 - Command Dialogs Line 1 of 15
Domain ID = IPUFM ----- DISPTREE ----- Date = 03/13/00
Operator ID = HUT Time = 17:08:37

Subsystem ==> JES2 System ==> AOC7 Dependency ==> START

JES2

+-- IRRDPTAB
+-- JESWTR
+-- LOGRECJ
+-- RMF
! +-- RMFIII
+-- SMFDUMPJ
+-- VTAM
    +-- APPC
    ! +-- ASCH
    +-- BNKTSO
    ! +-- BNKVTAM
    ! +-- BNKJES
    +-- TSO
    +-- UNIQUE

Command ==>
PF1=Help PF2=End PF3=Return PF4=Focus PF5=Info PF6=Ro11
PF9=Refresh PF11=Right PF12=Retrieve
```

The actual screen uses reverse video to improve the highlighting. Application groups are indicated with |.

PF4 will refocus the display onto the subsystem under the cursor. PF5 will invoke DISPINFO against the subsystem under the cursor. However, you cannot use DISPINFO on application groups.

Chapter 7. How to Monitor and Control Resources

This chapter introduces a series of commands that you can use to control resources. Controlling resources in this context means, making them available or unavailable.

Besides the principal methods for controlling resources as introduced in “Chapter 2. Concepts” on page 17, SA OS/390 offers more sophisticated techniques to the operator.

With the commands introduced in this chapter, you can for example:

- start or stop a resource or application group
- view resource/group details
- turn on/off the automation flag for a resource or application group
- view and/or modify service periods, referred to as schedules
- view the trigger definitions.

The following topics are discussed:

- “How to Start and Stop Resources”
- “How to Display Trigger Information - INGTRIG and DISPTRG” on page 95
- “How to Work with Application Groups” on page 103
- “How to Set a Timer” on page 106
- “How to Interact with the Automation Manager - INGAMS” on page 108
- “How to Change the Automation Agent Status - SETSTATE” on page 109
- “How to Monitor Hardware” on page 117

How to Start and Stop Resources

Besides goal driven automation that you exploit by defining automation policy, SA OS/390 offers a series of commands that let the operator react on special circumstances beyond regular automation. The commands for such purposes are introduced in the subsequent sections. Each command is documented with the complete syntax and some further sample output screens in *System Automation for OS/390 Operator's Commands*.

How to Use INGREQ

As described in “Automation Concepts” on page 17, commands issued with INGREQ and a high priority are the most powerful automation commands to make applications available or unavailable. They supersede all other requests that exist against a resource at that time.

You can use this command to:

- initiate the start process of one or more specified application resources or application group resources
- initiate the shutdown process of one or more specified application resources or application group resources.

A request is persistent until:

- you cancel it using the INGVOTE command
- it expires according to the specified EXPIRE parameter
- it is automatically removed when a specified condition comes true
- you want it to be cancelled after a specified timeout period, if the request has not been satisfied after that time
- it is overwritten by a request from the same source

Even though requests are persistent, it is not guaranteed that they will be satisfied by the automation manager.

With a request you specify two categories of parameters:

- How should the request be executed (for example, with low or high priority)?
- What should happen with the request during its lifetime, for example, should it expire after a certain time anyway, or after a timeout if it has not been successful.

If you specify the command name without any parameters, SA OS/390 displays a panel where you can specify, for example, startup or shutdown parameters, a priority, and a timeout for the request.

```

INGKYRU0          SA OS/390 - Command Dialogs
Domain ID   = IPSFM  ----- INGREQ -----   Date = 07/21/00
Operator ID = HUT    Time = 10:18:29

Resource =>                               format: name/type/system
System   =>                               System name, domain ID or sysplex name

Request  =>                               Request type (START, UP or STOP, DOWN)
Type     => NORM                          Type of processing (NORM/IMMED/FORCE/user) or ?
Scope    =>                               Request scope (ONLY/CHILDREN/ALL)
Priority  => LOW                            Priority of request (FORCE/HIGH/LOW)
Expire   =>                               , Expiration date(yyyy-mm-dd), time(hh:mm)
Timeout  => 0 / MSG                        Interval in minutes / Option (MSG/CANCEL)
AutoRemove =>                               Remove when (SYSGONE, UNKNOWN)
Restart  => NO                             Restart resource after shutdown (YES/NO)
Override => NO                             (ALL/NO/TRG/FLG/DPY/STS/UOW/INIT)
Verify   => YES                            Check affected resources (YES/NO/WTOR)
Precheck => YES                            Precheck for flags and passes (YES/NO)
Appl Parm =>

AOF710A VERIFY/REVISE INPUT AND THEN PRESS ENTER
Command ==>
PF1=Help   PF2=End   PF3=Return   PF6=Ro11

```

Figure 15. INGREQ Command Dialog

With the *Request* parameter you specify whether you want to launch a request to make the specified resource available (startup) or unavailable (shutdown).

With the *Type* parameter you specify the type of the startup/shutdown. Valid shutdown types are NORM, IMMED and FORCE. Valid startup types are NORM and any other type defined by the user in the policy database for the resource. Specify a questionmark (?) to see the list of user defined startup types.

With the *Scope* parameter you can specify whether the startup/shutdown affects this resource and/or its descendants, as follows:

ONLY Only the resource is started/stopped.

ALL The resource and its dependants are started/stopped.

CHILDREN

Only the dependants are stopped. This option does not apply for a start request.

Note:

A request against a resource to make its children unavailable (MakeUnavailable, Scope=CHILDREN) will not affect the resource itself, as you do not want to make it unavailable, but only want to make the dependent resources unavailable. So this request is propagated to the dependent resources. On the original target resource, however, such a vote will never be considered for the winning vote evaluation. Whatever priority such a vote will have, it will never become the winning vote on this resource.

With the parameter *Precheck* you can specify whether or not SA OS/390 should perform a validation check before the startup/shutdown command is issued. For example, SA OS/390 would check if automation flags permit a startup/shutdown. YES is the default.

With parameter *Appl Parm*s you can specify modifications and parameters to the START or STOP request that are particular to the application being started or stopped. This applies primarily to CICS, DB2 and IMS subsystems. The contents of this field is placed into the EHKVAR1 substitution variable. This variable can be used in the start or stop command.

After pressing ENTER to submit the request, you will see a verification panel that lists all resources that are affected either when posting an INGREQ command to the automation manager or when cancelling a previously made request. When making a request, a resource is affected if it is within the dependency graph that the request is propagated along. This will also display resources that are already in the desired state. In this case nothing will happen to the resource.

When cancelling a request, a resource is affected when it holds a vote for the request to be removed. Only resources that are highlighted will be processed by the command. All other resources are already in the state satisfying the appropriate dependencies.

With the *Verify* option you can decide whether you want to see a verification panel before submitting the request (see Figure 16 on page 88). Starting with the verification panel, you can manipulate affected requests, using the commands listed in the top of the panel, for example, you can invoke the INGVOTE command dialog for a selected resource. Or, you can go back to the INGREQ command dialog to change the options/parameters.

In the *TRG* column of the INGREQ verification dialog form Figure 16 on page 88, you can see whether for a resource a trigger condition is satisfied.

In the *SVP* column, you can see whether a service period is linked to the resource and whether the current time is within the service period.

```

AOFKVFY1          SA OS/390 - Command Dialogs          Line 1 of 3
Domain ID = IPUFM ----- INGREQ -----             Date = 03/13/00
Operator ID = HUT                                     Time = 18:05:21

Verify list of affected resources for request START

CMD: S show overrides  T show trigger details  V show votes
Cmd Name      Type System  TRG SVP  W Action Type  Observed Stat
-----
  APPC        APL  AOC7              Y        NORM  AVAILABLE
  JES2        APL  AOC7              Y        NORM  AVAILABLE
  VTAM        APL  AOC7              Y        NORM  AVAILABLE

```

Figure 16. INGREQ Verification

The *W* column indicates whether this vote is the winning vote for this resource.

Note: You can use a DB2 specific feature for shutdown on the INGREQ panel: In the case of using the *Precheck* option on the INGREQ command dialog, this will check the DB2 subsystem for INDOUBT threads. If there are any, then the ING107E message is issued and the shutdown disallowed. However, you can ask for this precheck not to be done by entering Precheck=N. Later when the actual subsystem is asked to be shutdown, the INDOUBT check is again performed although the Precheck was set no N. To get over this, you can enter an override of ALL or UOW and the shutdown will go ahead without this check.

Starting Subsystems

In order to start a subsystem it must be put into either the DOWN or the RESTART automation status seen by the automation agent. The DOWN status occurs just after SA OS/390 initialization and indicates that the subsystem has not been active since SA OS/390 was last started.

To put a subsystem into the RESTART status, you can use the SETSTATE command.

If Subsystems do not Start

If you have asked for a subsystem to start and SA OS/390 refuses to do it, there are some things you can check.

At first examine the AOF313I message. This should clearly state why the start up request was rejected. If there isn't one, then search your netlog for more information.

- *Supporting Resources Not Up*

If supporting resources are not up, SA OS/390 tries to start them. If you wait a while they should come up and then the target subsystem will be started.

You can check on the state of the parents through the DISPTREE display, including status, or through messages issued to the NCCF console. If for example, it turns out that a parent is in a status of BROKEN, it is not possible to start the desired subsystem until this problem is fixed.

- *Automation Flags Turned Off*

Automation flags may be turned off for the subsystem or for just the INITSTART or RESTART actions. If the INITSTART flag is turned off, the subsystem cannot be started from a DOWN status. If the RESTART flag is turned off, the subsystem cannot be started from a RESTART status.

To see the flag settings for a subsystem you can use either DISPFLGS or DISPINFO. DISPFLGS will show you both the current settings in force for the subsystem and, perhaps more importantly, the settings that were made which resulted in those values.

- ***Trigger Not Satisfied***

Triggers tell SA OS/390 when it is allowed to stop and start subsystems. If a trigger has been linked to a subsystem, SA OS/390 will not stop or start that subsystem unless the trigger says it is OK to do so. Normally this function is fine, but there may be times when you need to override it.

To find out about the trigger linked to a subsystem, use the DISPTRG command. For example, the command

```
DISPTRG TEST0,TARGET=KEY3
```

shows the triggers and events associated with the resource **TEST0**.

If you want to start something and override the event settings you can either issue an INGREQ REQ=START OVERRIDE=TRG command or with the INGREQ command, you can specify that trigger conditions should not be considered by specifying option **Override ==> TRG** in the panel from Figure 15 on page 86. Or if you want to ensure that the trigger is satisfied before you start the resource, you can set it with INGEVENT. INGEVENT can be used to set an event (but may affect more than just the subsystem you are dealing with).

- ***the automation manager automation flag is off:***

Use the INGINFO command or the INGLIST command to find out what the current setting is. If the automation flag is off, the automation manager will not send the order to start the subsystem to the automation agent.

For a detailed scenario on how to use SA OS/390 diagnosis methods, refer to “Chapter 8. Scenario: Finding out Why a Resource is not Available” on page 181.

If Subsystems do not Stop

If you have asked for a subsystem to stop and SA OS/390 refuses to do so, here are some things you can check:

- ***supporting resource cannot stop:*** the supporting resources cannot be brought in the condition fulfilling the stop dependency, so that the dependent resource that you want to stop, also cannot stop. This is the case if the compound status indicates: AWAITING.
- ***request with higher priority to have the subsystem UP:***
Use the INGVOTE command to determine if a higher priority request exists for the subsystem. If so, you can either re-issue the stop request with a higher priority thus overruling the other request or cancel the other request.
- ***the shutdown trigger is not satisfied:***
Use the DISPTRG command to find out the trigger conditions defined for the subsystem. Watch the shutdown conditions that are defined for the subsystem. You can either set one or more events bringing the shutdown condition into a satisfied state or use the INGREQ OVERRIDE=TRG parameter to bypass the trigger check.
- ***automation flags turned off:***
The automation flag may be turned off for the subsystem or just the terminate action. To see the flag settings use the DISPFLGS command or the DISPINFO command.
- ***the automation manager automation flag is off:***

Use the INGINFO command or the INGLIST command to find out what the current setting is. If the automation flag is off, the automation manager will not send the order to stop the subsystem to the automation agent.

- *check history:*

Use the INGINFO command to analyze the history of the resource.

How to Use INGVOTE

Whenever you (or a program) want the automation manager to do something, you must send it a request. Requests are remembered within the automation manager. They are made against individual resources and then propagated over the relationship graph to other resources within the automation manager. If for example, your request is to start resource A, and A has a relationship to B in a way that B needs to be started before A can run, then the automation manager generates a vote to resource B to start it. So a request can be viewed as a black box of related votes generated by the automation manager.

If you enter the INGVOTE command without any parameter, it displays all pending requests that are persistent at the automation manager.

If you enter the INGVOTE command specifying a resource, or launch it from the INGLIST command dialog, then SA OS/390 displays all pending votes for this given resource with the following information:

- request priority
- request action
- request vote
- source of request
- name of resource the request was made against

```

INGKYRQ2                SA OS/390 - Command Dialogs                Line 1 of 60
Domain ID = IPUFM      ----- INGVOTE -----                Date = 03/23/00
Operator ID = MIK      Sysplex = AOCPLEX                        Time = 16:24:05

Cmd: C Cancel request  K Kill request  S Show details  V Show votes
Cmd Name      Type System  Request Data
-----
  APPC        APL  AOC7    Req : MakeAvailable_Only
                Org : OPERATOR(HUT)
                Pri : 002A0000  Should Be Up - Operator
                Stat: Winning/Satisfied
  BNKTMG1     APL  AOC7    Req : MakeAvailable_Only
                Org : OPERATOR(MALL)
                Pri : 002A0000  Should Be Up - Operator
                Stat: Winning/Satisfied
  SHIFT2      SVP
                Req : MakeAvailable_Only
                Org : SCHEDULE
                Pri : 00620000  Must Be Up - Schedule
                Stat: Winning/Unsatisfied
  SHIFT3      SVP
                Req : MakeAvailable_Only

Command ==>
PF1=Help      PF2=End      PF3=Return   PF6=Roll
PF8=Forward   PF9=Refresh  PF12=Retrieve
  
```

Figure 17. INGVOTE Command Dialog

From the INGVOTE command dialog, you can enter the following commands against a selected vote:

- C Cancels the request. This command displays the verification panel that lists all resources that are affected if you want to cancel the selected vote/request (see also "How to Use INGREQ" on page 85).
- K Cancels the request without showing the verification panel.
- S Shows details about the request.
- V Displays all the requests/votes that have been entered for the selected resource.

How to Use INGHIST

The INGHIST command is a sysplex-wide command issued against the sysplex's automation manager. It displays history information about the workitems processed by the automation manager. You can specify a certain resource for which you want SA OS/390 to display the work history, or you can specify a time interval, for which you want to see all activities or you can combine both criteria.

If you enter this command without parameters, you receive the output for the complete sysplex starting from the last hour before you entered this command. Your output panel may look similar to the following:

```

INGKYHI0          SA OS/390 - Command Dialogs          Line 1 of 112
Domain ID = IPUFM  ----- INGHIST -----           Date = 05/23/00
Operator ID = HUT          Sysplex = AOC7PLEX          Time = 16:46:17

Start time ==> 2000-05-23 15:46:00    format: yyyy-mm-dd hh:mm:ss
End time   ==>                               Resource ==>

Cmd: + Expand workitem (e)  - Collapse workitem (c)
Cmd Date   Time   Footprint
-----
- 2000-05-23 16:46:14 GLOBAL automation flag is set off
- 2000-05-23 16:46:05 INITSTART automation flag is set off
- 2000-05-23 16:44:21 INITSTART automation flag is set off
- 2000-05-23 16:44:12 GLOBAL automation flag is set off
- 2000-05-23 16:43:32 GLOBAL automation flag is set off
- 2000-05-23 16:43:23 INITSTART automation flag is set off
- 2000-05-23 16:42:11 GLOBAL automation flag is set off
- 2000-05-23 16:42:02 INITSTART automation flag is set off
- 2000-05-23 16:40:24 INITSTART automation flag is set off
- 2000-05-23 16:40:14 GLOBAL automation flag is set off
- 2000-05-23 16:23:15 Startup for PROC_OPS/APL/AOC7 completed

Command ==>
PF1=Help      PF2=End      PF3=Return    PF6=Ro11
                PF8=Forward  PF9=Refresh   PF12=Retrieve

```

In the *Cmd* column on the left hand side of the INGHIST panel, with the + or the *e* command, you can expand each workitem so that you see information about which detail actions have been performed by the automation manager and which resources have been involved. In Figure 18 on page 92 you see for example, that at first the automation status has been set to *Idle* for resource *PROC_OPS/APL/AOC7*.

```

2000-05-23 16:23:15 Startup for PROC_OPS/APL/AOC7 completed
HSAL6269I Status/Automation is Idle (PROC_OPS/APL/AOC7)
HSAL6282I Status/Compound is Satisfactory (PROC_OPS/APL/AOC7)
HSAL6172I Group Observer update sent (PROC_OPS/APL/AOC7)
HSAL6157I Make Available order completed (PROC_OPS/APL/AOC7)

```

Figure 18. Expanded Workitem

With - or c, you can collapse expanded workitems again.

How to Use Schedules - INGSCHED

Service periods (also called schedules) are one of the methods to set goals for resources. Service periods are defined as permanent automation policy in the customization dialog. To display all service periods defined in the sysplex, issue the INGSCHED command without any parameters as shown in Figure 19.

```

INGKYSP0          SA OS/390 - Command Dialogs      Line 1 of 7
Domain ID = IPUFM ----- INGSCHED ----- Date = 03/14/00
Operator ID = HUT          System = AOC7           Time = 17:13:58

Cmd:  A Show Details  B Show Overrides  C Show Resources

Cmd Schedule Description
-----
BZOETEST SVP with a lot of entries
KRZTEST
SHIFT1   Weekday A.M. (06:00 - 11:59)
SHIFT2   Weekday P.M. (13:00 - 16:59)
a SHIFT3   Mo-Fr 16.00 - 05.55 ... 16.04 - 05.59
SHIFT4   Saturday 6.00 - 17.59
SHIFT5   Sunday 6.00 - 12.00

```

Figure 19. INGSCHED Command Dialog

From the INGSCHED command dialog, you can issue the following commands against a selected schedule:

- A** Using this action code, you can see the UP and DOWN time windows of the selected service period for the week as shown in Figure 20 on page 93 for service period SHIFT3 in our example. No updates are possible on this panel.
- B** Displays the actual UP and DOWN time windows for the selected schedule including the overrides starting with the current day. Use this option if you want to override a schedule for all resources that use this schedule (that means, for all resources, to which this schedule is linked in the customization dialog). Such an override is called a *schedule override* and is described in “Schedule Override” on page 93.
- C** Displays the resources that are using the selected schedule. You can select a resource to view the schedule that is used for this resource. Now you can override the schedule just for the selected resource. Such an override is called a *resource override* and is described in “Resource Override” on page 94.

```

INGKYSP1          SA OS/390 - Command Dialogs      Line 1 of 14
Domain ID = IPUFM ----- INGSCHED -----      Date = 03/14/00
Operator ID = HUT          System = AOC7           Time = 17:17:03

Schedule. . : SHIFT3          Mo-Fr 16.00 - 05.55 ... 16.04 - 05.59

  Day      Pri  Strt/Stop  Strt/Stop  Strt/Stop  Strt/Stop  Strt/Stop
  ---      --  -----  -----  -----  -----  -----
MON  UP  H  1600-2359  - - - - -  - - - - -  - - - - -  - - - - -
    DN  H  0000-1559  - - - - -  - - - - -  - - - - -  - - - - -
TUE  UP  H  0000-0555  1601-2359  - - - - -  - - - - -  - - - - -
    DN  H  0556-1600  - - - - -  - - - - -  - - - - -  - - - - -
WED  UP  H  0000-0556  1602-2359  - - - - -  - - - - -  - - - - -
    DN  H  0556-1601  - - - - -  - - - - -  - - - - -  - - - - -
THU  UP  H  0000-0557  1603-2359  - - - - -  - - - - -  - - - - -
    DN  H  0557-1602  - - - - -  - - - - -  - - - - -  - - - - -
FRI  UP  H  0000-0558  1604-2359  - - - - -  - - - - -  - - - - -
    DN  H  0559-1603  - - - - -  - - - - -  - - - - -  - - - - -
SAT  UP  H  0000-0559  - - - - -  - - - - -  - - - - -  - - - - -
    DN  H  0600-2400  - - - - -  - - - - -  - - - - -  - - - - -
SUN  UP  L  - - - - -  - - - - -  - - - - -  - - - - -  - - - - -
    DN  H  0000-2359  - - - - -  - - - - -  - - - - -  - - - - -

```

Figure 20. INGSCHED Details

The column with the **UP** and **DN** entries indicates whether the schedule is an UP or DOWN time window.

Schedule Override

You can interactively override a schedule for all resources that use this schedule. You can interactively override the schedule starting from a specified starting date for selected dates in the near or far future.

To reach the panel shown in Figure 21 on page 94, select option **B** from the panel shown in Figure 19 on page 92 or use the INGSCHED command with the schedule name as a parameter. Schedules that have been overwritten are shown in yellow. From this panel you can now overtype or complete the displayed schedule.

```

INGKYSP2                SA OS/390 - Command Dialogs
Domain ID = IPUFM      ----- INGSCHED -----      Date = 05/23/00
Operator ID = HUT          Sysplex = AOC7PLEX          Time = 18:12:22

Schedule . . . : SHIFT3      Daily 16.00 - 19.00 high UP
Starting date => 05 / 23 / 2000      (mm/dd/yyyy)

C Date          Pri  Strt/Stop  Strt/Stop  Strt/Stop  Strt/Stop  Strt/Stop
-----
05/23/00 Tue UP H  1600 1900  _____
                DN H  0000 1600  _____
05/24/00 Wed UP H  1600 1900  _____
                DN H  0000 1600  _____
05/25/00 Thu UP H  1600 1900  _____
                DN H  0000 1600  _____
05/26/00 Fri UP H  1600 1900  _____
                DN H  0000 1600  _____
05/27/00 Sat UP H  1600 1900  _____
                DN H  0000 1600  _____

Command ==>
PF1=Help      PF2=End      PF3=Return      PF6=Roll
PF7=Backward  PF8=Forward  PF9=Refresh     PF12=Retrieve

```

Figure 21. Panel for Schedule Overrides

Resource Override

To reach the panel shown in Figure 22 on page 95, select option **C** from the panel shown in Figure 19 on page 92 and then select the resource for which you want to override the schedule.

Another way to reach the resource override panel is to issue the INGSCHED command with a certain resource name as a parameter, like:

```
INGSCHED AGFG2/APL/AOCA
```

Finally, there is a third way to reach the resource override panel: from the INGLIST command dialog (see “How to Use INGLIST to View Resources” on page 71) you can issue action code **I** against a selected resource. In the upcoming panel you will see the desired schedule. Service windows that are overrides for the resource are shown in pink. Now you can edit the schedule by typing new values.

```

INGKYSP2                SA OS/390 - Command Dialogs
Domain ID = IPUFM      ----- INGSCHED -----      Date = 05/23/00
Operator ID = HUT          Sysplex = AOC7PLEX          Time = 18:34:32

Resource . . . : BZOLGSVP/APL/AOC7                Schedule . . . : BZOETEST
Starting date => 05 / 23 / 2000                (mm/dd/yyyy)

C Date          Pri  Strt/Stop  Strt/Stop  Strt/Stop  Strt/Stop  Strt/Stop
-----
05/23/00 Tue UP  H   0800 0810  _____  _____  _____  _____
                DN  H   0000 0759  _____  _____  _____  _____
05/24/00 Wed UP  L   0600 0700  _____  _____  _____  _____
                DN  L   0000 0600  _____  _____  _____  _____
05/25/00 Thu UP  H   1200 1600  _____  _____  _____  _____
                DN  H   0000 1159  _____  _____  _____  _____
05/26/00 Fri UP  H   1200 1230  _____  _____  _____  _____
                DN  H   0000 1159  _____  _____  _____  _____
05/27/00 Sat UP  L   0900 1000  _____  _____  _____  _____
                DN  L   0000 0859  1000 2400  _____  _____

Command ==>
PF1=Help      PF2=End      PF3=Return      PF6=Ro11
PF7=Backward  PF8=Forward   PF9=Refresh     PF12=Retrieve

```

Figure 22. Panel for Resource Overrides

From this panel which is specific for the current resource you can:

- enter new service times
- overwrite or blank out existing service times
- and delete a complete (pink) schedule override by entering action code *D* into the command column. Then the schedule override will disappear and the general schedule for all resources will be restored for the current resource (in green).

How to Display Trigger Information - INGTRIG and DISPTRG

Triggers are a very powerful tool of goal driven automation. As they influence the behaviour of applications and application groups, the automation programmer needs to be very careful in connecting triggers to resources. For information on event and trigger support refer to *System Automation for OS/390 Defining Automation Policy*.

In SA OS/390 two commands are available to display trigger information:

INGTRIG

This command shows all triggers that are defined and used by resources within the automation manager scope. For each trigger you can view all resources that use this trigger.

```

INGKYTR0          SA OS/390 - Command Dialogs          Line 1 of 13
Domain ID = IPUFM ----- INGTRIG -----          Date = 03/23/00
Operator ID = MIK          Sysplex = AOCPLEX          Time = 16:31:20

Cmd: S show associated resources

Cmd Trigger      Description
-----
BATCHSTP        Batch jobs B000P100,P200,P300
BATCHSTR        Batch jobs B000S100,S200,S300
DRWTRG1         TD Trigger 1 (evt1 - evt8)
DRWTRG2         TD trigger 2 (evt9 - evt12)
HUGTRIG1        Trigger for HUG applications
MSCTRIG1        scheduling test trigger 1
MSCTRIG2        scheduling test trigger 2
TRIGGER6        Hourly window + batch controlled events
TRIGGER7        Command controlled events, No UNSET
TRIGGER8        Command controlled events, diff. unsets

Command ==>
PF1=Help      PF2=End          PF3=Return      PF6=Roll
               PF9=Refresh      PF12=Retrieve

```

DISPTRG

This command displays the trigger conditions for a resource. To display a panel similar to the one shown in the following screenshot, enter:

```
DISPTRG BATB000P100
```

(If you enter this command without parameters, SA OS/390 prompts you for more information).

```

AOFLT000          SA OS/390 - Command Dialogs          Line 1 of 1
Domain ID = IPUFM ----- DISPTRG -----          Date = 05/23/00
Operator ID = HUT          System = AOC7          Time = 18:41:22

Resource ==> BATB000P100/APL/AOC7
System ==>          System name, domain id or sysplex name
Trigger. . . : BATCHSTP          Observed status : HARDDOWN

Cmd: S show details
Cmd Type      Events
-----
STARTUP      BATCHSTP

Command ==>
PF1=Help      PF2=End          PF3=Return      PF6=Roll
               PF9=Refresh      PF12=Retrieve

```

With the command code *S*, for each trigger you can view the events that must be set to activate the trigger. You will see a panel similar to the following one:

```

A0FLT100          SA OS/390 - Command Dialogs      Line 1   of 1
Domain ID   = IPUFM    --- Trigger Condition List ---- Date = 05/24/00
Operator ID = HUT      System = AOC7              Time = 16:48:32

Trigger . . . . : BATCHSTP
Condition type. : STARTUP
Resource. . . . : BATB000P100/APL/AOC7          Observed status : HARDDOWN

Cmd: D show resources  S set event for resource  U unset event for resource
Cmd Event   Status    Unset  Description
-----
  BATCHSTP  UNSET      NONE   Batch jobs B000P100,P200,P300

Command ==>
  PF1=Help    PF2=End      PF3=Return   PF6=Roll
              PF9=Refresh  PF12=Retrieve

```

Figure 23. Trigger Condition List

Note that in our example, the trigger and its event have the same name *BATCHSTP*. The event for this trigger is currently unset. With the command code *S*, you can set it.

How to Display Event Information - DISPEVT, DISPEVTS and INGEVENT

You can reach the DISPEVT command dialog by issuing DISPEVT *event_name* or using the command code *D* from the trigger condition list shown in Figure 23.

This panel shows all resources that have the specified event defined within their trigger definition. For each resource the following information is displayed:

- the name of the resource
- the type of the resource
- the name of the system where the resource resides
- the name of the trigger that the resource is linked to.
- the status of the event (SET or UNSET). If the *Status* column remains blank this means that the status is unknown. This is treated as UNSET.

```

AOFLE000          SA OS/390 - Command Dialogs          Line 1 of 3
Domain ID = IPUFM  ----- DISPEVT -----           Date = 05/24/00
Operator ID = HUT   Sysplex = AOC7PLEX                 Time = 16:43:21

Event      ==> BATCHSTP
System     ==> AOC7      System name, domain id or sysplex name
Description . . : Batch jobs B000P100,P200,P300
Unset condition. : NONE

Resource   Type System Trigger Status
-----
BATB000P100 APL AOC7 BATCHSTP SET
BATB000P200 APL AOC7 BATCHSTP SET
BATB000P300 APL AOC7 BATCHSTP

Command ==>
PF1=Help      PF2=End          PF3=Return      PF6=Roll
               PF9=Refresh      PF12=Retrieve

```

Figure 24. DISPEVT Command Dialog

With the INGEVENT command, you can set or unset an event for a specified resource or for all resources in the sysplex for which it is defined.

To reach the INGEVENT command dialog, perform the following steps:

1. Issue the DISPEVTS command from any command line. You will see a panel as shown in Figure 25 which displays the events defined for resources in the sysplex.

```

AOFLE100          SA OS/390 - Command Dialogs          Line 1 of 29
Domain ID = IPUFM  ----- DISPEVTS -----           Date = 05/31/00
Operator ID = MIK   Sysplex = AOC7PLEX                 Time = 14:41:46

Cmd: D show related resources      S set/reset event

Cmd Event   Unset Description
-----
BATCHSTP   NONE   Batch jobs B000P100,P200,P300
BATCHSTR   NONE   Batch jobs B000S100,S200,S300
B000P100   DOWN   Stop cond 1 Trigger6 (batch job end)
B000P200   DOWN   = P1
B000P300   DOWN   Stop cond 2 Trigger6 (batch job 1 min)
B000S100   UP     Start cond 1 Trigger6 batch job end
B000S200   UP     = P1
B000S300   UP     Start cond 2 Trigger 6 batch end (1 min)
MDOEVENT   NONE   Donies Event1
MDOEVT2    DOWN   Donies Event2
MDOEVT3    START  Donies Event3
MDOEVT4    UP     Donies Event4

Command ==>
PF1=Help      PF2=End          PF3=Return      PF6=Roll
               PF8=Forward      PF9=Refresh      PF12=Retrieve

```

Figure 25. DISPEVTS Command Dialog

From this command dialog, you have the following options:

- D** show related resources
 - S** set/reset event
2. Now use option **S** for a selected event to reach the INGEVENT command dialog shown in Figure 26.

Note: With the line mode INGEVENT command, you can directly set or unset an event for all or a specified resource, like for example:

```
INGEVENT BATCHSTP REQ=UNSET RESOURCE=BATB000P200/APL/AOC7
```

After successful completion, this will produce the message:

```
AOF442I UNSET EVENT BATCHSTP DONE FOR RESOURCE BATB000P200/APL/AOC7
ON AOC7. - FROM=AOC7
AOF099I FUNCTION SUCCESSFULLY COMPLETED
```

```
AOFLE110          SA OS/390 - Command Dialogs
Domain ID   = IPUFM          ----- INGEVENT -----      Date = 05/31/00
Operator ID = MIK           Sysplex = AOC7PLEX              Time = 15:34:04

Event . . . . . : BATCHSTP
Description . . . : Batch jobs B000P100,P200,P300
Unset condition . : NONE

Specify/revise the following parameters and then press enter:

Function ==> UNSET          SET or UNSET
Resource ==> BATB000P100/APL/AOC7      Resource name

System ==> AOC7            System name, domain ID or sysplex name

AOF442I UNSET EVENT BATCHSTP DONE FOR RESOURCE BATB000P100/APL/AOC7 ON AOC7.
Command ==>
F1=Help      F2=End      F3=Return          F6=Roll
F12=Retrieve
```

Figure 26. INGEVENT Command Dialog

Determining Automation Agent Flag Values

You can determine the current values of the automation flags for a particular subsystem using the DISPSTAT command dialog.

The DISPSTAT command dialog also provides a fast path to other command dialogs so you can change certain automation policy settings for a particular subsystem. It also shows the status of each subsystem.

```

AOFKSTA5          SA OS/390 - Command Dialogs          Line 1 of 441
Domain ID = IPUFA  ----- DISPSTAT -----          Date = 03/30/00
Operator ID = MIK                                     Time = 17:25:32
A ingauto B setstate C ingreq-stop D thresholds E explain F info G tree
H trigger I service J all children K children L all parents M parents
CMD RESOURCE      STATUS      SYSTEM      JOB NAME      A I S R D RS TYPE      Activity
-----
HUGSGX            UP            AOCA        HUGSGX        Y Y Y Y Y Y MVS      --none--
HUGSHUTINIT      UP            AOCA        HUGSHUTI      Y Y Y Y Y Y MVS      --none--
HUGSRVGRPT2      ENDED        AOCA        HUGSGT2       Y Y Y Y Y Y ONE SHOT --none--
HUGSRVGTTRA1     DOWN         AOCA        HUGSGTR1      Y Y Y Y Y Y MVS      --none--
HUGSTART         INACTIVE     AOCA        HUGSTART      Y Y Y Y Y Y MVS      --none--
HUGTRIG1         DOWN         AOCA        HUGTRIG1      Y Y Y Y Y Y MVS      --none--
HUGWTSO          UP            AOCA        HUGWTSO       Y Y Y Y Y Y MVS      --none--
HUGWVTAM         UP            AOCA        HUGWVTAM      Y Y Y Y Y Y MVS      --none--
IRRDPTAB         ENDED        AOCA        IRRDPTAB      Y Y Y Y Y Y ONE SHOT --none--
JESWTR           ENDED        AOCA        JESWTR        Y Y Y Y Y Y ONE SHOT --none--
JES2             UP            AOCA        JES2          Y Y Y Y Y Y MVS      --none--
JLP111A          UP            AOCA        JLP111A       Y Y Y Y Y Y MVS      --none--
JLP111B          UP            AOCA        JLP111B       Y Y Y Y Y Y MVS      --none--

Command ==>
PF1=Help   PF2=End     PF3=Return  PF4=INGLIST  PF5=Filters  PF6=Roll
PF7=Back   PF8=Forward PF9=Refresh  PF10=Previous PF11=Next    PF12=Retrieve

```

Figure 27. Example Display of Status of All Automated Resources (DISPSTAT)

The automation flags are:

- A Automation
- I Initial Start
- S Start
- R Recovery
- D Shutdown
- R Restart

Automation flags are set by the automation programmer in the customization dialog. Their meanings are explained in detail in *System Automation for OS/390 Defining Automation Policy*.

Each flag has one of the following values:

- there is no explicit setting.
- N the flag is turned off.
- E The value of the automation flag depends upon the values returned by one or more user exit and will be determined when the value is required.
- Y the flag is turned on.
- ? there is an error.

Displaying Actual and Effective Automation Agent Flags

In addition to using the DISPSTAT command dialog to see the current automation flags for every subsystem, you can use the DISPFLGS command dialog to display both the actual flags that are set, and the effective flags for those subsystems that have explicit flags coded.

To display the actual and effective automation flags type DISPFLGS on any command line. You see the DISPFLGS command dialog panel.

```

AOFKAAU          SA OS/390 - Command Dialogs          Line 14 of 21
Domain ID = IPUFM ----- DISPFLGS -----          Date = 05/23/97
Operator ID = WAS                                     Time = 09:13:10
System = SYS1
Resource          Actual      Effective
                  A I S R D RS  A I S R D RS  Settings
-----
DEFAULTS          Y - - - - -  Y Y Y Y Y Y  - No explicit setting
MVSESA            - - - - -  Y Y Y Y Y Y  N Turned off
SUBSYSTEM         - - - - -  Y Y Y Y Y Y  E Consult exit
JES2              - - - - -  Y Y Y Y Y Y  Y Turned on
TSO               - - - - -  Y Y Y Y Y Y  ? Error
VTAM              - - - - -  Y Y Y Y Y Y
XYZ               - - - - -  Y Y Y Y Y Y  Flags
-----
----- System = SYS2 -----
DEFAULTS          Y - - - - -  Y Y Y Y Y Y  A Automation
MVSESA            - - - - -  Y Y Y Y Y Y  I Initial start
SUBSYSTEM         - - - - -  Y Y Y Y Y Y  S Start up
CICS              - - - - -  N Y Y Y Y Y N  R Recovery
JES2              - - - - -  Y Y Y Y Y Y  D Shut down
TSO               - - - - -  Y Y Y Y Y Y  RS Restart

Command ==>
PF1=Help   PF2=End   PF3=Return
PF6=Roll   PF8=Forward PF9=Refresh PF12=Retrieve

```

Figure 28. DISPFLGS Command Dialog Panel

Two sets of flags are shown. Those on the left of the panel are the actual flags, and those on the right are the effective flags. The values shown for each flag are explained in “Determining Automation Agent Flag Values” on page 99.

Displaying Automation Agent Flag Override Settings

The customization dialog allows you to turn automation flags off for a scheduled time period. You can view these time period settings by issuing the DISPSCHD command.

```

AOFKAASC          SA OS/390 - Command Dialogs          Line 1 of 1
Domain ID = IPUFM ----- DISPSCHD -----          Date = 05/23/97
Operator ID = WAS                                     Time = 09:13:10

System  Resource  Fl Day      Start - End      Flags
-----
KEY3    VTAM          S MONDAY  08:00:00 - 10:00:00  A Automation
KEY3    TSO          I SUNDAY  00:00:00 - 01:00:00  I Initial Start
                                           S Start up
                                           R Recovery
                                           D Shut down
                                           RS Restart

Command ==>
PF1=Help   PF2=End   PF3=Return
PF6=Roll   PF8=Forward PF9=Refresh PF12=Retrieve

```

- The System field shows the name of the system where the resource is defined.
- The Resource field shows the name of the resource.
- The Fl (flag) field shows an abbreviation of the automation flag name.
- The Day field shows the day of the week that automation is turned off.
- The Start and End fields show the time periods that automation is turned off.

- The Flags field shows the full name and the one character abbreviation for each automation flag.

In our example, Start up is not automated for VTAM on Mondays from 8 to 10 pm and Initial start is not automated for TSO on Sundays from midnight to 1 am.

Setting Automation On or Off - INGAUTO

You can change the automation setting for a specific automated resource or a group of automated resources using the INGAUTO command dialog. You can turn all automation off or only particular automation flags.

Note: Be sure to specify the correct sub-component name. Although the sub-component does not exist, the message FUNCTION SUCCESSFULLY COMPLETED will appear.

If you type INGAUTO on any command line, you see the following panel:

```

AOFKAASF          SA OS/390 - Command Dialogs
Domain ID = IPUFM  ----- INGAUTO -----      Date = 05/23/97
Operator ID = WAS                                     Time = 09:13:10

Resource name => TSO_____ Specific or group resource or DEFAULT
Sub-components => _____ Resource sub-component
Note : Be sure to specify the correct sub-component
System        => _____ System name, sysplex name or domain ID
Scope        => ONLY_____ Change automation for:
                                ONLY - only this resource
                                CHILDREN - dependants
                                ALL - resource and dependants
Automation    => N          Specify new settings for automation flags
Initstart    => -          Y - flag is always on
Start        => -          N - flag is always off
Recovery     => -          E - exits called if specified, otherwise
Shutdown    => -          always on
Restart      => -          R - return to automation control file
                                settings
Interval     => _____ Specify duration of change (dd:hh:mm)
                                or leave blank for an indefinite change

Command ==>
PF1=Help    PF2=End    PF3=Return
PF6=Roll                                PF12=Retrieve

```

Figure 29. INGAUTO Command Dialog

In the *Resource name* field, type the name of the resource for which you want to determine automation flags. If you specify the value defaults, you set automation flags for all resources that do not have more specific automation flags defined or that do not belong to a group that has flags defined.

In our example screen from Figure 29, automation is turned off for the TSO resource.

You can use the *Interval* field to turn automation on or off for all or selected flags for a specific time period. In this field, type the amount of time you want the automation turned on or off. This time period begins immediately when you press the Enter key.

At the end of the interval, the flag(s) will be reset to the value defined by your automation control file. If you leave the *Interval* field blank, the flag(s) will remain changed until they are manually reset or updated.

For the complete syntax of the commands introduced in “Determining Automation Agent Flag Values” on page 99, refer to *System Automation for OS/390 Operator’s Commands*.

How to Work with Application Groups

An application group is a resource which both summarizes the status of other resources (its members) and which controls the activation of those members. A special feature is that the members can inherit the group’s dependencies.

Each member is a resource, as is the group itself. This means that groups can contain other groups. You can issue commands to start or stop groups as an entity. Also, you can link a group to a service period and thus schedule it automatically.

Detailed information on how to organize applications into a group and how to nest groups into other groups and how to generate resources from groups and applications is provided in *System Automation for OS/390 Defining Automation Policy*.

The concept of resources allows you to dynamically move applications and groups from one system to another system in the sysplex. This move is achieved by stopping an active set of resources and starting an alternate set in a coordinated fashion. With this concept, you can also start and stop equivalent resources to maintain a desired level of server capacity.

There are two types of application groups:

- *System Application Groups* - application groups that are associated with particular systems.
- *Sysplex Application Groups* - application groups that are associated with a certain sysplex. The application group members can be spread over multiple systems within this sysplex.

Furthermore, groups can have one of three different natures:

BASIC

In a BASIC application group *all* of its components must be available before the group is considered to be available.

MOVE

In a MOVE application group exactly one of its components must be available before the group is considered to be available. In MOVE groups you can specify alternative components that will be started if the primary component fails to start.

SERVER

In a SERVER application group any number of components can be specified that must be available before the group is considered to be available. In SERVER groups you can specify what should happen if its components fail to start.

The automation programmer can set the numbers of members that should be available for a SERVER group by specifying the *Availability Target* when defining the group.

Preference values are used for SERVER and MOVE groups to determine which members should preferably be made available.

For detailed information on how to define application groups and which nature to use for which purposes, refer to *System Automation for OS/390 Defining Automation Policy*.

How to Use INGGROUP to Change Policy for Applications

The functions provided by the INGGROUP command are:

- automatic group management to maintain application availability. This includes the activation of backup/alternate resources in response to resource or system failure.
- a superset of the behaviour provided by Automatic Restart Manager. While INGGROUP does not provide a true cross system restart, it is able to take recovery actions in a variety of situations where Automatic Restart Manager is not. These include application failure, supporting application failure, and 'total active instance' based management (for SERVER groups).
- the ability to move resources away from a system, on either a group/subgroup level or a system level.
- the ability to query and dynamically change a group's policy so as to cause one instance of a resource to be stopped and another started.
- the ability to view an estimate of the impact of those changes before committing them.
- the ability to perform actions resulting from the above in a delayed, non-disruptive fashion.
- the ability to return resources to their normal systems in a delayed, non-disruptive fashion.

So one of the most important functions of the INGGROUP command is moving resources around in a sysplex. Moving applications or application groups from one system to another, that means, stopping an active set of applications (dependent and supporting resources) on one system and starting them on another system without loss of information. This can be advisable for the following reasons:

- to ensure availability of resources throughout a sysplex despite single system failure
- to balance workload in a sysplex
- to enable complete applications to be moved away from a certain system if this is needed for other work or maintenance

Application move is implemented in SA OS/390 in two flavours:

- a planned or scheduled move, which is defined by automation policy and where the availability of resources is automatically ensured due to defined availability targets and preference values for the single resources. For detailed information, refer to *System Automation for OS/390 Defining Automation Policy*.
- an immediate move for emergency reasons; for this purpose, you can use the INGGROUP command which you issue against a group to move it.

When an application has been automatically moved to a backup system after a problem, the policy can be set to return it to its home system either as soon as the home becomes available (causing an application outage) or at the next (scheduled) application outage.

For more information about application move see "Controlling Application Move and Server Management" on page 26.

You can invoke the INGGROUP command dialog either by typing the command name into the command line or by selecting option *J* from the INGLIST command dialog. In both cases you reach the panel shown in Figure 30.

```

INGKYGRA                      SA OS/390 - Command Dialogs
Domain ID = IPUFM             ----- INGGROUP -----      Date = 03/30/00
Operator ID = MIK              Sysplex = AOCPLEX              Time = 10:29:31

Specify or revise the following data:

System => _____ System name, domain id or sysplex name
Action => _____ EXCLUDE-AVOID-INCLUDE or ACTIVATE-PACIFY
Group(s) => HUGMGRPAPG/APG_____
                _____
                _____
                _____
System(s)=> _____
                _____

Command ==>
PF1=Help   PF2=End   PF3=Return  PF4=Members   PF6=Ro11
                PF10=G0                PF12=Retrieve

```

Figure 30. INGGROUP Command Dialog (1)

This panel allows you to change the policy of application groups. You may specify:

- The target sysplex for the command through the system field. If omitted, this defaults to the local system/sysplex. Specify the system name only when viewing/changing the policy of an application group that is not part of the local sysplex.
- The policy change that you want to make through the action field.
- Next you must specify either the name of the target group or a set of templates that will match one or more groups. All policy items work with a list of group name templates and apply to all Move and Server groups matching those names. While applying a policy to a Basic group is not an error, it will not achieve anything either.
- For the Exclude/Avoid/Include option, you can specify a list of systems that the policy is to be set for. Specify a questionmark (?) in the *System(s)* line to see the list of systems within the sysplex.

This option indicates that you want to remove movable members from a system (exclude), prohibit SA OS/390 from activating movable members on a system (avoid) or that you wish to undo either of the other two actions (include).

Note: The AVOID/EXCLUDE options are only applied to the members of the group which are applications. They are not applied to members of a group which are also groups. In other words, these options are not recursively spread out to nested application groups.

- With the PACIFY option, you can make the specified group passive. This option will immediately revoke all votes from all of the group members. This may cause the desired state of some of its members to change, resulting in them being started or stopped.

With the ACTIVATE option, you can make a group active. When a group becomes active, SA OS/390 will propagate *MakeAvailable* requests to the group

members that are required to make the group available. Those members which are not required will receive a *MakeUnavailable* request. Note that if a member has a preference of 1 it will always be propagated a *MakeUnavailable* request and if it has a preference of 0 (a passive member) it will never be propagated any sort of request.

To make your changes active, press PF10. Pressing PF4 from the previous panel will bring you to the one shown in Figure 31 where you can change the preference policy values for the members of a Server group.

```

INGKYGRB          SA OS/390 - Command Dialogs          Line 1 of 3
Domain ID = IPUFM  ----- INGGROUP -----          Date = 03/30/00
Operator ID = MIK          Sysplex = AOCPLEX          Time = 10:30:26

Group: HUGMGRPAPG/APG          Nature: Server
Description: sample server group
Excluded:
Avoided :
Mode: Normal      Availability Target: 1      Adjust: 0      Result=> 1

Name      Type System      Pref  Adj  Result  Avl  Eff  Stat  Act
-----
HUGMGRP   APL  AOCA          700   0    700   Yes  950  Sel   --
HUGMGRP   APL  AOCC          700   0    700   No   700  Uns   --
HUGMGRP   APL  AOCD          700   0    700   Nst   0   Uns   --

Command ==>
PF1=Help      PF2=End          PF3=Return
PF9=Refresh   PF10=G0         PF11=Reset      PF6=Roll
PF12=Retrieve

```

Figure 31. INGGROUP Command Dialog (2)

In the panel from Figure 31 you can change the values in the **Result** field to change the availability target for that server group. Also, in the **Result** column you can change the preference value for that member. The effective preference value is now shown in the **Eff** column. (Preference value changes are also possible for Server groups).

To make your changes active, press PF10. To reset the initial settings, press PF11.

For detailed information about the INGGROUP command refer to *System Automation for OS/390 Operator's Commands* and to the online help of the INGGROUP command dialog.

How to Set a Timer

You can set a timer to issue commands at a specific time or interval of time for your convenience. For example, you do not have to be present at a console to perform a repetitive task at a certain time. This timer is similar to setting up an automatic coffee-maker so that it turns itself on and brews coffee while you are waking up in the morning.

This NetView timer is actually the SETTIMER command that issues a command or list of commands at a specified time or specified interval.

Using the SETTIMER command, brings up a list of existing timers as shown in Figure 32 on page 107. From this panel, you can launch the following tasks:

- “How to Create a Timer”
- “How to Modify a Timer” on page 108
- “How to Delete a Timer” on page 108

```

AOFKATI SA OS/390 - Command Dialogs Line 1 of 39
Domain ID = IPUFM ----- SETTIMER ----- Date = 03/15/00
Operator ID = HUT System = AOC7 Time = 19:12:01
Enter ADD on the COMMAND line to create a new timer entry
or use CMD selections A add, C change, or D delete to modify existing timers.
CMD TIMER-ID SCHEDULED TIME TYPE TASK SAVE CTUP INTERVAL
-----
TSTMONIT 03/15/00 19:09:34 EVERY AUTSTM NO NO 00:05:00
Command: TSTMONIT
AOFI0011 03/15/00 19:10:15 AFTER PPT NO NO
Command: AOFRASCD MONOPER AOFRGENH CONTINUE SA_NMC_DEIBMIPS_IPUFM 00:05:0
0 ALERT 00:00:30 DEIBMIPS IPUFM AOC7 200002291930145A0345229672
0
AOFI0021 03/15/00 19:10:16 EVERY PPT NO NO 00:05:00
Command: AOFRASCD JESOPER AOFRSD09 JES2 SHORT
AOFI0012 03/15/00 19:10:46 AFTER PPT NO NO
Command: AOFRASCD MONOPER AOFRGENH FAIL SA_NMC_DEIBMIPS_IPUFM 00:05:00 0
0:00:30 DEIBMIPS IPUFM AOC7 200002291930145A0345229672 0
AOFCCON 03/15/00 19:55:34 EVERY PPT NO NO 00:59:00
Command: AOFRASCD SYSOPER MVS D C
AOFMON 03/15/00 19:55:34 EVERY PPT NO NO 00:59:00
Command: AOFRASCD MONOPER MONITOR $SYSTEM
DEFLTPPT 03/15/00 20:39:33 EVERY PPT NO NO 03:00:00
Command: TSTMSG DEFAULT TIMER FOR PPT
SYS00001 03/16/00 00:01:00 CHRON PPT NO NO 001 00:00:00
Command: CHRON AT=00.01.00 EVERY=( ) RECOVERY=AUTOLGN COMMAND='PURGE
COSCONF' PGMAT=2000-03-01-00.01.00.000000 PGMINTVL=001-00.00.00

Command ==>
PF1=Help PF2=End PF3=Return PF6=Roll
PF8=Forward PF9=Refresh PF12=Retrieve

```

Figure 32. SETTIMER Command Dialog

How to Create a Timer

Type add on the command line from the panel shown in Figure 32 and press Enter. On the upcoming panel (shown in Figure 33 on page 108), fill in the fields as required.

Note: If you want to add a new timer but use most of the same values as an already-defined timer, type A in the CMD column and modify the SETTIMER panel.

```

AOFKATIR          SA OS/390 - Command Dialogs
Domain ID = IPUFM ----- SETTIMER ----- Date = 03/31/00
Operator ID = MIK          Add/Change Timer      Time = 17:07:18

Make appropriate changes then press the enter key.

Timer ID          => NEWTIMER      System = AOCA
Type              => EVERY        AT, EVERY, AFTER
What day?
  Specific date   =>              mm/dd/yy   (used with AT type only)
  Day of Week     =>              Monday, ... (used with AT or EVERY)
  Elapsed days    =>              0 to 365    (used with AFTER or EVERY)
Time              => 00:00:20
Task              => AUTOBASE      Operator ID or PPT
Save              => NO           No, Yes, GMT or LOCAL
Timer command => MVS D R,L

          TIMER IS SCHEDULED FOR 03/31/00 AT 17:06:30

Command ==>>
PF1=Help  PF2=End   PF3=Return  PF4=Clear Command      PF6=Roll
PF12=Retrieve

```

Figure 33. Add/Change Timer

How to Modify a Timer

On the panel shown in Figure 32 on page 107, type C in the CMD column for the timer you want to change. The upcoming panel is the same as shown in Figure 33 where you now can modify the settings of your selected timer.

How to Delete a Timer

On the panel shown in Figure 32 on page 107, type D in the CMD column for the timer you want to delete and press Enter.

How to Interact with the Automation Manager - INGAMS

You can operate the automation manager itself with the INGAMS command in the following way:

- display information about all currently registered automation managers and automation agents.
- change the operation mode of an automation manager from secondary to primary
- refresh the configuration data used by the automation manager

This command displays all currently registered automation managers and automation agents as shown in Figure 34 on page 109. The *Role* describes what you see:

AGENT

denotes an automation agent

PAM denotes a primary automation manager

SAM denotes a secondary automation manager

```

INGKYAM0          SA OS/390 - Command Dialogs          Line 1 of 6
Domain ID = IPUFM ----- INGAMS -----          Date = 03/30/00
Operator ID = MIK          Sysplex = AOCPLEX          Time = 10:31:48

Cmd:  A Change Mode  B Show Details  C Refresh Configuration  D Diagnostic

Cmd System      Member      Role  Status  Sysplex  XCF-Group  Release
-----
AOCA  AOCA        AOCA        AGENT  READY   AOCPLEX   INGXSG     V2R1M0
AOCA  AOCA$$$$1   AOCA        SAM    READY   AOCPLEX   INGXSG     V2R1M0
AOCB  AOCB        AOCB$$$$1   PAM    READY   AOCPLEX   INGXSG     V2R1M0
AOCB  AOCB        AOCB        AGENT  READY   AOCPLEX   INGXSG     V2R1M0
AOCC  AOCC        AOCC$$$$1   SAM    READY   AOCPLEX   INGXSG     V2R1M0
AOCC  AOCC        AOCC        AGENT  READY   AOCPLEX   INGXSG     V2R1M0

Command ==>
PF1=Help      PF2=End      PF3=Return   PF6=Ro11
                PF9=Refresh  PF12=Retrieve

```

Figure 34. INGAMS Command Dialog

Entering the following command codes displayed in the upper part of Figure 34, you can initiate all activities concerning automation managers:

- A** You can modify the operation mode of the automation manager from secondary to primary.
- B** You can have additional information displayed about the automation manager or the automation agents. For an automation agent, the DISPSYS command will be issued to show details about the agent and the environment it runs on.
- C** You can have a panel displayed that prompts you for the name of the data set containing the automation manager configuration file members. This panel is used to update the definition data for the automation manager in real time and also for reloading the corresponding automation control files on the active automation agents. This command thus maintains the consistency of the configuration data as used by the automation agent and the associated automation control files.
- D** You can issue this command for a primary automation manager to view or produce diagnostic information, such as recording actions performed during automation. For more information, see “How to Use the Diagnostic Option of INGAMS” on page 294.

How to Change the Automation Agent Status - SETSTATE

You may wish to change the status of an application under the following circumstances:

- When you want SA OS/390 to resume handling of an application after a manual operator shutdown or after any other event that causes an application to go to a non-automatable status (for example, STOPPED, CTLDOWN, BROKEN, ACTIVE).
- When you want to prevent automation from restarting an application by setting its state to CTLDOWN.

- When you want to inform SA OS/390 that an application that has been shut down is going to be moved to another system.

System operations defines twenty six different statuses for automation, described in "Automation Agent Statuses" on page 39. For details about these statuses, see the help panels or *System Automation for OS/390 Customizing and Programming*. See Figure 35 and Figure 36 on page 111 for the relationships of the automation statuses. You can change the states illustrated here with the `SETSTATE` command (described in the *System Automation for OS/390 Operator's Commands*).

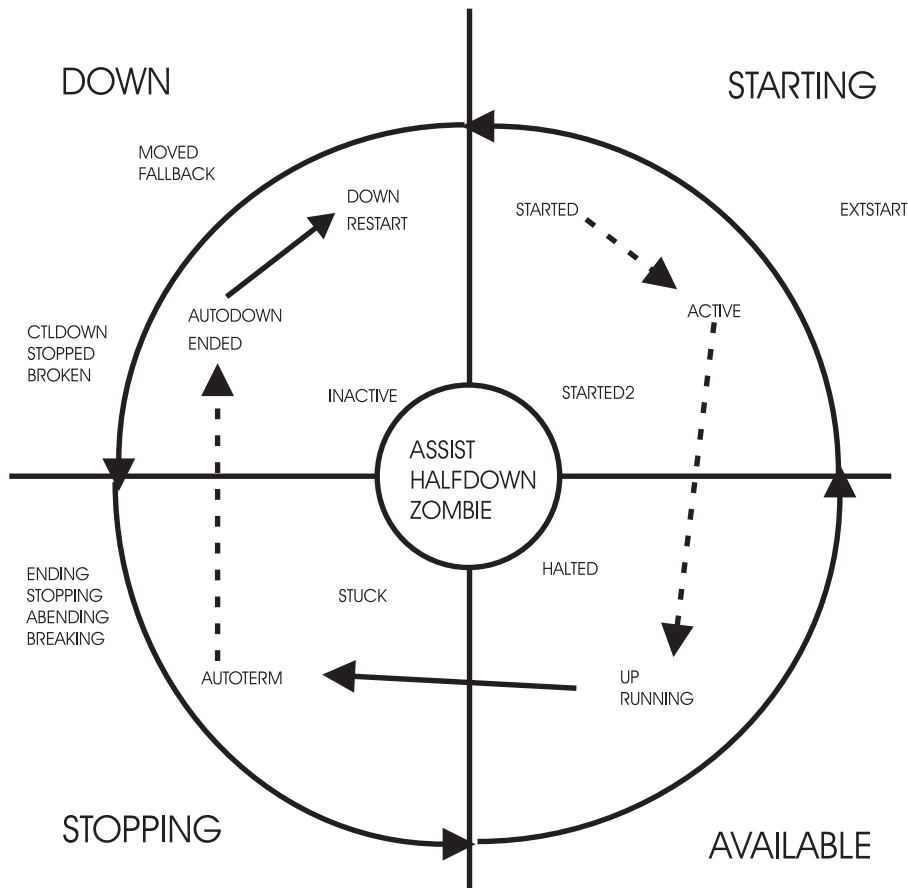


Figure 35. Transitions for a Normal Subsystem

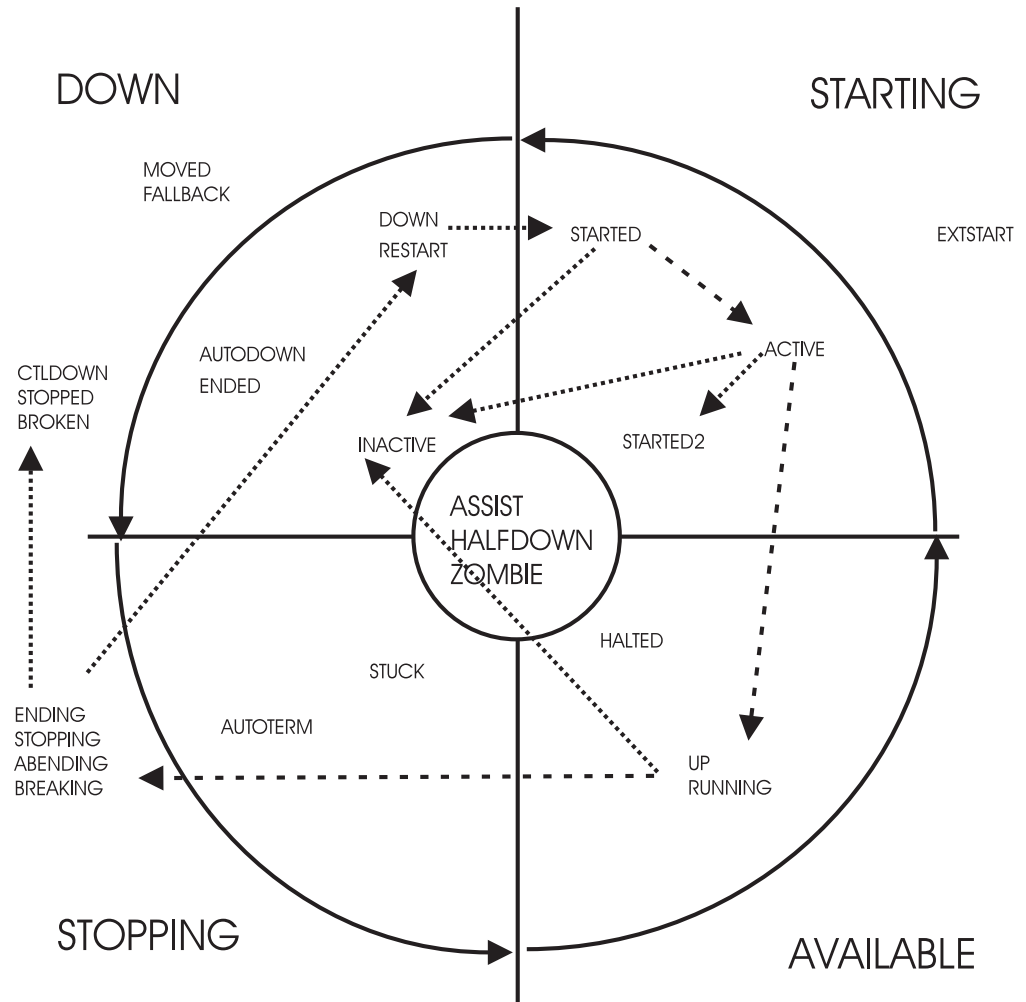


Figure 36. Transitions for an Abending Subsystem

To change the status of a subsystem, issue the SETSTATE command (see Figure 37 on page 112). The SETSTATE command is used to change the automation status of a subsystem or a group of subsystems (supporting and dependent resources). The status change you are able to make depends upon the subsystem's application monitor status. If the subsystem's application monitor status is ACTIVE, you may change its automation status to UP. If its application monitor status is INACTIVE, you can change it to RESTART or CTLDOWN. You may also be able to change it to MOVED or FALLBACK, depending upon its system associations.

With the SETSTATE command dialog, you can change the automation agent status of a subsystem or a group of subsystems by means of the *Scope* field as shown in the panel from Figure 37 on page 112. In this sample panel, the status of the TSO application and all of its dependent applications is set to CTLDOWN.

```

AOFKSAST          SA OS/390 - Command Dialogs
Domain ID = IPUFM  ----- SETSTATE -----   Date = 03/10/00
Operator ID = HUT                                     Time = 17:24:11

Specify subsystem and new state:

Subsystem => TSO_____ Subsystem to be processed
System   => _____ System name, domain ID, sysplex name or *ALL
State    => CTLDOWN_   Put subsystem in the following state:
                        (RESTART / AUTODOWN / CTLDOWN / UP / ENDED /
                        MOVED)

Scope    => ALL_____ Change state for:
                        ONLY   - only this subsystem
                        CHILDREN - only dependant subsystems
                        ALL    - resource and dependants

Start    => NO_____ Start or restart subsystem now (YES/NO)
Override => NO_      Override(Start=YES) (NO/FLG/TRG/SVP/EVT/ALL)

Command ==>
PF1=Help    PF2=End    PF3=Return
PF6=Roll    PF12=Retrieve

```

Figure 37. SETSTATE Command Dialog

Note: The *Override* field is valid only for systems automated with downlevel SA OS/390.

How to Monitor Messages

Message suppression facilities at the target system determine the amount of message traffic sent from a target system sent to a console. Messages that do not normally require operator intervention are usually suppressed at the target system. Messages that do normally require operator intervention may also be suppressed at the target system as automation programming is developed to respond for you.

You can monitor messages at the SA OS/390 workstation via several mechanisms and at several levels. You can:

- See no messages
- See a summary of outstanding WTOR messages
- See messages sent to a specific system console or operator console
- See messages related to the control of processor operations-managed resources
- See SA OS/390 messages (specified by message class)

How to See Outstanding WTOR Messages

WTOR (Write to Operator with Reply) messages are OS/390 messages which require operator action. These messages can be seen on the OS/390 operator console.

How to Monitor WTORs on NetView Consoles

Write to Operator with Reply (WTOR) messages are OS/390 system messages that inform you of various conditions. WTORs are messages that require a response.

To view a WTOR on NetView operator consoles, use the DISPWTOR command.

For further information on the DISPWTOR command refer to the *System Automation for OS/390 Operator's Commands*.

The WTORs are sorted by subsystem, with each subsystem's primary WTOR shown first, and then any secondary WTORs. The primary WTOR is the one that shutdown reply is passed to.

```

AOFKADAC          SA OS/390 - Command Dialogs          Line 1 of 1
Domain ID = IPUFM ----- DISPWTOR -----          Date = 11/16/98
Operator ID = LRM                                     Time = 14:50:13

  Rply  System  Subsystem  Message
  -----
    73  KEY1    MVSESA    DFS996I *IMS READY* M631

Command ==>
PF1=Help      PF2=End      PF3=Return   PF6=Roll
               PF9=Refresh  PF12=Retrieve
  
```

How to See Messages for a Specific System or Operator Console

You can choose to receive all messages for a specific target system operator or system console using the *Processor Operations Interested Operator List*. These messages are displayed at your NetView console session. Messages from the target console that are displayed include:

- Messages issued by processor operations that refer to the console. For example, if the active and backup consoles are switched, an appropriate message is issued.
- Messages issued by the PC screen-handler for the console. For example, if a console is enabled, an appropriate message is issued. The screen handler also issues an echo message for each screen handler command. For example, if you issue the command #QUERY ACTIVE, the following echo is issued by the screen handler: ISQP227I Command: #QUERY ACTIVE
- New message lines detected by the screen handler. These include new message lines issued to the OS/390 master console or to the VM, VSE, or TPF operator console, and new messages issued to line 22 of the system console. Multi-line messages issued by OS/390 look like several single-line messages from the console. Similarly, if an OS/390 message extends over two lines, it looks like multiple separate messages from the processor operations console.

When you are monitoring a console, messages from the active console are displayed. Monitoring of messages from the backup console is disabled. All processor operations messages from a target system begin with the processor operations identifier ISQ900I or ISQ901I. If the message comes from:

- A personal computer, it contains the *ps/2_name* and the *port_letter*
- A NetView connection, it contains the target system name and the console type

Messages prefixed by ISQ900I are not displayed but are used by automation. User automation should key on the ISQ900I messages. Messages prefixed by ISQ901I are sent to interested operators and should not be used for user automation.

Multi-line messages appear as multiple messages. Also, in some instances, messages from a target system operator console may be too wide to fit on one line of a 3270 Model 2 or 3205 console. These messages are split into two lines and sent with two separate processor operations message identifiers. The original message identifier is not repeated. These occurrences must be considered when writing automation procedures.

Message width problems usually occur when processor messages are from systems originally set up for consoles with wider lines (such as the 132-character 3270 Model 5 console) than the 80-character 3270 Model 2 or 3205 consoles. When processor operations was initially configured, the connection cards in the processor operations PC may have been defined as 3270 Model 2 or 3205 consoles to support the pass-through facility provided by the ISQTCC command.

Join or Leave an Interested Operator List: Use either the ISQXMON or ISQCMON command on a NetView console.

See the List of Interested Operators: The processor operations status facility contains status panels showing the list of interested operators for a specific console.

You cannot directly access the *Processor Operations Interested Operator List* panel with the ISQXDST command. You can access the *Processor Operations Interested Operator List* panel only from the following status panels:

- *Target System Summary* panel (Figure 41 on page 128)
- *Target Hardware Summary* panel — accessible only from other status panels
- *PS/2 Detail* panel (Figure 43 on page 134)
- *PS/2 Port Detail* panel (Figure 44 on page 137)

The best way to access the *Processor Operations Interested Operator List* panel is to issue the following command to access the *Target System Summary* panel for a specific target system:

```
ISQXDST target_system_name
```

The resulting status panel shows the names of the communications paths for all consoles attached to the specified target system. Port letters are listed for PCs only. You can see all the attached consoles with their path names, port letters (if applicable), and status. You place the cursor on the port letter of the desired processor operations PC and then press the PF7 key to see the associated *Processor Operations Interested Operator List* panel. If your operator identifier (the name you use to logon to NetView) is in this list, you should be receiving messages from that path. All other operators whose names are in the list also receive messages from that path.

You check the interested operator list for processor operations resource control messages (the ISQCMON list) by issuing the following NetView command:

```
LIST ASSIGN=GROUP
```

The interested operator list for processor operations is in group +TSCFMON.

How to See SA OS/390 Messages Specified by Message Class

Notification operators are defined during customization of SA OS/390, using the SA OS/390 customization dialog. A notification operator is a NetView console operator who is authorized to receive messages from SA OS/390. The classes of messages which a notification operator is authorized to receive are specified at the time a notification operator is defined. See the tasks below to understand how to display information about a specific notification operator, how to add and delete notification operators, and how to change the messages which a notification operator receives.

Automation manager messages can automatically be received.

Also, you can receive messages from all systems within the sysplex.

Table 7. SA OS/390 Message Classes

Message Class Description	Message Class Number
<i>General Message Classes</i>	
Errors	0
Debug	1
<i>Automation Agent Related Message Classes</i>	
All automation agent messages	40
Down status	41
Up status	42
Information	43
Action	44
Status	45
User intervention	46
Critical threshold setting exceeded	50
Frequent threshold setting exceeded	51
Infrequent threshold exceeded	52
Assist mode alert	55
IMS Automation Messages	60
<i>Automation Manager Related Message Classes</i>	
All automation manager messages	80
Intervention required	81
Automation denied	82
Automation Impacted	83
Awaiting Automation	84
In Automation	85
Degraded - Target resources	86
Degraded - All resources	87
Satisfactory - Target resources	88
Satisfactory - All resources	89
SA OS/390 Infrastructure/Environment	90

How to Get Notify Messages - INGNTFY

In this section, you find all information required for notification operators and messages about which notification operator should be notified.

Display Settings for a Notification Operator: To display notification operator settings type DISPNTFY on any command line.

```

AOFKAANT          SA OS/390 - Command Dialogs          Line 1 of 2
Domain ID = IPUFM ----- DISPNTFY -----          Date = 11/07/97
Operator ID = LRM                                     Time = 13:58:29

Operator System Log Rcv Description
-----
SYSOP KEY3 Y Y
MIK KEY3 N N

Command ==>
PF1=Help PF2=End PF3=Return PF6=Roll
PF9=Refresh PF12=Retrieve

```

For further information on the DISPNTFY command refer to the *System Automation for OS/390 Operator's Commands*.

Query a Specific Notification Operator: To display information about a specific notification operator, type INGNTFY on any command line and type query into the *Status/Action* field. Also, type the ID of the operator you want information about (in the example below, the operator ID is "NETOP1").

```

AOFKAASN          SA OS/390 - Command Dialogs          Date = 05/23/97
Domain ID = IPUFM ----- INGNTFY -----          Time = 09:13:10
Operator ID = WAS

Specify operator authority:

Status/Action => query          Operator status:
                                ON - Set your notifications ON
                                OFF - Set your notifications OFF
                                ADD - Add or Modify an operator
                                DELETE - Remove an operator
                                QUERY - Look up an operator
                                Operator for ADD, DELETE or QUERY

Operator ID => NETOP1
Classes => Up to 10
Description =>

Held Messages - Information => Immediate Action =>
                Eventual Action => Immediate Decision =>
                System Wait =>

System => _____ System name or domain ID

Command ==>
PF1=Help PF2=End PF3=Return PF6=Roll
PF12=Retrieve

```

Turn On or Off all Notification Messages: Use INGNTFY OFF on a NetView or operator console to temporarily turn off messages when you do not want to see them. Use INGNTFY ON on a NetView or operator console to turn the messages back on when you wish to see them again.

Add a Notification Operator: You can add more notification operators through the INGNTFY command dialog. Remember that this operator will only be able to receive messages until the next time the automation control file is loaded, when all changes made using the operator interface are lost.

To add a notification operator, type INGNTFY on any command line. You see the panel as shown on page 116. Type add into the *Status/Action* field. Also, type the ID of the operator you want to add.

In the Classes field, type the class(es) of messages you want this operator to see. (See Table 7 on page 115 for a list of message classes.) The default classes are 40 and 80.

If you want to hold certain types of messages on this operator's screen, move the cursor beside the desired Message type (Information, Eventual Action, Immediate Decision, System Wait, or Immediate Action), and type any character. For more information on message types, see *System Automation for OS/390 Messages and Codes*.

Change the Messages a Notification Operator Receives: To change the messages you or another operator receives, you access the INGNTFY command dialog and you fill in the panel exactly as if you were adding a new operator. (You do not have to delete the definition first because the new definition overwrites the old.)

Because the new definition overwrites the old, you need to be careful when you are changing the messages an operator receives. For example, if the operator was originally assigned to receive classes 41 and 43, and you typed 44 in the Classes field, 44 would be the only class that the operator would now receive. If you want to add a class, you must also type all the classes that were previously assigned.

You can perform a query to find out what messages the operator currently has assigned. See task "Query a specific notification operator" (page 116) for more information.

Delete a Notification Operator: You can also use the INGNTFY command dialog to delete notification operators. Remember that if you use this panel to delete an operator, the deletion will be in effect only until the automation control file is reloaded.

To delete a notification operator, type delete into the *Status/Action* field. Also, type the ID of the operator you want to delete. This field can contain any valid NetView operator or the keyword SYSOP. If SYSOP is defined as a notification operator its function is to receive messages to the master console when no other operator is logged on, or to receive specific messages depending on the message classes assigned.

How to Monitor Hardware

You can monitor all hardware, from processors to devices, using processor operations and I/O operations.

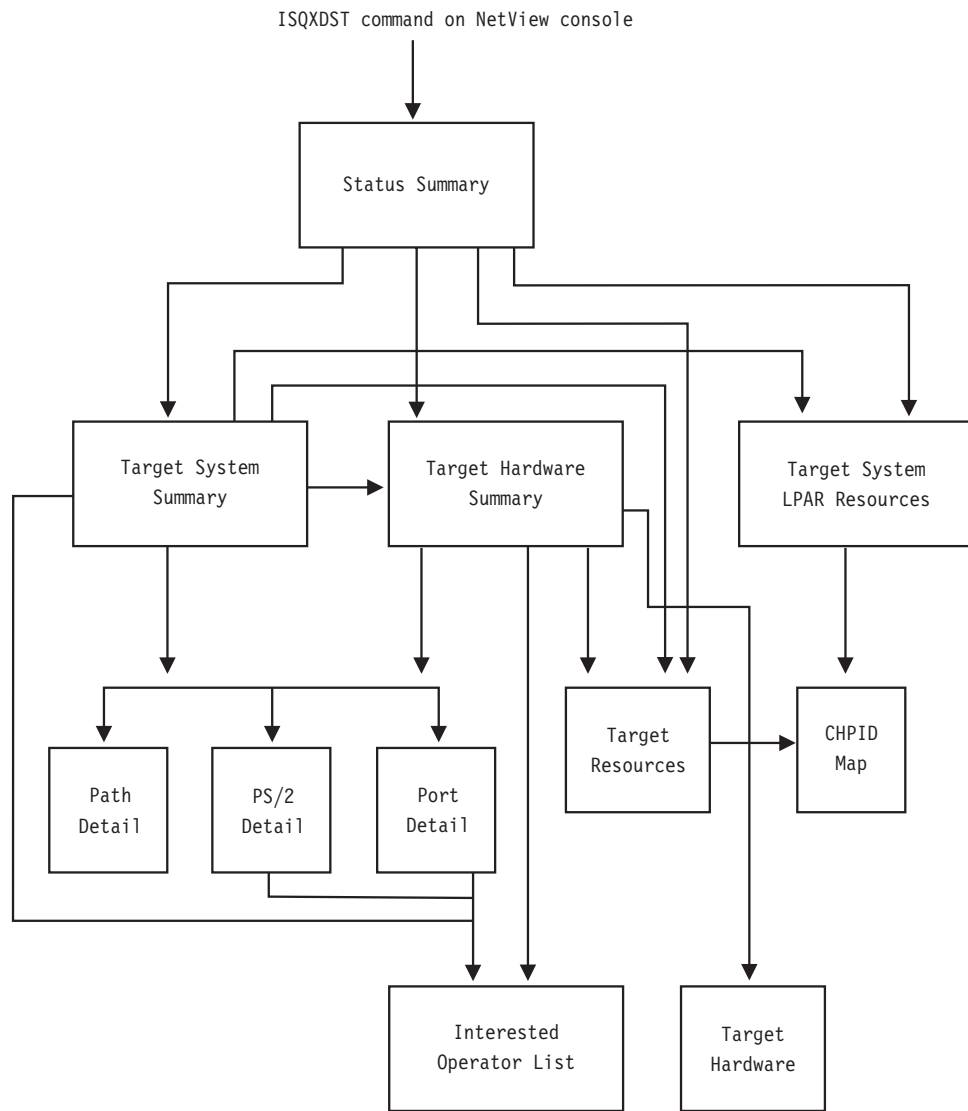
You can also monitor hardware resources and you can issue system operations and processor operations commands from the NetView Management Console as described in "Chapter 10. Using the NetView Management Console for SA OS/390" on page 199.

Some General Information About Panels: Pressing the Enter key toggles between a dynamically updated panel and a static panel. If any processor operations screen is updated frequently, it appears to flicker. You may need to place the panel into a static condition to select another function. The Updates field in the top right of the panel shows the current mode of the panel (Dynamic or Static).

Processor Operations Information

Processor operations allows you to monitor target processors, target systems, and communications paths using 3270-type panels. You access these panels either by using the "Console control" action (selectable from the pull-down menu of the

Commands action on the menu bar of the *System Status* window) or by issuing a command from the command line of your NetView operator's console. These panels are available only on a workstation or a NetView operator console attached to the SA OS/390 focal point system.



Displaying Resource Information for a Screen-Oriented Target Processor

To view target hardware summary for a screen-oriented processor, select PF9 from the *Target System Summary* panel (Figure 41 on page 128) or from the *Status Summary* panel (Figure 40 on page 127) on a NetView console.

```

ISQEHARD          SA OS/390 - Target Hardware Summary    Updates: Dynamic

Target Hardware Name: BANKER      Type: 9021      Mode: LPAR
Target Hardware Description: This is the executive 9021 system

Initialized Target Systems: SYSTEM01  SYSTEM02  SYSTEM03

Channel Summary Status: OPTIONAL CHANNELS UNAVAILABLE

Console Summary:
                PS/2 Name  Port  Status
Active System Console  PS2A    S
Backup System Console  PS2B    T

Enter=Static  PF1=Help  PF3=Exit  PF5=Resource  PF6=Roll
PF7=Oper List  PF10=Port Detail  PF11=PS/2 Detail  PF12=Quit

```

Figure 38. Target Hardware Summary Panel for Screen-Oriented Processor

This panel defines PF keys as follows:

- PF5 displays the *Target Resources* panel. This panel provides status information about the desired and actual resources available to the target hardware.
- The PF7 key displays the *Processor Operations Interested Operator List* panel (the one accessed with the ISQXMON command). You place the cursor on the port letter of the desired processor operations PC and then press the PF7 key to see the associated *Processor Operations Interested Operator List* panel.
- PF10 displays the *PS/2 Port Detail* panel (Figure 44 on page 137). This panel provides detailed status information about a specific port. Place the cursor on the line with the name of the processor operations PC and the port letter for which you want more information, and then press PF10.
- The PF11 key displays the *PS/2 Detail* panel (see Figure 43 on page 134). This panel provides detailed status information about a specific processor operations PC. Place the cursor on the line with the name of the processor operations PC for which you want more information and then press PF11.

The following specific information is shown:

- Target Hardware Name**
The name assigned to this definition of target hardware in the customization dialog.
- Target Hardware Type**
Indicates whether the target system is running on a 9021, 9121, 3090™, 308X, or 4381 processor.
- Target Hardware Mode**
LPAR, ESA, XA, 370
- Target Hardware Description**
Short textual description of this definition of target hardware, defined in the customization dialog.

Initialized Target Systems

(updated dynamically) List of target systems currently initialized to this target hardware. For non-LPAR-mode target hardware, this field lists one or none. For LPAR-mode target hardware, this field may list multiple target systems. This field is blank if no target systems are initialized to this target hardware.

Channel Summary Status

(updated dynamically) The value of the processor operations internal variable *chsum*. Valid values are as follows:

OK (green) All required and optional channels are present.

OPTIONAL CHANNELS UNAVAILABLE

(yellow) Mandatory channels are available but one or more optional channels are not available.

REQUIRED CHANNELS UNAVAILABLE

(red) Mandatory channels are not available.

UNKNOWN

(green) Channel analysis has not been performed yet. (Channel analysis is performed only for 9021, 9121, or 3090 systems. The ISQXIPL command with the CHECK keyword and the ISQXDLC command perform channel analysis.)

Console Summary

(updated dynamically) Identifies the type, PC name, port letter, and status of the active and backup system consoles.

- Console type: Active or Backup System Console
- PS/2 name: the name of the processor operations PC communicating with the system consoles
- Port: the letter assigned to the port through which the focal-point system communicates with the system consoles
- Status: for processors, the value of the processor operations internal variable *ptstat*. Valid values are as follows:

blank (not highlighted) Either the target system has not encountered any of the following conditions, or the condition has been resolved.

PS/2 PORT PROBLEM

(yellow or red) The focal-point system can communicate with the processor operations PC, but not with one or more of the processor operations PC ports. If this condition is displayed in yellow, the processor operations PC port is UNDEFINED, but nothing else is wrong. A port can be in this condition when port initialization fails, or when you close a port. Look at the *PS/2 Port Detail* panel for more information (Figure 44 on page 137).

PS/2 SESSION PROBLEM

(red) The focal-point system cannot communicate with any processor operations PC port because a problem with the communications session prevents it from communicating with the processor operations PC itself. Look at the *PS/2 Detail* panel for more information (Figure 43 on page 134).

Displaying Resource Information for an OCF-Based Processor

To view target hardware summary for an OCF-based processor, select PF9 from the *Target System Summary* panel (Figure 41 on page 128) or from the *Status Summary* panel (Figure 40 on page 127) on a NetView console.

```
ISQEHARP          SA OS/390 Target Hardware Summary  Updates: Dynamic

Target Hardware Name: FREEWAY   Type: 2064       Mode: LPAR
                               Model: 109           Serial Number: 02-0051528

Target Hardware Description: Testsystem 2064

Initialized Target Systems: KEY3      KEY4

Console Summary          PATH Name      Status
Active System Console    NVCPATH9

Last Significant Message:

Enter=Static  PF1=Help  PF3=Exit  PF5=Resource  PF6=Roll
PF7=Oper List  PF11=PATH Detail  PF12=Quit
```

Figure 39. Target Hardware Summary Panel for OCF-Based Processors

This panel defines the PF keys as follows:

- PF5 displays the *Target Resources* panel. This panel provides status information about the desired and actual resources available to the target hardware.
- The PF7 key displays the *Processor Operations Interested Operator List* panel (the one accessed with the ISQXMON command).
- PF11 displays the *Path Detail* panel (Figure 42 on page 133). This panel provides detailed status information about a specific NetView path. First place the cursor on the line with the name of the path for which you want more information, and then press PF11.

The *Target Hardware Summary* panels show the following specific information:

Target Hardware Name

The name assigned to this definition of target hardware in the customization dialog.

Target Hardware Type

Indicates the machine type of a zSeries or 390-CMOS processor.

Target Hardware Mode

LPAR, ESA

Target Hardware Description

Short textual description of this definition of target hardware, defined in the customization dialog.

Initialized Target Systems

(updated dynamically) List of target systems currently initialized to this target hardware. For non-LPAR-mode target hardware, this field lists one

or none. For LPAR -mode target hardware, this field may list multiple target systems. This field is blank if no target systems are initialized to this target hardware.

Console Summary

(updated dynamically) Identifies the type, path name, and status of the active system consoles.

- Console type: Active System Console
- Path name: name of the active NVC path. Valid values are as follows:
 - blank** (not highlighted) Either the target system has not encountered any of the following conditions, or the condition has been resolved.

Valid values for the status of the NetView connection path are:

NVC SESSION BUSY

(red) Processor operations cannot presently communicate with the target support element, the problem appears recoverable.

NVC SESSION PROBLEM

(red) Processor operations cannot communicate with the target support element.

Last Significant Message

The last significant message or alert associated with this target hardware

Display Target Resource Status

To access the *Target Resources* panel, press the PF5 key at one of the following panels:

- *Status Summary* panel
- *Target System Summary* panel (if the target system is running on target hardware that is not in LPAR mode)
- *Target Hardware Summary* panel

Actual resource information is gathered by ISQXDLC and ISQXIPL CHECK for 9021, 9121, or 3090 systems only.

ISQETHR SA OS/390 - Target Resources Updates: Dynamic

Target Hardware Name: CPC1 Mode: LPAR

Description: Parallel enterprise server

Central Storage : 0

Expanded Storage : 0

Number of Central Processors : 0

Number of Vector Processors : 0

Image Profile Name : IMG

Load Profile Name : PLD

Reset Profile Name : PRES

PF2 Displays CHPID Map

Enter=Static PF2=CHPIDs PF1=Help PF3=Exit PF6=Roll PF12=Quit

The *Target Resources* panel shows the following information:

Target Hardware Name

The name assigned in the customization dialog to this definition of target hardware.

Target Hardware Mode

LPAR, XA, ESA, or 370.

Target Hardware Description

A short textual description of target hardware as defined in the customization dialog.

Central Storage

The desired amount of main storage defined for screen-oriented target hardware.

Expanded Storage

The desired amount of expanded storage defined for screen-oriented target hardware.

Number of Central Processors

The number of central processors defined for screen-oriented target hardware.

Number of Vector Processors

The number of vector processors defined for screen-oriented target hardware.

Image Profile Name

The Image profile name defined at the support element. This is for OCF-based processors.

Load Profile Name

The Load profile name defined at the support element. This is for OCF-based processors.

Reset Profile Name

The Reset profile name defined at the support element. This is for OCF-based processors.

Display Target System LPAR Resources

You access the *Target System LPAR Resource* panel by pressing PF5 at the *Status Summary* panel from Figure 40 on page 127 or at the *Target System Summary* panel from Figure 41 on page 128, if the target system is running in a logical partition.

The *Target System LPAR Resource* panel shows the status of the resources available to the target system. For screen-oriented processors, actual resource information is gathered during the processing of ISQXDLC, ISQXDLP, and ISQXIPL commands for processors that support LPAR mode. For OCF-based processors, actual resource information is gathered during the processing of the ACTIVATE command and Image profile for processors that support LPAR mode.

```
ISQETSR          SA OS/390 - Target System LPAR Resource    Updates: Dynamic
```

```
Target Hardware Name: BANKER          Target System Name: SYSTEM01
Description: This is the executive payroll system
Channel Status: OK                    Mode: ESA/ESA
```

```
Central Storage (desired/actual)      : 100/100
Expanded Storage (desired/actual)     : 50/50
Number of Central Processors (desired/actual) : 6/6
Number of Vector Processors (desired/actual) : 1/1
LPAR Name                             : EXECPAY
Favored LPAR                          : Y
LPAR Automatic IPL                    : N/N
Image Profile Name                    :
Load Profile Name                     :
Reset Profile Name                    :
```

```
PF2 Displays CHPID Map
ISQ125I ACTUAL VALUES ARE NOT AVAILABLE UNTIL ISQXDLP EXECUTES.
```

```
Enter=Static PF1=Help PF2=CHPIDS PF3=Exit PF6=Roll PF12=Quit
```

The *Target System LPAR Resource* panel shows the following specific information:

Target Hardware Name

The name assigned in the customization dialog to the target hardware on which this target system is defined.

Target System Name

The name assigned in the customization dialog to this target system.

Description

A short textual description of this target system definition, defined in the customization dialog.

Channel Status Summary

(updated dynamically) The current value of the processor operations internal variable *chsum*. Valid values are as follows:

OK (green) All required and optional channels are present.

OPTIONAL CHANNELS UNAVAILABLE

(yellow) Mandatory channels are available but one or more optional channels are not available.

REQUIRED CHANNELS UNAVAILABLE

(red) Mandatory channels are not available.

UNKNOWN

(green) Channel analysis has not been performed yet. (Channel analysis is performed only for 9021, 9121, or 3090 systems. The ISQXIPL command with the CHECK keyword and the ISQXDLC command perform channel analysis.)

Mode 370, ESA, or CF.

Central Storage

The amount of main storage defined for this target system.

Expanded Storage

The amount of expanded storage defined for this target system.

Number of Central Processors

The number of central processors defined for this target system.

Number of Vector Processors

The number of vector processors defined for this target system.

Logical Partition Name or LPAR Name

The name of the logical partition in which this target system is operating.

Favored LPAR

Y or N; Y means yes the logical partition in which this target system is operating is favored, N means no it is not favored.

LPAR automatic IPL

Y or N; Y means yes the logical partition in which this target system is operating performs the initial program load process automatically, N means no it does not perform the initial program load process automatically.

Image Profile Name

The name of the Image profile.

Load Profile Name

The name of the Load profile.

Reset Profile Name

The name of the Reset profile.

How to Control a Processor Operations PC

The processor operations PC echoes commands run by automation and relays messages to the processor. The display can also be used as an operator console. See Figure 2 on page 14 to see where the processor operations PC fits into a system.

To check the processor operations PC status, on a 3270 *console*, use ISQXDST processor_operations_PS/2_name to see the PS/2 Detail panel. See "How to Monitor Processor Status" on page 126 for a description of the panels for monitoring status.

To start a processor operations PC port, use the ISQXIII command from a NetView console (see *System Automation for OS/390 Operator's Commands*).

To stop a processor operations PC port, use the ISQXCLS processor_operations_PS/2_name port command on a NetView console running on that PC. Using the SHUTDOWN parameter ends the processing of the processor operations distributed feature code also. The processor operations PC status is set to 'de-allocated' and the status of the associated processor operations PC port is unavailable.

To power off a 3270 card, use the #POWEROFF command;

- On a NetView console, isqsend processor_operations_PS/2_name port *_letter* #poweroff
- On the processor operations PC, port port_*letter* poweroff

To reboot a processor operations PC using a LAN passthru, start with the system folder.

To reboot a processor operations PC, use isqsend processor_operations_PS/2_name port *port_letter* shutdown reboot.

How to Monitor Processor Status

Processor status can be monitored by viewing the status of a system icon on the NMC workstation or processor status can be seen in more detail using the processor operations 3270-type panels. On the NMC workstation, the status of a system icon represents the aggregation of status of the target's operating system software and its underlying processor hardware. You can see at a glance whether the systems for which you are responsible have satisfactory status.

Refer to "Chapter 10. Using the NetView Management Console for SA OS/390" on page 199 for information on how to enter commands against an unsatisfactory processor operations object.

This section contains the following subsections that describe certain aspects of monitoring processor status:

- "View Status Summary of all Target Systems"
- "View One Specific Target System" on page 127

View Status Summary of all Target Systems

On a 3270 console, issue ISQXDST (with no parameters) on a NetView console. The *Status Summary* panel is displayed.

```

ISQESUM                      SA OS/390 - Status Summary      Updates: Dynamic 1

Place cursor on desired system and press PF key for more details

Target System Name   Status 3

SYSTEM01             IPL COMPLETE
SYSTEM02             IPL COMPLETE
SYSTEM03             IPL COMPLETE
SYSTEM04             STAGE-1 ACTIVATE COMPLETE
SYSTEM05             LOAD FAILED
SYSTEM06             INITIALIZED
SYSTEM07             WAITING FOR IEA101A MESSAGE
SYSTEM08             WAITING FOR IEA347A MESSAGE
SYSTEM09             WAITING FOR VM START MESSAGE
SYSTEM10             CLOSED
SYSTEM11             UNKNOWN
SYSTEM12             NOT ACTIVE
SYSTEM13             IPL FAILED
SYSTEM14             POWER-ON RESET REQUIRED

Enter=Static  PF1=Help  PF3=Exit  PF4=Target System Summary  PF5=Resource 2
PF6=Roll     PF7=Up    PF8=Down  PF9=Target Hardware Summary  PF12=Quit

```

Figure 40. Status Summary Panel

- 1** This indicates whether updates are static or dynamic (it changes automatically whenever the status changes). You can toggle to a static state with the Enter key (for example, when you want to enter a choice).
- 2** The PF keys allow you to invoke other status panels.
- 3** The status that you see for a target system represents the most severe condition that exists for that system. These values are extracted from the *status*, *target hardware*, *attention*, and *console summary* status fields of the *Target System Summary* panel (see illustration in task below).

View One Specific Target System

On a 3270 console, use ISQXDST followed by the name of the target system on a NetView console. The *Target System Summary* panel is displayed.

```

ISQETARG          SA OS/390 - Target System Summary          Updates: Dynamic

Target System Name: CPCTRG
Target System Description: This is the executive payroll system
Status           : INITIALIZED
Target Hardware   :
Attention        :

Target Hardware: CPC1          O.S.      : MVS
Mode             : LPAR        LPAR name: CPCLPAR
Channel Status Summary: OPTIONAL CHANNELS UNAVAILABLE

Console Summary:
Path Name  Port Type  Status
Active System Console  CPCPATH      NVC      Active
Active Operator Console CPCPPS2    0       PS2
Backup System Console
Backup Operator Console CPCPPS2    Z       PS2

Last Significant Message:
ISQ417I DEACTIVATE STATUS(FAILED) CONDITION(08150001)
ISQ426I SYSTEM IS RUNNING. FORCE(YES) MAY BE NEEDED ON CPCTRG
Enter=Static PF1=Help PF3=Exit PF5=Resource PF6=Roll PF7=Oper List
PF9=Target Hardware PF10=Port Detail PF11=Path Detail PF12=Quit

```

Figure 41. Target System Summary Panel

This panel defines the PF keys as follows:

- The PF5 key displays the “Resource” status panel for the selected target system. If the target system runs in a logical partition, you will go to the *Target System LPAR Resource* panel. If the target system runs in target hardware that is not in LPAR mode, you will go to the *Target Resources* panel. These panels provide status information about the desired and actual resources available to the target system, and are identical for target systems running on target hardware not in LPAR mode.
- The PF7 key displays the *Processor Operations Interested Operator List* panel (the one accessed with the ISQXMON command). You place the cursor on the port letter of the desired processor operations PC and then press the PF7 key to see the associated *Processor Operations Interested Operator List* panel.
- The PF9 key displays the *Target Hardware Summary* panel (Figure 39 on page 121). This panel provides detailed status information about the target hardware on which the target system is defined.
- The PF10 key displays the *PS/2 Port Detail* panel (Figure 44 on page 137). This panel provides detailed status information about a specific port. First you place the cursor on the line with the name of the processor operations PC and the port letter for which you want more information, and then you press PF10.
- The PF11 key displays the NVC *Path Detail* panel or the *PS/2 Detail* panel. For paths of the type PC, see the *PS/2 Detail* panel (Figure 43 on page 134). This panel provides detailed status information about a specific processor operations PC. First you place the cursor on the line with the name of the processor operations PC for which you want more information, and then you press PF11. For paths of the type NVC, see the NVC *Path Detail* panel (Figure 42 on page 133). This panel provides detailed status information about a specific NetView connection path. Place the cursor on the line with the name of the NetView connection path, and then press PF11.

The *Target System Summary* panel shows the following specific information:

Target System Name

The name assigned in the customization dialog to this target system.

Target System Description

Short textual description of this target system, defined in the customization dialog.

Status (updated dynamically) The current value of the processor operations internal variable *tstat*.

You can change this status from INITIALIZED, LOAD FAILED, or IPL FAILED to IPL COMPLETE by issuing the ISQVARS command to change the internal variable *tstat*. (For more information about specifying *tstat* as a keyword on the ISQVARS command, see the description of the ISQVARS command in *System Automation for OS/390 Operator's Commands*). You would want to do this when you perform a cold start of processor operations while a target system is already running. After the cold start, you issue the ISQXIII command to the target system that is already running so its status becomes INITIALIZED, then you change the value of *tstat* to IPL COMPLETE. You may also want to change the status manually if the cause of the LOAD FAILED status was corrected by using the pass-through facility of processor operations, or if it was corrected locally at the site of the target system.

You can also issue the ISQVARS command to change the internal variable *tstat* from IPL COMPLETE to IPL FAILED. Processor operations sets a status of IPL COMPLETE when it initiates a load at a VSE target system operating in the unattended node support mode or at a TPF target system. However, neither of these operating systems provides a sufficient indication that the load process failed, preventing processor operations from changing the target system status appropriately.

Valid values for this status field are as follows:

CLOSED

(green) The target system has been closed.

INITIALIZED

(green) The target system has been successfully initialized.

IPL COMPLETE

(green, yellow, or red) For a TPF or VSE system, the Load or Load Clear process started. For an OS/390 system, processor operations automation responded to the IEA347A message. For a VM system, processor operations automation responded to the VM start message. If this condition is displayed in red, this is done to get your attention to inform you that something is wrong (such as processor operations lost its communication link with the target system) rather than that the IPL process failed. This condition will revert to being displayed in green when the problem is corrected.

STAGE-1 ACTIVATE COMPLETE (for OCF-based processors)

(yellow) The support element power-on reset has occurred but the load is not yet complete.

NOT ACTIVE (for OCF-based processors)

(yellow) Activate response was received from the target and did not indicate that stage-1 activation was complete.

IPL FAILED

(red) OS/390 only — Error messages were generated during the initial program load process.

LOAD FAILED

(red) The Load or Load Clear operation did not complete successfully.

UNKNOWN

(green) No attempt has been made to initialize or activate this target system. This status can be set only by a cold start of processor operations.

WAITING FOR IEA101A START MESSAGE

(yellow or red) OS/390 only: ACTIVATE, ISQXIPL, or ISQXLOD command processing has completed for an OS/390 system and processor operations is waiting for the IEA101A message on the operator console. If this condition is displayed in red, it is to get your attention to inform you that something is wrong (such as processor operations lost its communication link with the target system) rather than that processor operations has been waiting for the message too long.

WAITING FOR IEA347A MESSAGE

(yellow or red) OS/390 only: processor operations has replied to the IEA101A message and is waiting for the IEA347A message on the operator console. If this condition is displayed in red, this is done to get your attention to inform you that something is wrong (such as processor operations lost its communication link with the target system) rather than that processor operations has been waiting for the message too long.

WAITING FOR VM START MESSAGE

(yellow or red) VM only: processor operations is waiting for the first VM IPL message on the operator console. ISQXLOD, ISQXIPL, or ACTIVATE command processing has completed for a VM system and processor operations is waiting for the first VM IPL message on the operator console. If this condition is displayed in red, it is to get your attention to inform you that something is wrong (such as processor operations lost its communication link with the target system) rather than that processor operations has been waiting for the message too long.

Target Hardware

(updated dynamically) The current value of the processor operations internal variable *thwstat*. Valid values are as follows:

blank (not highlighted) No problem has been reported for the target hardware. You can also use the ISQVARS command to change *thwstat* to blanks after correcting an error condition reflected in this field.

LPAR DEFINITION PROBLEM

(red) Processing of the CHECK keyword of the ISQXIPL command detected a logical partition resource problem.

TARGET HARDWARE PROBLEM

(red) The operating system or the processor controller reported a target hardware problem.

POWER-ON-RESET REQUIRED (for screen-oriented processors)

(red) CPC is powered up; power-on-reset is required.

POWERED OFF (for OCF-based processors)

(red) The CPC is physically powered off.

Attention

(updated dynamically) The current value of the processor operations internal variable *tattn*. Valid values are as follows:

blank (not highlighted) The target system has not encountered any of the following conditions. You can also use the ISQVARS command to change *tattn* to blanks after correcting an error condition reflected in this field.

DCCF (red) OS/390 only — The processor operations PC has detected a DCCF message.

DISABLED WAIT

(red) The processor operations PC has detected a Disabled Wait condition.

Target Hardware

The name of the target hardware on which this target system is running.

O.S. MVS, VM, VSE, TPF, or CF

Mode LPAR, XA, ESA, 370

LPAR name

The name of the logical partition in which this target system is running.

Channel Status Summary

(updated dynamically) The current value of the processor operations internal variable *chsum*. Valid values are as follows:

OK (green) All required and optional channels are present.

OPTIONAL CHANNELS UNAVAILABLE

(yellow) Mandatory channels are available but one or more optional channels are not available.

REQUIRED CHANNELS UNAVAILABLE

(red) Mandatory channels are not available.

UNKNOWN

(green) Channel analysis has not been performed yet. (Channel analysis is performed only for 9021, 9121, or 3090 systems. The ISQXIPL command with the CHECK keyword and the ISQXDLC command perform channel analysis.)

Console Summary

(updated dynamically) Identifies the console type, path name, port letter, type, and status of up to four consoles:

- Console type: active or backup system or operator console
- Path name: the name of the path used to communicate with the system or operator consoles
- Port: the letter assigned to the port through which the focal-point system communicates with the system or operator consoles (applies only to PC paths)
- Type: either PC or NVC, depending on whether the communication path is through a PC or a NetView connection.

- Console status summary: the current values of the processor operations internal variables *toca* (operator console, active), *tocb* (operator console, backup), *tsc* (system console, active), and *tscb* (system console, backup).

Valid values are as follows:

blank (not highlighted) Either the target system has not encountered any of the following conditions, or the condition has been resolved.

PS/2 PORT PROBLEM

(yellow or red) The focal-point system can communicate with the processor operations PC, but not with one or more of the processor operations PC ports. If this condition is displayed in yellow, the processor operations PC port is UNDEFINED, but nothing else is wrong. A port can be in this condition when port initialization fails, or when you close a port. Look at the *PS/2 Port Detail* panel for more information (Figure 44 on page 137).

PATH PROBLEM

(red) The focal-point system cannot communicate with the support element on the NetView connection. Look at the *Path Detail* panel for more information (Figure 42 on page 133).

PS/2 SESSION PROBLEM

(red) The focal-point system cannot communicate with any processor operations PC port because a problem with the communications session prevents it from communicating with the processor operations PC itself. Look at the *PS/2 Detail* panel for more information (Figure 43 on page 134).

ACTIVE

(green) The path is ready for communications.

NVC SESSION BUSY

(red) Processor operations cannot presently communicate with the target support element, the problem appears recoverable.

NVC SESSION PROBLEM

(red) Processor operations cannot communicate with the target support element.

Last Significant Message

(updated dynamically) The text of the last command response or report received from the target system. For screen-oriented processors, it may also display the last real error logged. Where a PC path is used for one console and a NetView connection path is used for the other console, this field contains the last "tracked" message from either path. The date and time of the message are also displayed. The text of the message is truncated to 79 characters, including the message identifier but not including the time stamp. The message is not removed from the panel when the condition that generated the message is resolved.

How to Monitor Communications Path Status

The communications paths from the processor operations focal point system to target systems are of two types: NetView connection and PC. For each of these types of path, you can display details of the connection.

Note:

Throughout this publication the term *processor operations PC* (*ProcOps PC*) is used to refer to the personal computer (PC) that is connected to one or

more target systems and which contains the processor operations distributed feature code. In the worksheets and SA OS/390 panels, the terms "PC", "PS/2" or "ProcOps PS/2" are used to refer to this workstation. The workstation may be a Micro Channel Architecture (MCA) bus personal computer, a PCI bus personal computer, or an IBM-compatible ISA bus personal computer.

Display NetView Connection Path Details: If you are using a NetView connection, you can directly access the *Path Detail* panel by issuing the command ISQXDST path_name from the NetView console. You can also access the *Path Detail* panel by pressing the PF11 key at the *Target System Summary* panel or at the *Target Hardware Summary* panel.

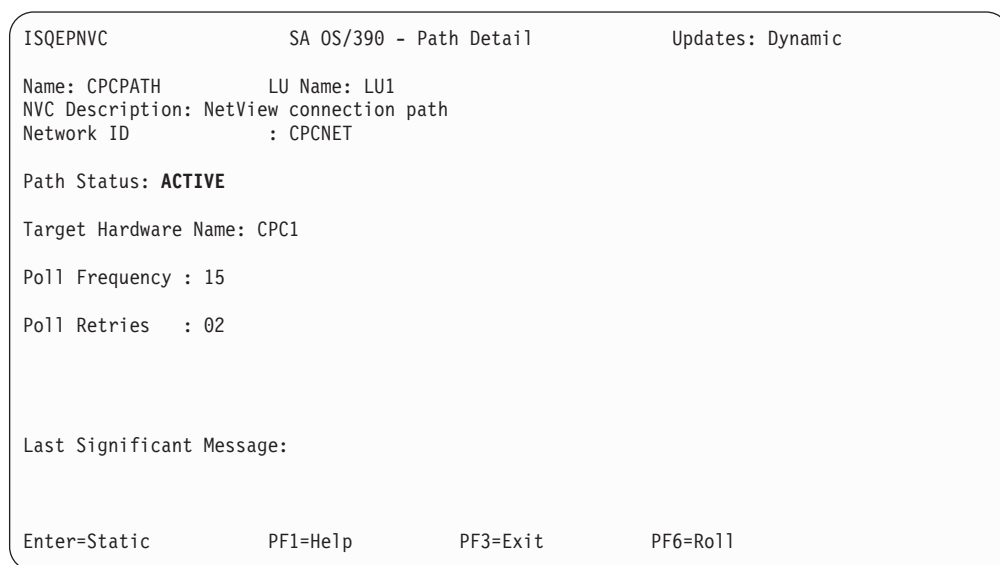


Figure 42. Path Detail Panel

The *Path Detail* panel shows the following information:

Name The name assigned in the customization dialog to the NetView connection path.

LU Name
The logical unit name assigned to the NetView connection path.

Path Description
A short textual description of this path as defined in the customization dialog.

Network ID
The name of the SNA network ID for the NetView connection.

Path Status
(updated dynamically) The status of the NetView path. Valid values are:

UNKNOWN
(green) No command was ever issued to this path name.

ACTIVE
(green) The path is ready for communications.

PATH PROBLEM

(red) The focal-point system cannot communicate with the support element on the NetView connection. This status is accompanied by a Last Significant Message.

Path Frequency

The time (in minutes) that processor operations should poll the support element for status.

Poll Retries (updated dynamically)

The number of attempts to retry that should occur before processor operations notifies the operator that the connection failed.

Last Significant Message

(updated dynamically) The text of the last command response or report received from the target system. The text of the message is truncated to 79 characters, including the message identifier but not including the time stamp. The message is not removed from the panel when the condition that generated the message is resolved.

Display PC Path Status Details: You can directly access the *PS/2 Detail* panel by issuing the command ISQXDST PS/2_name on the NetView console. You can also access the *PS/2 Detail* panel by pressing a PF key at the *Target System Summary* panel or at the *Target Hardware Summary* panel.

```
ISQEPS2                SA OS/390 - PS/2 Detail                Updates: Dynamic
Name: PS2NAM01          LU Name: LU62AAAB          WWV Installed: No
PS/2 Description: This is the executive payroll PS/2 system
Focal Point Port Letter: F          Control Port Letter : P

PS/2 Status: CLEAR TO SEND

Port Letter      Status
-----
M                ACTIVE
N                CLOSED
O                LINK ERROR
T                UNKNOWN

Last Error Message: 07/13/96 11:05:03
ISQ522I PS/2: TEST@PS2 allocation failed primary RC=1 secondary RC=2

Enter=Static      PF1=Help          PF3=Exit          PF6=Roll
PF7=Oper List     PF10=Port Detail PF12=Quit
```

Figure 43. PS/2 Detail Panel

This panel defines the PF keys as follows:

- The PF7 key displays the *Processor Operations Interested Operator List* panel (the one accessed with the ISQXMON command). You place the cursor on the port letter of the desired processor operations PC and then press the PF7 key to see the associated *Processor Operations Interested Operator List* panel.
- The PF10 key displays the *PS/2 Port Detail* panel (Figure 44 on page 137). This panel provides detailed status information about a specific port. First you place the cursor on the line with the port letter for which you want more information, and then you press PF10.

The *PS/2 Detail* panel shows the following specific information:

Name The name assigned in the customization dialog to the processor operations PC.

LU Name

The logical unit name assigned to the processor operations PC.

WWV Installed

YES (WWV hardware is installed in the processor operations PC) or NO (WWV hardware is not installed in the processor operations PC).

PS/2 Description

Short textual description of this processor operations PC, defined in the customization dialog.

Focal Point Port Letter

The letter defined in the customization dialog as the port to the focal-point system from this processor operations PC.

Control Port Letter

The letter defined in the customization dialog as the control port to this processor operations PC.

PS/2 Status

(updated dynamically) The value of the processor operations internal variable *pstat*. Valid values are as follows:

ALLOCATE IN PROGRESS

(red) The focal-point system failed to establish communications with the PC. The first of two LU 6.2 sessions is being established. (A timeout occurred.)

CLEAR TO SEND

(green) The processor operations PC is ready for communications.

DEALLOCATED

(green) The processor operations PC session has been closed.

DORMANT

(green or yellow) The processor operations PC has not been initialized. This field is displayed in yellow if there was an attempt to activate the link.

ERROR

(red) A severe error prevents communications with the processor operations PC.

HALF SESSION MODE ONLY

(red) The PC failed to establish the second LU 6.2 connection to the focal-point system. (A timeout occurred.)

HANDSHAKE IN PROGRESS

(yellow) Session establishment between the focal-point system and the PC is in progress. This is an intermediate status while the two LU 6.2 sessions are being established.

Port Letter

The letters assigned in the customization dialog to the console connection ports supported by this processor operations PC.

Status (updated dynamically) The current values of the processor operations internal variables *scstat* (system console) or *ocstat* (operator console),

indicating the status of each of the console connection ports supported by this processor operations PC. Valid values are as follows:

ACTIVE

(green) The port has been initialized. The ISQXIII, ISQXIPL, and ACTIVATE commands initialize ports.

CLOSED

(green) The port has been closed and is no longer initialized to a specific target system. A port is placed in the CLOSED status when the command ISQXCLS target_system_name is issued to close all ports for that target system. (Contrast with UNDEFINED status.)

CONSOLE LOST

(red) The processor operations PC reported a problem with communicating with the target console.

LINK ERROR

(red) An error condition caused the communications session between the processor operations PC and the focal-point system to end.

PS/2 UNAVAILABLE

(red) The processor operations PC has been closed.

UNDEFINED

(yellow) The initialization process has not successfully defined the port to the processor operations PC. The processor operations PC is initialized, but the port or the screen handler is not defined. This status is also set when the command ISQXCLS target_system_name console_designator or ISQXCLS PS/2_name port_letter is issued to close one specific port.

UNKNOWN

(green) No attempt has been made to initialize the port.

Last Error Message

(updated dynamically) The text of the last error message that generated a status condition, displayed in red. The date and time the message was generated are also displayed. The message text is truncated to 79 characters, including the message identifier but not including the time stamp. The error message is not removed from the panel when the error condition that generated the message is resolved.

Display PC Port Status Details: You can directly access the *PS/2 Port Detail* panel by issuing the command ISQXDST PS/2_name port_letter on the NetView console.

You can also access the *PS/2 Port Detail* panel by pressing a PF key at any of the following status panels:

- *Target System Summary* panel
- *Target Hardware Summary* panel
- *PS/2 Detail* panel.

```

ISQEPORPT                SA OS/390 - PS/2 Port Detail                Updates: Dynamic

PS/2 Name      : PS2NAM01
LU Name       : LU62AAAB
Port          : S

Status        : ACTIVE
Port Name     : CUT1
Port Type     : ACTIVE SYSTEM CONSOLE
Screen Handler : SYS3090
Protocol      : 3270 (3270 or ASCII)
System Name   : BANKER (system name)
Lock Holder   : OPER1

Last Error Message: 07/13/96 11:05:03
ISQ522I PS/2: TEST@PS2 allocation failed primary RC=1 secondary RC=2

Enter=Static  PF1=Help  PF3=Exit  PF6=Roll  PF7=Oper List  PF12=Quit

```

Figure 44. PS/2 Port Detail Panel

This panel defines the PF keys as follows:

- The PF7 key displays the *Processor Operations Interested Operator List* panel (the one accessed with the ISQXMON command). You place the cursor on the port letter of the desired processor operations PC and then press the PF7 key to see the associated *Processor Operations Interested Operator List* panel.

The *PS/2 Port Detail* status panel shows the following specific information:

PS/2 Name

The name assigned in the customization dialog to the processor operations PC communicating through this port.

LU Name

The logical unit name assigned to the processor operations PC communicating through this port.

Port The letter assigned to this port, which is used to address the port.

Status (updated dynamically) The value of the processor operations internal variable *ocstat* (operator console), *scstat* (system console), or *ptstat* (port status, for the control port or the focal-point port). Valid values are as follows:

ACTIVE

(green) The port has been initialized. The ISQXIII, ISQXIPL, and ACTIVATE commands initialize ports.

CLOSED

(green) The port has been closed and is no longer initialized to a specific target system. A port is placed in the CLOSED status when the command ISQXCLS target_system_name is issued to close all ports for that target system. (Contrast with UNDEFINED status.)

CONSOLE LOST

(red) The processor operations PC reported a problem with communicating with the target console.

LINK ERROR

(red) An error condition caused the communications session between the processor operations PC and the focal-point system to end.

PS/2 UNAVAILABLE

(red) The processor operations PC has been closed.

UNDEFINED

(yellow) The initialization process has not successfully defined the port to the processor operations PC. The processor operations PC is initialized, but the port or the screen handler is not defined. This status is also set when either of the following commands is issued to close one specific port:

```
ISQXCLS target_system_name console_designator
```

```
ISQXCLS PS/2_name port_letter
```

UNKNOWN

(green) No attempt has been made to initialize the port.

Port Name

This field identifies whether the port is a simple ASCII port or is emulating a 3270 port. This field contains *CUTx* if the port is emulating a 3270 port, where *x* is a 1 (first card), 2 (second card), 3 (third card), or 4 (fourth card). This value is not related to the locations of the 3270 cards in the processor operations PC; it indicates the order in which the cards were defined with a setup program on the PC configuration diskette.

Port Type

(updated dynamically) This field describes the port in terms of the console connected to the port, or console designations. Valid values are as follows:

```
ACTIVE OPERATING SYSTEM CONSOLE  
BACKUP OPERATING SYSTEM CONSOLE  
ACTIVE SYSTEM CONSOLE  
BACKUP SYSTEM CONSOLE
```

Screen Handler

(updated dynamically) SYS9021, SYS3090, SYS4381, SYS308X, MVS, VM, VSE, or TPF. This field shows the previous value if the port is not currently initialized. If the port status is UNKNOWN, this field shows the screen handler defined for this port in the customization dialog.

Protocol

3270 or ASCII for console ports.

System Name

(updated dynamically) For a system console, this field identifies the name of the target hardware (defined in the customization dialog) to which the system console is connected.

For an operator console, this field identifies the name of the currently initialized target system (defined in the customization dialog) to which the operator console is connected. For the focal point port or the PC control port, this field displays N/A.

Lock Holder

Either the name of the operator or autotask who has locked access to the console or blanks if the console is not locked.

Last Error Message

(updated dynamically) The text of the last error message that generated a

status condition, displayed in red. The date and time the message was generated are also displayed. The text of the error message is truncated to 79 characters, including the message identifier but not including the time stamp. The error message is not removed from the panel when the error condition that generated the message is resolved.

How to Monitor Alerts on a NetView Console

Alerts are high priority events that may warrant operator action.

Issue NPDA from the command line of your NetView operator's console. The NPDA (Network Problem Determination Application) menu will be displayed. You can request a dynamic display of alerts. From that display you can select an individual alert and see event detail and recommended action. For more details on the use of the NPDA panels, refer to *Tivoli NetView for OS/390 User's Guide*.

Monitoring with the Status Display Facility (SDF)

The Status Display Facility (SDF) displays the status of various resources of an OS/390 system, and of other OS/390 systems that specify this system as an automation focal point. The resources that can be displayed by SDF include:

- applications and subsystems
- WTORs
- gateways.
- application groups

Note: A *gateway* is a combination of a NetView-NetView task session and two automation operators (one on each of two systems) that allows communication of messages, commands, and responses between the two systems.

SDF also shows spool usage problems and ASSIST requests from OS/390 subcomponents. SDF consists of a hierarchy of dynamically updated panels showing color-coded status conditions. SDF is set up during the customization of SA OS/390.

Use the status display facility (SDF) to monitor the status of application software, WTORs and gateways on your systems from a NetView or operator console.

All the resources you need to monitor are set up by hierarchical arrangement during customization. At this time, the system programmer:

1. Defines the SDF hierarchy.

The SDF hierarchy indicates which automated resources are affected by status changes in other automated resources (see "How SDF Works" on page 143). The SDF hierarchy can be different from that specified in the automation control file for system startup and shutdown. Use whatever makes sense for your system.

If SDF displays more than one system, programmers create an SDF hierarchy for each system.

2. Creates the panels that show the systems and subsystems. These panels can also be customized to display gateway sessions and WTORs.
3. Determines the status colors and other screen defaults for the enterprise or takes the defaults for these attributes.

For information on setting up SDF, see *System Automation for OS/390 Programmer's Reference* and *System Automation for OS/390 User's Guide*. Because SDF can be customized, your panels may not look like those shown in this topic.

SDF Focal Point Monitoring

At first you need to construct an SDF screen that contains all of the systems within your sysplex. This will give you an *at a glance* panel that will be dynamically updated with the overall status of each system in your sysplex. By selecting an individual system, you can view a more detailed display of the state of the resources on that system.

On the focal point, you can now issue a command, specifying a target system. The command will interact with the target system (via XCF or RMTCMD) and give you a full screen display as if you were logged onto the target system.

This means that from SDF you can call up DISPINFO on a target subsystem by simply pressing a key. This allows you to see a large amount of information about a subsystem that has a problem.

Other commands that support this style of usage include:

- DISPATHR
- DISPERRS
- DISPFLGS
- DISPSTAT
- DISPTREE
- INGINFO
- INGREQ
- INGVOTE
- SETSTATE

All of these commands can be used from the focal point to interrogate the target system without having to log onto it.

Note

If the target system is not in the same sysplex as your focal point system, then RMTCMD will be used for the inter system communication. This means that there is a dependency upon VTAM being active on both the focal point and the target system for communication to be possible.

If the target system is in the same sysplex, then communications occur via XCF and you do not need to have VTAM active on the target system to talk to it.

Interpreting Colors in the SDF and DISPSTAT

In SDF and on the DISPSTAT command dialog, subsystems appear in different colors which indicate their status. In SDF, the condition of WTORs and gateways is also indicated by color.

Subsystem Colors and Priorities

The color of a subsystem on a DISPSTAT command dialog panel and the color and the highlighting of a subsystem in SDF indicate the current status of a subsystem

(the possible status conditions are defined in “Automation Agent Statuses” on page 39). The following list shows the default color (and highlighting) assigned to each status when SA OS/390 was shipped. White is also used by default to identify status components without a tree structure. These colors may have been changed for your SDF display. Blinking as a means of highlighting is not used by all types of display, in particular when you are using 3270 terminal emulation on a PC. You may see another type of highlighting, for example black text on a white background.

Table 8. Table of Default Subsystem Status Colors and Priorities

Color	Highlight	Status	Priority
Red	Reverse	BROKEN	120
Red	Blinking	BREAKING	130
Red	Underline	INACTIVE	140
Red	Normal	STOPPED	150
Pink	Normal	HALFDOWN	220
Pink	Blinking	STARTED2	230
Pink	Underline	STUCK	240
Pink	Reverse	ZOMBIE	250
White	Reverse	ABENDING	320
White	Underline	HALTED	330
White	Blinking	ASSIST	340
Yellow	Reverse	STOPPING	420
Yellow	Normal	AUTOTERM	430
Yellow	Underline	ENDING	440
Turquoise	Blinking	RUNNING	520
Turquoise	Reverse	ACTIVE	530
Turquoise	Underline	STARTED	540
Turquoise	Normal	RESTART	550
Turquoise	Blinking	EXTSTART	550
Green	Normal	UP	640
Green	Underline	ENDED	650
Blue	Underline	DOWN	730
Blue	Normal	AUTODOWN	740
Blue	Blinking	CTLDOWN	750
Blue	Reverse	MOVED	760
Blue	Normal	FALLBACK	770

Each automation status is assigned a priority number, which SDF uses to determine what color to display if there are multiple status conditions present in a system. The status conditions are listed in the preceding table in order of descending priority. In other words, the first status listed is the status with the highest priority, and the one whose color will dominate. All of the colors and priorities listed above are defaults, and can be modified when a customer defines SA OS/390 policy.

Note: Panels can be modified according to your needs.

MVS Subcomponent Colors

Blinking white is used to display MVS subcomponents that are in ASSIST mode.

Gateway Colors

Besides displaying the status of subsystems, SDF uses colors to show the status of gateway sessions. The following list explains what the gateway colors indicate:

Color	What it means
Reverse Turquoise	Gateway is active
Red	Gateway is inactive

Spool Colors

SDF uses the following colors to show the status of spools.

Color	What it means
Green	Spool is OK
Yellow	Spool is short
Red	Spool is full

WTOR Colors

SDF also uses colors to show what type of WTOR each displayed WTOR is, based on classifications that have been specified using the customization dialog. See *System Automation for OS/390 Defining Automation Policy* for more details.

Color	What it means
Green	WTOR is normal
Yellow	WTOR is unusual
Red	WTOR is important

Using SDF

You use SDF to monitor the status of subsystems, WTORs, and gateways on your system and other systems. To monitor status, you watch the highest level SDF panel (also known as the root panel or system summary panel). The following example shows a panel with the systems of a sysplex. This panel displays for example, systems, subsystems, WTORs or gateways within this sysplex.

```

SYSTEM                SA OS/390 - SUPPORT SYSTEMS

  System  Subsystems  WTORs   Gateways  Products  System
  KEY1    HUGC2APL0    NETATST1  IPSFP0    C I D O  P V M B T U
KEY2     IMS723C4     IMS721M1  IPSFN0    C I D O  P V M B T U
KEY3     IMS733C4     NETATST3  IPSF00    C I D O  P V M B T U
KEY4
XXXX
                                C I D O  P V M B T U

                                07/12/00 08:45

===>
1=HELP 2=DETAIL 3=RETURN 6=ROLL 8=NEXT SCR 10=LEFT 11=RIGHT 12=TOP

```

Figure 45. Example SDF System Summary Panel

On this panel, each system is displayed in a color that reflects the highest priority status of the resources in that system. If a resource in a system changes status, the system changes color to reflect the new status. By watching this panel you will see status changes in any system.

Imagine, **KEY1 HUGC2APL0** is displayed in red reverse on your screen, which means, the subsystem HUGC2APL0 on system KEY1 is in status BROKEN. To view more information on this subsystem, move the cursor to HUGC2APL0 (or KEY1) and press PF2 to get a panel as shown in “How to Check Resource Status Conditions” on page 144).

How SDF Works

SDF uses the hierarchy established during SDF customization to propagate colors up to the highest level panel. The following figure shows a graphic representation of an example SDF hierarchy for KEY1:

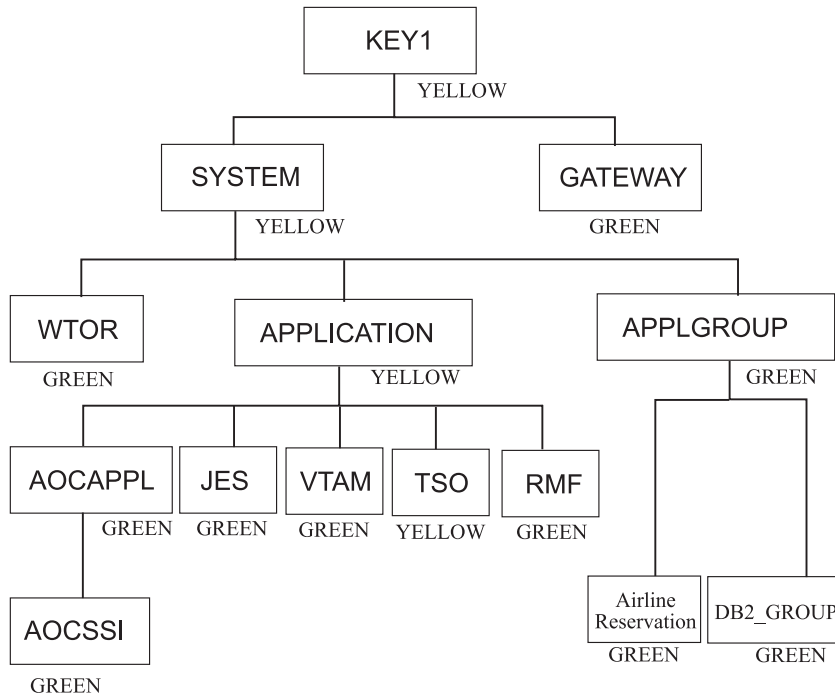


Figure 46. Example SDF Hierarchy for KEY1

Imagine that TSO appears in yellow on your screen because it is in AUTOTERM status. This color is reflected up the hierarchy to APPLICATION, SYSTEM, and KEY1, because AUTOTERM has a higher priority than the status UP (indicated by the color green). If various resources in a system have different status conditions, the one with the highest priority status controls the color of that system. This allows you to resolve issues concerning the highest priority status first, then deal with the lower priority status conditions.

How to Access SDF

To access SDF, type SDF on a NetView command line or type 3 (SDF) on the command line of the SA OS/390 System Operations menu (see “Using Command Dialogs” on page 68).

You see the highest level (or root) panel of SDF. Figure 45 on page 143 shows an example of the highest level panel for the SA OS/390 supported systems. On this panel, **KEY1 HUGC2APL0** is highlighted to indicate that it appears in red on your screen, which means that subsystem HUGC”APL0 on KEY1 is BROKEN. All other systems may appear in green, which means UP.

How to Check Resource Status Conditions

Normally when you use SDF to monitor resources, you watch the highest level panel until you see a system change color. This color change indicates a change in status in one of the resources in the system. To determine which resource, and to see more information on the status change:

1. Move the cursor to the system (or subsystem) that shows a status change.
2. Press PF2. This takes you to the Detail Status Display panel for the resource that caused the system to change color.

If more than one resource changes status at the same time, SDF shows the information for the system with the highest priority status first. See “Subsystem

Colors and Priorities” on page 140 for information on status priorities. You can press PF8 to page through the Detail Status Display panels for other resources on KEY1.

For example, in the Best Goods Company, you move the cursor to MVSESA3 (the system in red). When you press PF2, you see the Detail Status Display panel for DB2, which is the resource with the highest priority, because it is BROKEN.

```
----- DETAIL STATUS DISPLAY -----
                                     1 OF 514

COMPONENT: HUGC2APL0                SYSTEM : KEY1
COLOR   : RED                       PRIORITY : 120
DATE    : 07/17/00                  TIME    : 10:11:42
REPORTER : GATIPUFA                 NODE    : IPUFA

REFERENCE VALUE: HUGC2APL0

AOF571I 10:11:42 : KEY1.HUGC2APL0 SUBSYSTEM STATUS FOR JOB HUGC2A0 IS
BROKEN

===>
1=HELP 3=RETURN 4=DELETE 6=ROLL 7=UP 8=DOWN 9=ASSIST 11=BOTTOM 12=TOP
```

Figure 47. Example SDF Detail Status Display Panel for HUGC2APL0

This panel also shows the automation or human operator that sent the notification and gives the priority number that corresponds to the automation status. Priority numbers determine which color the resource is displayed in and the order of the Detail Status Display panels (the lower the number the higher the priority).

In this example, the panel is one of four Detail Status Display panels (as indicated at the top right corner of the panel), one for each of the resources under MVSESA3 that has detail information. Press PF8 to see the Detail Status Displays for the other resources. PF8 pages through the displays in order of descending status priority.

To return to a particular panel, you can press PF7, which pages through the displays in order of ascending priority, or you can press PF12, which takes you back to the first Detail Status Display in the stack, the one with the highest priority status.

PF3 Returns to the system panel.

PF4 Deletes the panel you are currently on. (The record is physically deleted.)

Note: You should normally not use this PF key.

PF9 Takes you to the Operator Assist panel when in assist mode.

PF11 Moves to the Detail Status Display panel for the resource with the lowest priority, the last panel in the Detail Status Display stack.

PF12 Moves to the Detail Status Display panel for the resource with the highest priority, the first panel in the Detail Status Display stack.

Note: PF keys can be customized. How to achieve this is described in the *System Automation for OS/390 Programmer's Reference*.

How to Look at the Resource Hierarchy

To look at the resource hierarchy, select a resource with the cursor and press PF8 to go down a level or PF7 to go up a level.

```
Resource Status for System Boulder1
System  Subsystem  WTORs    Gateways  Spool    MVS Comps
FOC1    SDSF        NetView          JES2
FOC2    AOCAPPL3
TGT1    AOCSSI
TGT3    JES
SYS1    VTAM
SYS2    TSO
SYS4    RMF
```

How to Monitor WTORs with SDF

To view a WTOR through SDF, - if SDF is set up to display WTORs - , you can type SDF on a NetView console to use the status display facility. Position the cursor on a job under WTORs (for example, INGESO, in the following panel extract) and press PF2 for more details. A Detail Status Display panel will be shown, containing text and information about an outstanding WTOR message.

```
Resource Status for System Boulder1
System      Subsystem  WTORs    Gateways  Spool    MVS Comps
SYS_TSCF2   INGESO     INGESO          JES2
```

How to Monitor Application Groups with SDF

To view application groups through SDF, - if SDF is set up to display application groups (see also "How SDF Works" on page 143 - , you can type SDF on a NetView console to use the status display facility. By using PF8 (ZOOM), navigate to the SUMMARY STATUS panel for the system, for which you want to monitor application groups. In our customized example from Figure 48 on page 147, we selected system *KEY3*.


```

KEY3
                                SUMMARY-STATUS
                                KEY3
                                >WTOR          >GATEWAY
                                >MESSAGES      >MVSCOMP
                                !-----!
                                >MVS
                                >SYSTEM
                                >APPLS        >GROUPS
                                >TEST
                                06/05/00 14:02
====>
1=HELP 2=DETAIL 3=RETURN 6=ROLL 7=UP      8=ZOOM 12=TOP

```

Figure 48. SDF Summary Status Panel

Now position the cursor under GROUPS and press PF8. In our example, we will see a customized panel containing information about application groups on **KEY3**.

```

KEY3                                KEY3:  APPLGROUP-STATUS
                                QFETCH
                                SYBNET_G
                                SYBSYS_G
                                06/05/00 14:13
====>                                13=EXPLAIN      17=START 18=STOP
1=HELP 2=DETAIL 3=RETURN 6=ROLL 12=TOP 20=APPLGR 21=ACF 22=ASF 23=LIST 24=INFO

```

Positioning the cursor on an application group of your choice and pressing PF2 (DETAIL) will display the SDF Detail Status Display panel for the selected application group, in our example, **QFETCH** (see Figure 49 on page 148).

```
----- DETAIL STATUS DISPLAY -----
                                     1 OF 3

COMPONENT: QFETCH                     SYSTEM : KEY3
COLOR   : PINK                        PRIORITY : 490
DATE    : 06/05/00                    TIME    : 12:57:08
REPORTER : AUTMSG                      NODE    : IPSNO
REFERENCE VALUE: QFETCH

QFETCH GROUP STATUS FOR SYSTEM APPLGROUP IS CTLDOWN

===>
1=HELP 3=RETURN 6=ROLL 7=UP 8=DOWN 9=ASSIST 10=QUIT 11=BOTTOM 12=TOP
```

Figure 49. SDF Detail Status Display Panel for an Application group

How to Monitor and Control a Sysplex

SA OS/390 provides a command interface to monitor and operate sysplexes. It helps operators to manage critical sysplex resources like coupling facilities and CF structures, couple data sets, and more. You can benefit from reduced sysplex operations complexity leading to higher sysplex availability and greater productivity.

The following section describes the panels of the system operations commands that support you in working with sysplex specific automation tasks. For details about the syntax and parameters of these commands, refer to *System Automation for OS/390 Operator's Commands*.

How to Work with Sysplex Automation

SA OS/390 provides the command INGPLEX to monitor and control the couple data sets and coupling facilities of your sysplex.

If you enter INGPLEX in the command line without any parameters, the following selection panel is displayed:

```

INGLX000          SA OS/390 - Command Dialogs
Domain Id   = IPSFO   ----- INGPLEX -----
Operator Id = OPER
Date = 10/02/01
Time = 15:34:10

Sysplex . . . . . : KEY1PLEX

Select the desired command:          INGPLEX ...

  1 Display systems (including ETR & signalling paths)    SYStem
  2 Display consoles                                     CONsole
  3 Control coupling facilities                          CF
  4 Control couple data sets                            CDS

Command ==>
F1=Help      F2=End      F3=Return
F6=Roll     F12=Retrieve

```

Figure 50. INGPLEX Selection Panel

You can select the required action by entering the selection number or the subcommand (shown on the right side of the panel) on the command line.

These subcommands support the following functions:

SYStem

Displays the target sysplex name, its GRS mode and its systems. For each system, details about the system name and status are shown.

CONsole

Displays details about the target sysplex. For example, the master console name, WTO and WTOR buffer utilization, and the number of queued messages.

CF

Displays the coupling facilities in the sysplex. For each coupling facility the structures and paths can be displayed, and the coupling facility can be drained and enabled.

CDS

Displays the couple data sets in the sysplex. For each couple data set you can obtain detailed information, and you can switch the couple data sets or allocate new alternate couple data sets.

These functions are described in more detail in the following chapters.

INGPLEX SYStem

INGPLEX SYStem displays the target sysplex name, its GRS mode and details about its systems.

```

A0FKX100          SA OS/390 - Command Dialogs          Line 1   of 4
Domain ID  = IPSFO  ----- INGPLEX SYSTEM -----    Date = 10/02/01
Operator ID = OPER                                     Time = 16:11:29

Sysplex . . . . . : KEY1PLEX
GRS Mode  . . . . . : STAR

Display more info: C CPU E ETR I IPL O IOS S STOR/ESTOR
Signalling Path : D device T structure

          Monitor
Cmd  System  Status  Timestamp  INTERVAL  Action  SSUM  -----
-----  -----  -----  -----  -----  -----  -----  -----
-    KEY1    ACTIVE  16:11:25  86400     PROMPT  86400  1
-    KEY2    ACTIVE  16:11:25  86400     PROMPT  86400  1
-    KEY3    ACTIVE  16:11:27  86400     PROMPT  86400  1
-    KEY4    ACTIVE  16:11:23  86400     ISOLATE  0       1

Command ==>
F1=Help      F2=End          F3=Return      F6=Roll
              F9=Refresh      F12=Retrieve

```

Figure 51. INGPLEX SYStem Panel

- The **Sysplex** field shows the name of the sysplex.
 - The **GRS Mode** field shows the GRS mode of the target system. The mode can be either STAR or RING.
 - The **CMD** column allows you to specify one of the command codes to display more information. Type the appropriate letter next to the resource name, and press ENTER.
 - The **System** column shows the name of the system.
 - The **Status** column shows the status of the system.
 - The **Monitor Timestamp** column shows the last time stamp recorded for status monitoring on this system.
 - The **INTERVAL** column shows the system failure detection interval in seconds. This interval is the time XCF lets elapse without a status update before assuming that the system failed.
- The last three columns contain configuration data of the SFM policy (if applicable).
- The **SSUM Action** field shows the SSUM action. It can be one of the following:
 - ISOLATE
 - DEACTIVATE
 - RESET
 - PROMPT
 - N/A
 - The **SSUM TIME** field shows the SSUM interval as specified in the current SFM policy.
 - The **SSUM WEIGHT** field shows the SSUM weight specified in the current SFM policy. This weight is used in sysplex configurations after a signalling connectivity failure.

To display more detailed information, enter the following command codes:

C Displays the status of selected central processors

- E Displays the timer synchronization mode and ETR ports
- I Displays IPL information
- O Displays IODF data
- S Displays the number of megabytes of central and expanded storage assigned and available to the system
- D Displays detailed information about signalling path data for specific signalling paths
- T Displays detailed signalling path information for all coupling facility structures

Note: The INGPLEX SYStem command replaces the command DISPXSYS used in previous releases of SA OS/390.

INGPLEX CONsole

INGPLEX CONsole displays the following information for the target sysplex:

- The name of the master console
- WTO & WTOR buffer utilization
- Number of queued messages (replies) of various types
- Number of outstanding mount requests
- Number of operator requests and list of consoles (name, status, authority, number of WTOR buffers, UD, device, system, ALTGRP, MSCOPE)

```

INGLX400          SA OS/390 - Command Dialogs          Line 1 of 6
Domain Id = IPSFO  ----- INGPLEX CONSOLE -----   Date = 10/02/01
Operator Id = OPER                                     Time = 16:13:35

Sysplex . . . . . : KEY1PLEX          Master Console . . . : --none--
Message Buffer Usage : 10 / 9999       Reply Buffer Usage . . : 10 / 99
Awaiting Replies . . : 10              Eventual Action . . . : 0
Immediate Action . . : 0               Awaiting Mounts . . . : 0
Critical Action . . : 3                Operator Requests . . : 0
-----

Cmds: D Details / R Requests

  Console  Status  AUTH  NBUF  UD  Device  System  ALTGRP  MSCOPE
  -----  -----  -----  -----  ---  -----  -----  -----  -----
- MASTER   INACTIVE  MASTER  n/a  Y   -none-  --none-- --none-- *ALL
- MASTER1  INACTIVE  ALL     n/a  N   -none-  --none-- --none-- *ALL
- 03       INACTIVE  MASTER  n/a  N   -none-  --none-- --none-- *ALL
- 04       INACTIVE  MASTER  n/a  N   -none-  --none-- --none-- *ALL
- 05       INACTIVE  MASTER  n/a  N   -none-  --none-- --none-- *ALL
- 06       INACTIVE  MASTER  n/a  N   -none-  --none-- --none-- *ALL

Command ==>
F1=Help      F2=End          F3=Return      F6=Ro11
              F9=Refresh      F12=Retrieve

```

Figure 52. INGPLEX Console Panel

- The **Sysplex** field shows the name of the sysplex.
- The **Message Buffer Usage** field shows the actual outstanding WTO message buffers and the maximum number of outstanding WTO message buffers allowed.
- The **Awaiting Replies** field shows the number of messages awaiting replies.

- The **Immediate Action** field shows the number of outstanding immediate action messages (with descriptor codes 1 or 2). If the number is greater than 99999, asterisks appear in this field.
- The **Critical Action** field shows the number of outstanding critical eventual action messages (with descriptor code 11). If the number is greater than 99999, asterisks appear in this field.
- The **Master Console** field shows the name of the master console.
- The **Reply Buffer Usage** field shows the actual outstanding WTOR message buffers and the maximum number of WTOR message buffers allowed. The maximum value is specified by the RMAX parameter in the CONSOLxx parmlib member.
- The **Eventual Action** field shows the number of outstanding eventual action messages (with descriptor code 3). If the number is greater than 99999, asterisks appear in this field.
- The **Awaiting Mounts** field shows the number of outstanding mount requests.
- The **Operator Requests** field shows the number of outstanding requests for operator intervention.
- The **CMD** column lets you specify the command codes shown on the panel. Type the appropriate letter next to the resource name, and press Enter.
- The **Console** column shows the name of the console as specified in the CONSOLxx parmlib member.
- The **Status** field shows the status of the console. This can be one of the following:

HARDCOPY

Hardcopy log. This condition is indicated when the console is active on the system where the command processes.

ACTIVE

Active console.

ACTIVE-P

In the process of becoming an active console. This condition will be indicated only when the console is active on the system where the command is processing.

MASTER

Master console

INACTIVE

Inactive console

INACT-P

In the process of becoming a non-active console. This condition will be indicated only when the console is active on the system where the command is processing.

PROB-DET

The active system console is in the problem determination mode. PD is indicated only for the system console.

SUBSYS

Subsystem-allocatable console

- The **AUTH** column shows which commands can be entered from this console:
ALL Any INFO SYS, IQ or CONS command can be entered from this console.

CONS INFO commands and any commands from the console command group can be entered from this console.

INFO Any command from the informational command group can be entered from this console.

IO INFO commands and any commands from the I/O control command group can be entered from this console.

MASTER

The specified console is authorized to enter any operator command.

NONE

This console has no command authority.

SYS INFO commands and any commands from the system control command group can be entered from this console.

- The **NBUF** column shows the number of WTO message buffers currently queued to this console. If *nnnn* is greater than 9999, asterisks (****) appear in this field.
- The **UD** column shows whether this console is receiving messages with the UD attribute.
- The **Device** column shows the name of the console as specified in the CONSOLxx parmlib member. This console can be a subsystem allocatable console.
- The **System** column shows the device number of the active console.
- The **ALTGRP** column shows the alternate group defined for this console.
- The **MSCOPE** column lists the name of the system or systems from which this console is receiving unsolicited messages. Note that these systems might be different from the system where this console is physically attached.

Note: The INGPLEX CONsole command replaces the command DISPCONS used in previous releases of SA OS/390.

INGPLEX CF

With INGPLEX CF you can:

- Drain or enable a selected coupling facility
- Display the paths and structures to a selected coupling facility

```

INGLX900          SA OS/390 - Command Dialogs      Line 1 of 2
Domain Id = IPSFO ----- INGCF -----          Date = 10/02/01
Operator Id = OPER                               Time = 16:14:27

Sysplex . . . . . : KEY1PLEX          SM process level . : 9
-----
Cmds: D drain CF / E enable CF / P display sender paths / S display structures

  CF Name   Total Space  Free Space  Free%  Volatile  CF level
-----
- CF01      509184 K    289792 K  56.91   YES       9
- CF02      509184 K    508672 K  99.90   YES       9

Command ==>
F1=Help      F2=End          F3=Return      F6=Roll
              F9=Refresh      F12=Retrieve

```

Figure 53. INGCF Panel

This panel displays all coupling facilities in a sysplex including particular storage information of each coupling facility. On this panel you can select one of the following actions by entering the command code next to the coupling facility:

D (Drain CF)

Releases a coupling facility from its structures and connections in order to remove it from the sysplex for maintenance.

E (Enable CF)

Integrates a coupling facility into a sysplex.

P (Display Sender Paths)

Displays the paths from the systems in the sysplex having a connection defined to the specified coupling facility. For each path the physical and the logical status are displayed.

S (Display Structures)

Shows all structures allocated in the specified coupling facility.

These actions are described in detail in the following sections.

Drain CF: With this function, you can remove a CF from the sysplex, for example, for maintenance purposes. You can perform the following sequence of tasks:

1. Display information for all allocated structures of the CF.
2. Rebuild all rebuildable structures on another CF and delete instances of structures on the target CF that are being duplexed on another CF.
3. Force the deletion of structures that have no active connectors and cannot be rebuilt.

Note that there are structures that you can neither rebuild nor delete with the force action. These include the structures that have at least one active connector and do not support rebuild. To remove such structures first disconnect all active connectors, and then delete the structure manually if it is persistent or has persistent connections.

4. Disconnect the CF from the systems with which it is connected

The DRAIN option ensures that these actions are performed in the correct order, as specified above.

Depending on the status of the CF and its allocated structures, you can execute one of four actions with the program function keys:

REBUILD (F10)

Starts the rebuild of structures that can be rebuilt on another CF. Therefore, a rebuild is only initiated for structures whose preference list contains more than one CF.

There are two methods for rebuild, user-managed and system-managed rebuild. User-managed rebuild is supported for all release levels. System-managed rebuild is only available with systems that have OS/390 2.8 or above; it must have been enabled by formatting the CFRM couple data sets with the specification

```
ITEM NAME(SMREBLD) NUMBER(1)
```

System-managed rebuild is only performed when the requirements for user-managed rebuild are not met. This applies, for example, to structures without active connectors.

The REBUILD action also deletes all structure instances on the target CF that are being duplexed on another CF.

FORCE (F5)

Forces the deallocation of structures with one of the following conditions:

- No connection exists.
- No alternate CF for structure with no active connections.
- No alternate CF for structure with no connections.

This action is only available after all structures that can be rebuilt have been rebuilt.

DRAIN (F4)

Disconnects the coupling facility from its connected systems by setting the sender path(s) OFFLINE.

This action is only enabled after all structures of the target CF have been removed to another CF or deallocated. Note that structures that have active connectors but do not support rebuild cannot be removed with F10 or F5. They must be deallocated manually before execution of this step is enabled.

Example of draining a CF:

```

INGLX901          SA OS/390 - Command Dialogs      Line 1 of 31
Domain Id = IPSFO  ----- INGCF DRAIN -----      Date = 10/02/01
Operator Id = OPER                                         Time = 07:01:00

Coupling Facility ==> CF1          Status . . . . . : NORMAL
Sysplex . . . . . ==> KEY1PLEX      Permission . . . . . : ALL
-----
Structure          Condition
-----
DFHXQLS_TESTTSQ1  No active connections. System-managed rebuild supported.
DSNG_LOCK1
DSNG_SCA           System-managed rebuild is supported.
ISGLOCK
ISTGENERIC
IXCGRS
IXCplex_PATH1
M7SG_LOCK1        *No alternate CF for structure with no active connections.
M7SGEMHQ          No active connections. System-managed rebuild supported.
M7SGMSGQ          No active connections. System-managed rebuild supported.
M7SGMSGQOV        No active connections. System-managed rebuild supported.

Command ==>
F1=Help           F2=End           F3=Return          F6=Ro11
                  F8=Forward       F9=Refresh        F10=Rebuild      F12=Retrieve

```

Figure 54. DRAIN CF Command Dialog

The status of the CF (NORMAL) and the authorization type of the operator (ALL) are displayed on the right side of the panel. The main part of the panel consists of a list containing the structures allocated in CF1 and their conditions. The conditions are classified by color and an asterisk. The asterisk signifies that a structure cannot be rebuilt.

The only action that is enabled is F10=Rebuild. Pressing F10 displays the following confirmation panel:

```

INGLX92R          SA OS/390 - Command Dialogs      Date = 10/02/01
Domain Id = IPSFO  ----- INGCF DRAIN -----      Time = 07:01:04
Operator Id = OPER

Coupling Facility . : CF1
Sysplex . . . . . : KEY1PLEX

                R E B U I L D Confirmation

The REBUILD process runs asynchronously on the next system in the sysplex that
has access to the CFRM couple data set and can perform all necessary actions.
Each structure that has no * indicator in front of its status is rebuilt to its
status accordingly. The structures are processed in sequence. Once started use
the refresh PF key for getting the current status of the process. When more
than one structure is being rebuilt a timeout occurred indicating that XCF is
very busy. But processing continues. A display without any structure or only
structures that cannot be rebuilt indicates a successful completion.

Command ==>
                  F2=End           F3=Return          F6=Ro11
                  F10=Go           F11=Cancel        F12=Retrieve

```

Figure 55. DRAIN Command Dialog: Confirmation Panel for REBUILD

After F10 has been pressed, the structures are in the process of being rebuilt:

```

INGLX901          SA OS/390 - Command Dialogs      Line 1 of 6
Domain Id = IPSFO  ----- INGCF DRAIN -----      Date = 10/02/01
Operator Id = OPER                                     Time = 07:18:44

Coupling Facility ==> CF1          Status . . . . . : REBUILDING
Sysplex . . . . . ==> KEY1PLEX      Permission . . . . . : ALL
-----
Structure          Condition
-----
DSNG_LOCK1        Structure is awaiting rebuild.
ISGLCK            Structure is awaiting rebuild.
ISTGENERIC        Structure is awaiting rebuild.
IXCGRS            Structure is being rebuilt.

Command ==>
F1=Help          F2=End          F3=Return          F6=Ro11
                  F9=Refresh          F12=Retrieve

```

Figure 56. DRAIN Command Dialog: Rebuild Process

After the rebuild has been completed, a panel similar to the following is displayed:

```

INGLX901          SA OS/390 - Command Dialogs      Line 1 of 1
Domain Id = IPSFO  ----- INGCF DRAIN -----      Date = 10/02/01
Operator Id = OPER                                     Time = 07:53:36

Coupling Facility ==> CF1          Status . . . . . : NORMAL
Sysplex . . . . . ==> KEY1PLEX      Permission . . . . . : ALL
-----
Structure          Condition
-----
M7SG_LOCK1        *No alternate CF for structure with no active connections.

Command ==>
F1=Help          F2=End          F3=Return          F5=Force          F6=Ro11
                  F9=Refresh          F12=Retrieve

```

Figure 57. DRAIN Command Dialog: Panel After Rebuild

One structure could not be rebuilt because no alternate CF is specified in its preference list. The REBUILD status is no longer available. Instead, the FORCE action (F5) is offered because the structure that could not be rebuilt has a condition that allows forcing the deallocation of the structure. Pressing F5 displays a confirmation panel similar to that for REBUILD. Pressing F10 on the confirmation

panel and refreshing the command dialog after the action has been completed results in the following panel:

```

INGLX901          SA OS/390 - Command Dialogs      Line
Domain Id   = IPSFO      ----- INGCF DRAIN -----      Date = 10/02/01
Operator Id = OPER                               Time = 08:12:28

Coupling Facility ==> CF1          Status . . . . . : NORMAL
Sysplex . . . . . ==> KEY1PLEX      Permission . . . . . : ALL
-----
Structure      Condition
-----

Command ==>
F1=Help      F2=End      F3=Return      F4=Drain      F6=Roll
F9=Refresh                                F12=Retrieve

```

Figure 58. DRAIN Command Dialog: Panel After Forcing

Now, no more structures are allocated in the CF and the CF can be released from the connections with the systems of the sysplex (F4=Drain). After completion of that action, the status of the CF changes to DRAINED, as shown on the following panel:

```

INGLX901          SA OS/390 - Command Dialogs      Line
Domain Id   = IPSFO      ----- INGCF DRAIN -----      Date = 10/02/01
Operator Id = OPER                               Time = 08:12:32

Coupling Facility ==> CF1          Status . . . . . : DRAINED
Sysplex . . . . . ==> KEY1PLEX      Permission . . . . . : ALL
-----
Structure      Condition
-----

Command ==>
F1=Help      F2=End      F3=Return      F6=Roll
F9=Refresh                                F12=Retrieve

```

Figure 59. DRAIN Command Dialog: Panel After Draining

After the CF has been released from all connections with the sysplex members, it can be inactivated. This must be done manually.

Enable CF: With this function, you can (re)integrate a CF into a sysplex. You can perform the following tasks:

1. Connect the systems of the sysplex with the coupling facility.
2. Switch to another CFRM policy if the target CF is not defined in the active policy and a suitable policy is available.
A suitable CFRM policy must contain:
 - A definition of the target CF
 - Appropriate definitions for every active CF and every allocated structure
3. Rebuild all structures on the target CF whose preference list starts with this CF, unless this is excluded by other requirements.

The ENABLE CF option ensures that these actions are performed in the correct order, as specified above.

The following function keys support these actions:

ENABLE (F4)

Sets the sender paths of all systems of the sysplex to ONLINE. This action is enabled when the CF is active.

SWITCH (F5)

Switches to another CFRM policy when the target CF is not defined in the active CFRM policy and a suitable policy is available. When there is more than one suitable policy you can choose one of these from a selection panel.

A CFRM policy is suitable when it contains:

- A definition of the target CF
- Definitions for every active CF and every allocated structure

This action is only available when the target CF is active, but not defined in the current CFRM policy.

POPULATE (F10)

Starts a rebuild process in which all structures that have the target CF at the beginning of their preference list but are currently allocated on another CF are allocated on the target CF.

This action requires that the CF is enabled, connected to all members of the sysplex, and defined in the current CFRM policy. The action is offered whenever SA OS/390 detects that a structure is not allocated on the target CF although it is the preferred CF of that structure.

In the following example, a CF that has already been activated is reintegrated into the sysplex.

```

INGLX901          SA OS/390 - Command Dialogs          Line
Domain Id   = IPSFO          ----- INGCF ENABLE -----          Date = 10/02/01
Operator Id = OPER          Time = 11:06:06

Coupling Facility ==> CF02          Status . . . . . : DRAINED
Sysplex . . . . . ==> KEY1PLEX          Permission . . . . . : ALL
-----
Structure          Condition
-----

Command ==>
F1=Help          F2=End          F3=Return          F4=Enable          F6=Roll
F9=Refresh          F12=Retrieve

```

Figure 60. ENABLE command dialog: panel before any action

The selected CF has already been activated manually, therefore its status, as shown on the right side of the panel, is DRAINED. The authorization type of the operator (ALL) is also displayed on the right side of the panel. The main part of the panel is empty because no structures are allocated in CF02. The only action that is activated is ENABLE (F4). Pressing F4 displays the following confirmation panel:

```

INGLX92E          SA OS/390 - Command Dialogs          Line
Domain Id   = IPSFO          ----- INGCF ENABLE -----          Date = 10/01/01
Operator Id = OPER          Time = 11:06:20

Coupling Facility . : CF02
Sysplex . . . . . : KEY1PLEX

                E N A B L E Confirmation

The ENABLE process runs asynchronously on the next system in the Sysplex that
has access to the CFRM couple data set. All sender paths of all system in the
sysplex are set to ONLINE. Once started use the refresh PF key for getting
the current status of the process. The status NORMAL indicates a successful
completion.

Command ==>
                F2=End          F3=Return          F10=Go          F6=Roll
                F11=Cancel          F12=Retrieve

```

Figure 61. Confirmation Panel for ENABLE

After pressing F10 on the confirmation panel, the command dialog changes as follows:

```

INGLX901          SA OS/390 - Command Dialogs      Line 1 of 3
Domain Id = IPSFO  ----- INGCF ENABLE -----   Date = 10/02/01
Operator Id = OPER                                         Time = 11:06:39

Coupling Facility ==> CF02          Status . . . . . : NORMAL
Sysplex . . . . . ==> KEY1PLEX      Permission . . . . . : ALL
-----
Structure          Condition
-----
GRPYCSQ_ADMIN     Structure is currently allocated in CF01.
GRPYHSAQUEUE      Structure is currently allocated in CF01.
HSA_LOG           Structure is currently allocated in CF01.

Command ==>
F1=Help          F2=End          F3=Return          F6=Roll
F9=Refresh       F10=Populate         F12=Retrieve

```

Figure 62. ENABLE command dialog: panel after enabling

The status has changed to NORMAL, and you can populate the CF with F10. This implies that the target CF is defined in the active CFRM policy. If this were not the case, the new state would have been NOTINPOLICY, and if a suitable policy were available, the action key F5 for a policy switch would have been offered.

The structure list contains three entries with the condition 'Structure is currently allocated in CF01.'. These are the structures that are currently allocated in CF01, but have CF02 at the first position in their preference list.

Pressing F10 now populates the CF, and the refreshed panel looks similar to the following:

```

INGLX901          SA OS/390 - Command Dialogs      Line 1 of 3
Domain Id   = IPSFO      ----- INGCF ENABLE -----      Date = 10/02/01
Operator Id = OPER                               Time = 11:17:35

Coupling Facility ==> CF02          Status . . . . . : NORMAL
Sysplex . . . . . ==> KEY1PLEX      Permission . . . . : ALL
-----
Structure      Condition
-----
GRPYCSQ_ADMIN  System-managed rebuild is supported.
GRPYHSAQUEUE   System-managed rebuild is supported.
HSA_LOG

Command ==>
F1=Help      F2=End      F3=Return      F6=Roll
              F9=Refresh      F12=Retrieve

```

Figure 63. ENABLE command dialog panel: panel after populating

The POPULATE action is no longer available because all structures whose preference list starts with CF02 are now allocated in CF02.

Display Sender Paths: With this function, the paths from the connected systems to the specified coupling facility are displayed.

```

INGLX903          SA OS/390 - Command Dialogs      Line 1 of 6
Domain Id   = IPSFM      ----- INGCF PATH -----      Date = 10/02/01
Operator ID = OPER                               Time = 14:34:02

Coupling Facility ==> CF01
Sysplex . . . . . ==> KEY1PLEX
-----
System  CHPID  Physical      Logical  Type
-----
KEY1    5B     ONLINE       ONLINE  ICS
        59     ONLINE       ONLINE  ICS
KEY2    5B     ONLINE       ONLINE  ICS
        59     ONLINE       ONLINE  ICS
KEY3    05     ONLINE       ONLINE  CFS
KEY4    05     ONLINE       ONLINE  CFS

Command ==>
F1=Help      F2=End      F3=Return      F6=Roll
              F9=Refresh      F12=Retrieve

```

Figure 64. Display Sender Path Panel

- The **Coupling Facility** field shows the name of the coupling facility for which the paths should be displayed. It can be overtyped to show another display.

- The **System** column contains the names of the systems that are connected to the target CF.
- The **CHPID** column shows the IDs of the sender channel paths.
- The **Physical** column shows the status of the sender channel paths.
- The **Logical** column shows the logical status of the paths to that CF.
- The **Type** column shows the type of the sender channel paths.

Note: The display sender paths option of the INGPLEX CF command replaces the command DISPPATH used in previous releases of SA OS/390.

Display Structures: This option shows all allocated structures for the selected coupling facility.

```

INGLX904                SA OS/390 - Command Dialogs          Line 1    of 31
Domain ID = IPSFM      ----- INGCF STRUCTURE -----      Date = 10/02/01
Operator ID = OPER                                           Time = 14:47:43

Coupling Facility ==> CF01
Sysplex . . . . . ==> KEY1PLEX          Permission . . . . : ALL
Include condition ==> NO (Yes/No - Condition retrieval takes longer)
-----
Cmds: D display details / F force / R rebuild

  Structure          P
  -----
- DFHXQLS_TESTTSQ1
- DSN1_GBPO
- DSN1_LOCK1
- DSN1_SCA
- GRPNCSQ_ADMIN
- GRPNHSAQUEUE
- HSA_LOG
- IEFAUTOS

Command ==>
F1=Help      F2=End      F3=Return      F6=Ro11
              F8=Forward  F9=Refresh     F12=Retrieve

```

Figure 65. Display Structures Panel

- The **Include Condition** field is an input field. By entering Yes or No in this field you determine whether or not the conditions of the structures are displayed in the **Structure** column.
- The **Permission** field shows your authorization level. There are two possible values, ALL and DISPLAY. DISPLAY indicates that you can only use the display functions. ALL indicates that you can also rebuild and delete structures.
- The **Structure** column shows the names of the structures.
- The letter P in the **P** column indicates that policy changes are pending for the structure.
- The **Condition** column shows the status of the structures. You can switch the display of the conditions on and off with the **Include Condition** field.

The following command codes are available:

Display Details (D)

This action displays detail information about the structure.

Force (F)

This action forces the deallocation of the structure if it has one of the following conditions:

- No connection exists.
- No alternate CF for structure with no active connections.
- No alternate CF for structure with no connections.

Rebuild (R)

Starts the rebuild of the selected structure on another CF. Therefore, a rebuild is only initiated for structures whose preference list contains more than one CF.

There are two methods for rebuild, user-managed and system-managed rebuild. User-managed rebuild is supported for all release levels. System-managed rebuild is only available with systems that have OS/390 2.8 or above. It must have been enabled by formatting the CFRM couple data sets with the specification

```
ITEM NAME(SMREBLD) NUMBER(1)
```

System-managed rebuild is only performed when the requirements for user-managed rebuild are not met. This applies, for example, to structures without active connectors.

For structures that are being duplexed on another CF, the REBUILD action deletes the structure instance on the target CF.

Note: The display sender paths option of the INGPLEX CF command replaces the command DISPSTR used in previous releases of SA OS/390.

INGPLEX CDS

INGPLEX CDS displays information about all the couple data sets in the sysplex and allows the operator to:

- Switch from the primary to the alternate CDS
- Allocate a new alternate CDS
- Change the active policy (if applicable)
- Display CHPIDs and CDS information

```

INGKX300          SA OS/390 - Command Dialogs      Line 1 of 18
Domain ID = IPSFO ----- INGPLEX CDS ----- Date = 10/02/01
Operator ID = OPER          Sysplex = KEY1PLEX      Time = 16:15:20

System..: KEY3          Interval...: 86400          OPNotify: 86400
Maxmsg..: 999999      Cleanup....: 60          Retry...: 255
Classlen: 956          Max CFlevel: 9          COUPLExx: COUPLER1
SMREBLD.: N/A          Max SMlevel: 9

Cmds: A allocate alternate CDS / C display CHPIDs
      D display CDS information / P switch alternate CDS to primary CDS

Type      MS      Volume  Dev   Couple Dataset Name
-----
- SYSPLEX
  PRIMARY..: 10   KEY1SP  260A  SYS1.KEY1.PXCFDCS
  ALTERNATE: 10   KEYLIB  2610  SYS1.KEY1.AXCFDCS
- ARM
  PRIMARY..: 8    KEY1SP  260A  SYS1.KEY1.PARMCDS
  ALTERNATE: 8    KEYLIB  2610  SYS1.KEY1.AARMCDS
- CFRM
  PRIMARY..: 32   KEY1SP  260A  SYS1.KEY1.PXESCDS
  ALTERNATE: 32   KEYLIB  2610  SYS1.KEY1.AXESCDS
- LOGR
  PRIMARY..: 32   KEY1SP  260A  SYS1.KEY1.PLOGCDS
  ALTERNATE: 32   KEYLIB  2610  SYS1.KEY1.ALOGCDS

Command ==>
F1=Help      F2=End      F3=Return      F6=Ro11
              F8=Forward  F9=Refresh      F12=Retrieve

```

Figure 66. INGPLEX CDS Panel

This panel contains sysplex-related information about the system on which the INGPLEX command was executed. The details are as follows:

- The **System** field shows the name of the system.
- The **Interval** field shows the system failure detection interval in seconds. This interval is the amount of time XCF lets elapse without a status update before assuming that the system failed.
- The **OPNotify** field shows the number of seconds that XCF waits before notifying the operator of a potential system problem.
- The **Maxmsg** field shows the default value for the maximum amount of kilobytes of message buffer space. This default value is used when MAXMSG is not specified on SETXCF START commands.
- The **Cleanup** field shows the number of seconds that XCF waits for cleanup of members.
- The **Retry** field shows the default value for the retry limit. This value is used when the RETRY keyword is not specified on SETXCF START commands.
- The **Classlen** field shows the default length (in bytes) of messages allowed for a transport class. This value is used when CLASSLEN is not specified on the SETXCF START CLASSDEF command.
- The **Max CFlevel** field shows the maximum CFLEVEL supported by this system. This system can connect to a coupling facility with a higher CFLEVEL than the value of **Max CFlevel** but would not be enabled to use any functions supported by the higher level coupling facility.
- The **COUPLExx** field shows the COUPLExx parmlib member used for system IPL.

- The **SMREBLD** field shows whether (value 1) or not (value 0) system-managed rebuild has been activated in the CFRM couple data set.
- The **Max SMlevel** field shows the maximum system-managed process level supported by this system.

For each couple data set you can enter one of the following command codes to initiate an action:

A - allocate alternate CDS

This action replaces the current alternate CDS for a selected CDS type by a new one. There are two options how to do this:

- The alternate CDS is allocated automatically by SA OS/390.
This automatic allocation requires that spare volumes have been defined, and that one of these spare volumes is available. For details see *System Automation for OS/390 Defining Automation Policy*.
- You specify the data set that is used as the new alternate CDS.

If you specify your own data set, verify the following:

- The data set must exist
- It must have been formatted with the XCF formatting tool
- It must be at least as large as the current primary CDS, which means that every value you have passed to the XCF formatting tool (for example, in the case of a sysplex CDS, the maximum number of systems supported) must be equal to or greater than the corresponding value of the primary CDS.

C - display CHPIDs

This action displays information about the channel paths for the selected CDS type.

D - display CDS information

This action displays detailed information about the selected CDS type. If the CDSs of the selected type contain policies, the detail information panel provides further actions:

display policy (D)

This action displays details about the selected policy.

display pending structures (P)

This action is only available for the CFRM couple data sets. A pending structure is produced by a switch of the CFRM policy when the structure was allocated at the time of the switch and, for example, the new policy defines the structure differently from the old policy or not at all.

start policy (S)

This action makes the selected policy the active policy. The policy switch must be confirmed before it is executed.

P - switch alternate CDS to primary CDS

This action makes the alternate CDS the primary. Since an alternate CDS is no longer available after the switch, SA OS/390 displays a confirmation panel before the action is performed. On this panel you can specify a new alternate CDS. When CDS recovery is switched on and you do not supply your own alternate, SA OS/390 tries to allocate a new alternate CDS automatically.

Note: The INGPLEX CDS command replaces the command DISPCDS used in previous releases of SA OS/390.

How SA OS/390 Uses Error Thresholds

Error thresholds influence whether SA OS/390 recovers from an error situation or not. For applications, you can define a critical threshold for restarting these applications. This is a number of error conditions within a certain time interval, for example, five error conditions requiring restart within one hour. During a condition requiring restart, SA OS/390 checks whether the number of occurrences of the condition reaches the critical threshold. If it is reached, SA OS/390 does not attempt to restart a resource.

For OS/390 components, such as dump data sets or log data sets, you can define thresholds to limit the frequency of how often they may be deleted after they have filled up without an action being taken or a notification being sent to the operator.

Error thresholds also determine when you should be alerted to problems. The primary use of error thresholds is to track subsystem abends and ensure that the abend and restart cycle does not become an infinite loop, but they may also be customized for other uses.

Refer to *System Automation for OS/390 Defining Automation Policy* for information on how to define error thresholds. The following sections describe how to obtain information about them.

Displaying Threshold Settings and Occurrences

SA OS/390 counts the number of times that a subsystem abends. Each time, an abending subsystem is restarted, a check is made to see if the restart is done too often. SA OS/390 allows you to specify thresholds in terms of error rates. If the measured error rate reaches the *critical* threshold, SA OS/390 stops to recover the resource and posts it to a broken status.

You have the following possibilities to both obtain information about threshold settings and to view when thresholds have been reached:

DISPTHRS

If you specify the DISPTHRS command (see “How to Display Threshold Settings for a Selected Resource - DISPTHRS” on page 168), you get the INGTHRES command dialog, which displays the settings for all thresholds for the resource you specified (see Figure 67 on page 169).

DISPATHR

To display all thresholds, type DISPATHR on any command line. This will lead you to the related *Command Dialogs* panel (Figure 68 on page 170).

DISPERRS

If you want to check the error counts for all resources on a specific system, you should issue a DISPERRS command to this target system. SA OS/390 will display the DISPERRS *Command Dialogs* panel with a list of all the errors that have been recorded for all resources on the target system (see “How to Display Occurred Errors - DISPERRS” on page 170).

DISPASF

If you want to check the error counts for a specific resource on a specific target system, issue the DISPASF command.

How to Display Threshold Settings for a Selected Resource - DISPTHRS

1. Type DISPTHRS on any command line.

You see the following panel:

```
AOFKAADT          SA OS/390 - Command Dialogs
Domain ID  = IPUFM  ----- DISPTHRS -----      Date = 05/23/97
Operator ID = WAS                                     Time = 09:13:10

Select the threshold setting to be displayed:

Type of Thresholds   Specific Resource name or group

Defaults              =>  _
Resource name or group => _____

System               => _____   System name or domain ID

Default thresholds will be displayed if resource
is undefined or invalid.

Command ==>
PF1=Help   PF2=End   PF3=Return
PF6=Roll                                     PF12=Retrieve
```

2. Select the type of threshold you want to select:

- **Defaults** shows the default threshold settings for the whole system. These default settings apply to automated resources that do not have their own thresholds defined or that do not belong to a group that has thresholds defined. The default threshold settings are displayed by entering a non-blank character in this field.
- Any resource name (such as TSO or RMF) or resource group (such as SUBSYSTEM or MVSESA) can be entered in the *Resource name or group* field.

Resource name shows threshold settings for a resource that you specify.

Resource group shows the default threshold settings for subsystems or components. All subsystems or components that do not have thresholds already defined take these defaults.

If you want to specify default thresholds, type any character. If you want to specify *Resource name or group*, type in the name of the specific resource or resource group.

For Resource name, you can specify any automated resource.

For Resource group, you can type:

- **subsystem**, which specifies default settings for all subsystems
- **mvsesa**, which specifies default settings for all components.

3. **System** specifies the name of the system from which to obtain the information.
4. Press the Enter key.

You see the INGTHRES command dialog, which displays the settings for the critical, frequent, and infrequent thresholds for the resource you specified.

```

AOFKAASR          SA OS/390 - Command Dialogs
Domain ID  = IPUFM  ----- INGTHRES -----   Date = 06/30/97
Operator ID = WAS                                     Time = 16:15:30

Specify thresholds and resource changes:

Resource   =>   RMF           Group or specific resource
System     =>   KEY3         System name or domain ID

Critical   =>   3   errors in 12:00   Time (HH:MM)
Frequent   =>   3   errors in 24:00   Time (HH:MM)
Infrequent =>   2   errors in 24:00   Time (HH:MM)

Pressing ENTER will set the THRESHOLD values

Command ==>
          PF1=Help   PF2=End   PF3=Return
          PF6=Roll
                                     PF12=Retrieve

```

Figure 67. INGTHRES Command Dialogs Panel

In this example, the critical threshold is 3 errors in 12 hours, the frequent threshold is 3 errors in 24 hours, and the infrequent threshold is 2 errors in 24 hours. Note that the only errors that SA OS/390 counts are restartable subsystem abends. However, your systems programmers may have modified your system to make other errors count towards the total as well.

How to Display All Threshold Settings - DISPATCHR

You can use the DISPATCHR command dialog to display a summary of the error thresholds that have been set either in your automation control file definitions or through the INGTHRES command dialog.

Only resources that have error thresholds explicitly defined are displayed.

To display all thresholds type DISPATCHR on any command line.

You see the following panel:

```

AOFKAAD4          SA OS/390 - Command Dialogs          Line 1_of 13
Domain ID = IPUFM  ----- DISPATCHR -----          Date = 05/23/97
Operator ID = WAS                                     Time = 09:13:10

      System      Resource      Critical      Frequent      Infrequent
      -----      -
AOC8      DEFAULTS      4 in 01:00    4 in 02:00    6 in 12:00
AOC8      MVSESA          4 in 01:00    4 in 02:00    6 in 12:00
AOC8      SUBSYSTEM       3 in 12:00    3 in 24:00    2 in 24:00
AOC8      MVSDUMP         6 in 00:30    4 in 00:20    2 in 00:20
AOC8      SMFDUMP         4 in 01:00    4 in 02:00    6 in 12:00
AOC8      PIMS            1 in 99:00    1 in 99:00    1 in 99:00
AOC8      PIMSPGM         4 in 00:15    3 in 01:00    2 in 01:00

Command ==>
      PF1=Help   PF2=End   PF3=Return
      PF6=Roll   PF8=Forward   PF9=Refresh   PF12=Retrieve

```

Figure 68. Example DISPATCHR Command Dialog Panel

- The **System** field shows the name of the system where the resource is located.
- The **Resource** field shows the name of the resource. The first three entries are always DEFAULTS, MVSESA, and SUBSYSTEM.
- The **Critical** field shows the critical threshold for the resource.
- The **Frequent** field shows the frequent threshold for the resource.
- The **Infrequent** field shows the infrequent threshold for the resource.

Thresholds are in the format *nn in hh:mm*, which means that the threshold is reached if more than *nn* errors occur within *hh* hours and *mm* minutes. If no critical threshold has been specified, the field is blank.

How to Display Occurred Errors - DISPERRS

If you specify the DISPERRS command, you get the DISPERRS command dialog, which displays the number of errors for all the applications on the target system and also when an application has reached its threshold. Scroll through the panel to find the resource that has failed.


```

AOFKAAD5          SA OS/390 - Command Dialogs          Line 1 of 19
Domain ID = IPUFM ----- DISPERRS -----          Date = 10/28/97
Operator ID = MIK                                     Time = 15:30:24

  System   Resource   Type           Thrs  No Date      Time
-----
AOC7      AOFIPLDT   CONTROL        10  03/03/99  12:11
AOC7                                     9  03/03/99  09:22
AOC7                                     8  03/01/99  12:12
AOC7                                     7  02/24/99  10:32
AOC7                                     6  02/18/99  08:13
AOC7                                     5  02/05/99  14:26
AOC7                                     4  02/01/99  15:42
AOC7                                     3  01/25/99  07:49
AOC7                                     2  01/15/99  12:01
AOC7                                     1  01/04/99  07:21
AOC7      THRY000NN10  SUBSYSTEM     CRIT  3  02/25/99  13:15
AOC7                                     2  02/25/99  13:14
AOC7                                     1  02/25/99  13:00
AOC7      TRGG007AA00  SUBSYSTEM     CRIT  1  02/19/99  09:38
AOC7      TRGG007AA10  SUBSYSTEM     CRIT  1  02/19/99  09:38
AOC7      MVSDUMP      MVSESA        CRIT  10 01/25/99  08:23
AOC7                                     9  01/25/99  08:08
AOC7                                     8  01/21/99  07:21
AOC7                                     7  01/21/99  07:17
AOC7                                     6  12/15/98  23:31
AOC7                                     5  12/15/98  23:31
AOC7                                     4  12/15/98  23:30

Command ==>
PF1=Help      PF2=End      PF3=Return   PF6=Roll
               PF9=Refresh  PF12=Retrieve

```

Figure 69. DISPERRS Command Dialogs Panel

In this sample screen, the AOFIPLDT entry shows when the last IPL was performed on the system. The THRY000NN10 subsystem is shown as having reached its *critical* threshold at 13:15 on 02/25/99.

If a subsystem is in the BROKEN status and it has not exceeded its critical threshold, then it has probably encountered an unrecoverable error. If you look into either SDF or DISPINFO for it, you should find the text of the AOF571I status change notification message, which will explain why it was posted to BROKEN.

How to Display Occurred Errors for a Specific Resource - DISPASF

While DISPERRS displays occurred errors for all a system's resources, DISPASF lets you see detailed information about errors for a resource on a specific system. For example, if you want to see more information about the error with resource *MVSDUMP* on system *AOC7* from the panel in Figure 69, issue the following command:

```
DISPASF MVSDUMP TARGET=AOC7
```

to display the following information:

```

AOFK3D0X          SA OS/390 - Command Response      Line 1   of 19
Domain ID   = IPUFM          ----- DISPASF ----- Date = 03/04/99
Operator ID = HUT                               Time = 12:35:42

Command = ASF ID=MVSDUMP,REQ=DISP
SYSTEM = AOC7          STATISTICS DISPLAY REQUESTED FOR MVSDUMP
-----
STATISTICS DISPLAY REQUESTED FOR MVSDUMP
ID= MVSDUMP          , TYPE= MVSESA          , STATUS= DOWN
LAST UPDATE BY OPERATOR AUTREC
LAST THRESHOLD EXCEEDED - CRIT
OPERATOR NOTIFIED: N
LAST STATUS CHANGE DATE= 08/08/98 , TIME= 06:26 , OPID= AUTREC
LAST MONITORED DATE= 08/08/98 , TIME= 06:26
  ERROR COUNT      DATE      TIME
      01      12/03/98    21:56
      02      12/03/98    21:56
      03      12/15/98    23:30
      04      12/15/98    23:30
      05      12/15/98    23:31
      06      12/15/98    23:31
      07      01/21/99     07:17
      08      01/21/99     07:21
      09      01/25/99     08:08
      10      01/25/99     08:23
END OF MULTI-LINE MESSAGE GROUP

Command ==>
PF1=Help      PF2=End          PF3=Return      PF6=Ro11
                PF9=Refresh      PF12=Retrieve

```

Figure 70. DISPASF Command Response

How to Set or Change Error Thresholds

You can set or change thresholds for a resource, the resource group defaults, or the system defaults using the INGTHRES command dialog.

1. Follow the instructions in “How to Display Threshold Settings for a Selected Resource - DISPTHRS” on page 168 to specify the resource for which you want to set thresholds and to access the INGTHRES command dialog.
2. To change the Critical, Frequent, or Infrequent thresholds, type the number of errors and specify the time period.

Communicating with Other Systems

This chapter discusses the following topics:

- “Sending Commands within a Sysplex”
- “Terminal Access Facility Full-Screen Sessions” on page 178
- “Gateway Sessions” on page 180

Sending Commands within a Sysplex

This section informs you about the prerequisites for communicating with systems

- within a sysplex; this scenario is called *single system image*.
- within your complete enterprise; this scenario is called *single point of control for the enterprise*.

There is also a series of commands that are directly processed by the automation manager of a sysplex. For these commands, you need no target parameter. You can retrieve sysplexwide information, such as the statuses of resources within the sysplex. For a complete list of sysplexwide commands, refer to the *System Automation for OS/390 Operator's Commands*.

You can use a system within the sysplex to monitor and manipulate all other systems in the sysplex. Then each system in the sysplex looks like the one you are currently working on (single system image).

If your system is the focal point system, you can use it to manipulate all resources of your enterprise from this focal point system issuing NetView commands. The target systems need not be members of your sysplex (single point of control).

To exploit these features, the following prerequisites and conditions need to be fulfilled:

- The target system is within the local sysplex (this is valid for single system image) or the target system has a direct gateway connection with the local system (this is valid for single point of control).

The following prerequisites need to be fulfilled for both cases:

- The target has SA OS/390 release 3 or higher installed.
- The target is active.
- SA OS/390 on the target has been fully initialized.
- The target can either be reached by XCF or by RMTCMD.

SA OS/390 will search your environment for the target system in the following order:

- system name within the local sysplex
- domain ID within the local sysplex
- local sysplex name
- domain ID within the enterprise
- system name within the enterprise
- sysplex name within the enterprise

You have several choices as to how to route commands to other systems within the sysplex. These choices are described in the following subsections.

INGSEND

This will assist you in sending a command through either the SA OS/390 Gateways (this requires an NNT gateway to be established between the two systems and depends upon VTAM) or over a semi-shared RMTCMD session (this requires some configuration setup and depends upon VTAM).

1. Type **INGSEND** with no parameters on the command line of any NetView or system operations panel and you see the Command Routing panel:

```

AOFK2DG                      SA OS/390 -Operator Interface
                              ----- COMMAND ROUTING -----

      DOMAIN ID = IPUFM                      DATE = 10/06/97
      OPERATOR ID = LRM                      TIME = 17:34:25

      Response => YES                      Enter ACK, YES, NO or CORR

      Operid   => LRM                      Leave blank for default

      To       =>                          netid.luname if CRM = RMTCMD

      CRM      => RMTCMD                    Enter ROUTE or RMTCMD

      Corrwait => 10                        Only if CRM = RMTCMD

      Command  =>

Action ==>
PF1=Help  PF2=End  PF3=Return                      PF6=Ro11

```

2. Type RMTCMD in the command routing mechanism (CMR) field.
3. Fill out the other fields and press Enter. (For more information on the individual fields, refer to *System Automation for OS/390 Operator's Commands*).

Personal RMTCMD

You can use NetView native RMTCMD (this requires you to be defined upon the target system and depends upon VTAM).

MVS Route

This sends a command to OS/390 on your system, which then passes it onto the target system via OS/390s extended console services.

This interface can only be used to send MVS commands to the target system, but has the advantage that it does not depend upon VTAM. This means that it can be used to restart NetView or VTAM on the target system.

Single System Image and Single Point of Control

If the command you want to send is an SA OS/390 command and is supported by single system image (most of them are), you can just issue it, specifying the destination system as the target. This only requires that NetView be active on both systems - VTAM is not used.

The following example shows the usage of single system image to determine the status of APPL1 on every system within the sysplex (AOCA, AOCC, AOCD) and then to restart it on AOCC where it is BROKEN. All operations are carried out from the IPUFA system.

```
DISPSTAT APPL1,TARGET=*ALL
```

```

AOFKSTA5          SA OS/390 - Command Dialogs          Line 1 of 3
Domain ID = IPUFM ----- DISPSTAT -----          Date = 04/12/00
Operator ID = MIK                                     Time = 10:06:25
A ingauto B setstate C ingreq-stop D thresholds E explain F info G tree
H trigger I service J all children K children L all parents M parents
CMD RESOURCE      STATUS      SYSTEM      JOB NAME      A I S R D RS TYPE      Activity
-----
APPL1             AUTODOWN    AOCA        APPL1         Y Y Y Y Y Y TRANS      --none--
APPL1             DOWN        AOCB        APPL1         Y Y Y Y Y Y TRANS      --none--
APPL1             BROKEN      AOCC        APPL1         Y Y Y Y Y Y TRANS      --none--
APPL1             CTLDOWN     AOCD        APPL1         Y Y Y Y Y Y TRANS      --none--

Command ==>
PF1=Help    PF2=End    PF3=Return  PF4=INGLIST  PF5=Filters  PF6=Roll
PF8=Forward  PF9=Refresh PF10=Previous PF11=Next    PF12=Retrieve

```

Enter B against APPL1 on AOCC and press enter.

```

AOFKSAST          SA OS/390 - Command Dialogs          Date = 04/12/00
Domain ID = IPUFM ----- SETSTATE -----          Time = 10:16:32
Operator ID = MIK

Specify subsystem and new state:

Subsystem => APPL1      Subsystem to be processed
System   => AOCC        System name, domain ID, sysplex name or *ALL
State    =>              Put subsystem in the following state:
                        (RESTART / AUTODOWN / CTLDOWN / UP / ENDED /
                        MOVED)

Scope    => ONLY        Change state for:
                        ONLY   - only this subsystem
                        CHILDREN - only dependant subsystems
                        ALL    - resource and dependants

Start    => NO          Start or restart subsystem now (YES/NO)
Override => NO          Override(Start=YES) (NO/FLG/TRG/SVP/EVT/ALL)

Command ==>
PF1=Help    PF2=End    PF3=Return          PF6=Roll
PF12=Retrieve

```

Complete the command parameters (STATE=RESTART, START=YES) and press ENTER to issue the command. It will be sent to the target system and executed.

Route a Command with a Gateway Session

1. Determine if the session or path you want to use is active. Use the DISPGW command and look at the Status field.
2. Type INGSSEND command with no parameters on the command line of any NetView or system operations panel and you see the Command Routing panel.
3. Type ROUTE in the CMR field on the Command Routing panel.
4. Fill out the other fields and press Enter. For further information on the individual fields, refer to *System Automation for OS/390 Operator's Commands*.

Cross-Domain Sessions

Cross-domain sessions let you send commands to other domains using NetView RMTCMD, gateways, Terminal Access Facility (TAF), or NetView-NetView task (NNT) sessions. To display cross domain sessions, from the NetView command line, type AOC to invoke the SA OS/390 main menu. From the SA OS/390 main menu, type 1 (Operator Interface) and press the Enter key. You see the *Main Operator Menu*. On the command line, type 1 (CROSS DOMAIN) and press the

Enter key. You see the *Cross Domain Menu*. From this menu you can display cross-domain sessions.

```

A0FK2D                SA OS/390 - Operator Interface
                   ----- COMMAND DOMAIN MENU -----

      DOMAIN ID   = IPUFM                DATE = 03/06/00
      OPERATOR ID = HUT                  TIME = 15:36:51

Select:

1   Cross Domain - Enter Cross Domain Commands using NNT Sessions
2   Cross Domain - Enter Cross Domain Commands using INGSND
3   Cross Domain - Enter Cross Domain Commands using TAF Sessions

```

NetView-NetView Task Sessions: You can use the Cross Domain Entry Menu to display a list of the NetView-NetView task (NNT) sessions defined for an operator ID using the customization dialog and to determine the status of each session. You can also route commands to other systems using this panel.

To access the *Cross Domain Entry Menu*, from the NetView command line, type **Oper**. You see the Main Operator Menu. Type **1**. You see the Cross Domain Menu. Type **1**.

You see the Cross Domain Entry Menu, which shows the current status of the NNT sessions defined in the customization dialog. If no NNT sessions are defined for your operator ID you will see a line mode message A0F041I UNABLE TO FIND ENTRIES FOR NNTS. Press PF1 to obtain information on the status conditions shown.

```

A0FK2DC                SA OS/390 - Operator Interface                Page 1    of 1
                   ----- CROSS DOMAIN ENTRY MENU -----

      DOMAIN ID   = IPUFM                = 07/04/96
      OPERATOR ID = NETOP1              TIME = 11:00:30

SEL #   DESCRIPTION                DOMAIN ID   LOGONID   STATUS
-----
1   Network Concentrator A        A0F01     OPER1     INACTIVE
2   Primary CICS Service         A0F02     NETOP1    ACTIVE
3   Development Machine          A0F03     OPER1     ACTIVE

To initiate/terminate a session enter I/T plus a selection number (no blanks).
To send a command enter / plus the selection number (no spaces) and command.

Action ==>
PF1= Help  PF2= End  PF3= Return
PF6= Roll                                     PF12=Retrieve

```

Figure 71. Using the Cross Domain Entry Menu Panel to Display NetView-NetView task Sessions

If you want to issue a command to another system, you first need to check the value in the Status field:

- If the value in the Status field is ACTIVE, you can issue the command. If the Status is INACTIVE, you need to activate the NNT session. To do this, type in *inumber* where *i* is the letter i, and *number* is the number of the session you want to activate. There is no space between the i and the number. Press the Enter key.
- Press PF1 to obtain information about the status shown and for suggestions on what you can do to activate your session.

To issue a command, type

/ number command

where */* is the slash key, *number* is the number of the NetView-NetView task session, and *command* is the command you want to send to that domain.

EXAMPLES

When you enter this panel, session 1 is the default. To initiate session 1, type *i*.

To send the NetView ACT AYAZ0027 command to session 2, you would type

/2 act ayaz0027.

Session 2 now becomes the default. To send another command to session 2, type */* followed by the command.

To terminate session 3, type *t3*.

Sending Commands to a Linux Target System

Use the ISQSEND command of processor operations to send a command to a Linux target system. The system previously must have been initialized successfully, using the ISQXIII command. In order to see the responses on the NetView screen, the command ISQXMON must have been used to add you to the interested operator list of the target system.

Since the Linux operating system handles commands case sensitive, you have to use the "netvasis" prefix. In the following example, the Linux command *ps -x* is issued to show Linux process related information. Note, that NetView suppresses the "netvasis" prefix when redisplaying the entered command.

```

NCCF                Tivoli Netview  IPVFJ TIL      05/28/01 15:19:09
* IPVFJ  ISQSEND FCLX2 OC PS -X
U IPVFJ  ISQ901I FCLX2 SC ISQ417I CMD STATUS(ACCEPTED)
U IPVFJ  ISQ901I FCLX2 OC PS -X
U IPVFJ  ISQ017I ISQSEND COMPLETED SUCCESSFULLY.
U IPVFJ  ISQ901I FCLX2 OC PID TTY STAT TIME COMMAND
U IPVFJ  ISQ901I FCLX2 OC 1 ? S 0:00 init
U IPVFJ  ISQ901I FCLX2 OC 2 ? SW 0:00 ckMCHECK!
U IPVFJ  ISQ901I FCLX2 OC 3 ? SW 0:00 ckeventd!
U IPVFJ  ISQ901I FCLX2 OC 4 ? SW 0:00 ckswapd!
U IPVFJ  ISQ901I FCLX2 OC 5 ? SW 0:00 ckreclaimd!
U IPVFJ  ISQ901I FCLX2 OC 6 ? SW 0:00 cbbdf flush!
U IPVFJ  ISQ901I FCLX2 OC 7 ? SW 0:00 ckupdated!
U IPVFJ  ISQ901I FCLX2 OC 306 ? SW 0:00 ckeventd!
U IPVFJ  ISQ901I FCLX2 OC 309 ? SW 0:00 ckeventd!
U IPVFJ  ISQ901I FCLX2 OC 312 ? SW 0:00 ckeventd!
U IPVFJ  ISQ901I FCLX2 OC 315 ? SW 0:00 ckeventd!
U IPVFJ  ISQ901I FCLX2 OC 436 ? SN 0:00 syslogd -M 0
U IPVFJ  ISQ901I FCLX2 OC 450 ? SN 0:00 klogd
U IPVFJ  ISQ901I FCLX2 OC 469 ? SN 0:00 crond
U IPVFJ  ISQ901I FCLX2 OC 488 ? SN 0:00 inetd
U IPVFJ  ISQ901I FCLX2 OC 507 ? SN 0:00 httpD
U IPVFJ  ISQ901I FCLX2 OC 554 console S 0:00 -bash
U IPVFJ  ISQ901I FCLX2 OC 603 console R 0:00 ps -X
U IPVFJ  ISQ901I FCLX2 OC  root@boe1nfc2 /root!#
-----
???
```

Figure 72. Sending a Command to a Linux Target System

Terminal Access Facility Full-Screen Sessions

The NetView terminal access facility (TAF) allows you to log on to multiple applications either on your system or other systems. *Tivoli NetView for OS/390 Automated Operations Network User's Guide* describes in detail how to use TAF.

SA OS/390 allows you to define TAF sessions in the customization dialog so that you do not have to set them up each time you want to use them. Refer to *System Automation for OS/390 Defining Automation Policy* for more details.

Determining the Status of TAF Full-Screen Sessions

Using the TAF Fullscreen Menu panel you can see the list of TAF full-screen sessions that have been defined to SA OS/390 for your operator ID, and determine which of these are active.

To see the list of TAF full-screen sessions available to you:

1. From the NetView command line, type **Oper**. You see the Main Operator Menu.
2. On the Selection line, type **1** (CROSS DOMAIN) and press the Enter key. You see the Cross Domain Menu.
3. On the Action line, type **3** and press the Enter key. You see the TAF Fullscreen Menu.

Note: If no TAF sessions are defined for your operator ID, you will see a line mode message

```
AOF041I UNABLE TO FIND FULL SESSION ENTRIES
```



```

AOFK2DF          SA OS/390 - Operator Interface          Page 1 of 1
          ----- TAF FULLSCREEN MENU -----

          DOMAIN ID = IPUFM          DATE = 11/06/97
          OPERATOR ID = OPER1        TIME = 17:25:34

SEL  DESCRIPTION      APPLID  SYSTEM      STATUS
---  -
  1   TSO              IPSFM   KEY3        ACTIVE
  2   IMS              IPSFN   KEY4        INACTIVE

Enter SELECTION NUMBER (plus a T to terminate session)

Action ==>
          PF1= Help  PF2= End  PF3= Return
          PF6= Roll

```

Figure 73. TAF Fullscreen Menu Panel

If the status is ACTIVE, the session has been started. If it is INACTIVE, you have to start the session before you can use it.

Managing TAF Full-Screen Sessions

You can start, resume, or end sessions from the TAF Fullscreen Menu panel.

Starting TAF Sessions: If the TAF session you want to use is inactive, you can start it from the TAF Fullscreen Menu. To do this:

1. On the Action line, type the number of the session you want and press the Enter key.
 For example, to start IMS, you type 2 and press the Enter key.
 The status changes to Active.
2. Log onto the application as you normally would.
 Refer to *Tivoli NetView for OS/390 Automated Operations Network User's Guide* for more information on using TAF.

Leaving TAF Sessions: There are two ways to leave a TAF session. You can:

- hit PF6. Note that PF6 is not available in your TAF session.
- hit PA1 and select a suspension option from the NetView TAF menu you are presented with. You can also end the TAF session from here.

Resuming TAF Sessions: If you have previously started a TAF session, you resume it using the TAF Fullscreen Menu panel. To do this:

On the Action line, type the number of the session you want to resume and press the Enter key.
 You return to a line mode display.

Ending TAF Sessions: You can also end a TAF session. This changes the session to INACTIVE. To do this:

1. On the Action line, type the number of the session you want to end followed by a space and t.
2. Press the Enter key.
 The status changes to INACTIVE.
 For example, to end the TSO session, you type 1 t and press the Enter key.

Note: You must customize the NetView command list CNME1001 (BFSESS) to your required LU prefix as it is currently defined to TAF.

Gateway Sessions

In SA OS/390 you can monitor other systems and issue commands to those systems using gateway sessions. Gateway sessions are NetView-NetView task (OST/NNT) sessions that SA OS/390 establishes and maintains for you, according to information you supply in the customization dialog.

Gateways are useful because they:

- save you the step of logging on to the NetView on the other system
- let you communicate with another system even if you do not have an ID for that system
- can provide a second NetView session with a system if you have an ID for that system.

SA OS/390 provides several panels that let you check your communication links with other systems and send commands to those systems. You can:

- determine the status of gateway sessions.
- determine the status of paths. A path uses an intermediate system to connect two systems that are not directly linked.
- issue commands to other systems using gateway sessions.

Determining the Status of Gateway Sessions

You can determine which gateway sessions have been defined and see which of these are active. You may want to do this if you use SDF to monitor other systems, since SDF uses gateway sessions to receive information from remote systems.

You also need to check the status of a gateway session if you want to receive notification messages from other systems. (Notification messages are messages that document significant actions that SA OS/390 has detected or taken.) Finally, you need to check the status of a gateway session if you want to issue a command to another system using a gateway session.

You can obtain information on gateway sessions from the Gateway Display panel or from SDF, if SDF has been customized to do this.

To access the Gateway Display panel, type DISPGW from any command line and press the ENTER key.

```
AOFK2GL                      SA OS/390 - Command Dialogs          Line 1 of 6
Domain ID = IPUFM             ----- DISPGW -----          Date = 11/04/97
Operator ID = LRM                                     Time = 09:38:06
      System = KEY3                                     Focal Point = IPSFM
Domain  Sdfroot      Status   Description
-----
IPSFN   KEY4         ACTIVE   Gateway to target key4
IPSF0   KEY5         ACTIVE   Gateway to target key5
IPSF6   KEY6         ACTIVE   Gateway to target KEY6
IPUFK   AOC7         NOT STARTD Gateway to target AOC5
IPUFM   AOC7         ACTIVE   Gateway to target AOC7
IPVFH   TSCF2        ACTIVE   Gateway to target TSCF2
```

For further information on the DISPGW command refer to the *System Automation for OS/390 Operator's Commands*.

Chapter 8. Scenario: Finding out Why a Resource is not Available

For most operators, the key resource to be monitored is the application. You want to be sure that your enterprise's critical jobs and subsystems are getting the service they require and are operating satisfactorily. The scenario contained in this chapter gives you a general idea of how to use SA OS/390 commands to discover and react to problems affecting your important applications.

So imagine the following scenario:

You get a phone call from one of your users: Resource **MSCSK1** is not available. Please find out why and start it!

Now here are the steps you perform to make the resource available:

1. Use the INGLIST command to find out details (especially the status information) about resource **MSCSK1**. As you know the name of the resource, you can issue the command as follows on your NetView console:
INGLIST MSCSK1
2. Suppose you get an output screen as shown in Figure 74, which shows that the compound status for **MSCSK1** is **SATISFACTORY** which results from the fact that the observed status **SOFTDOWN** fulfills the desired status (**UNAVAILABLE**). However, you wonder why is the desired status **UNAVAILABLE** even though you and your user expected it to be available. This needs further investigation.

```
INGKYST0          SA OS/390 - Command Dialogs          Line 1 of 1
Domain ID = IPUFM  ----- INGLIST -----          Date = 05/09/00
Operator ID = MSCCH          Sysplex = AOC9PLEX          Time = 14:10:36
CMD: A Update      B Start      C Stop      D INGRELS      E INGVOTE      F INGINFO
      G Members      H DISPTRG      I INGSCHED      J INGGROUP          / scroll
CMD Name          Type System      Compound      Desired      Observed      Nature
-----
E MSCSK1          APL AOC9          SATISFACTORY UNAVAILABLE SOFTDOWN

Which
votes are
involved?

Command ==>
PF1=Help      PF2=End      PF3=Return      PF4=DISPSTAT      PF5=Filters      PF6=Roll
PF9=Refresh      PF10=Previous      PF11=Next      PF12=Retrieve
```

Figure 74. INGLIST Output

3. To find out the votes that unexpectedly caused the resource to be unavailable (SOFTDOWN), you enter action code **E** into the **CMD** column next to the resource *MSCSK1* in the INGLIST command dialog panel as indicated in Figure 74 on page 181.
4. This will lead you to the INGVOTE command dialog as shown in Figure 75. From this panel you can see that there has been an operator request (MakeUnAvailable) with highest priority (hex 005A0000) to stop the resource; this has obviously been satisfied.

```

INGKYRQ0          SA OS/390 - Command Dialogs          Line 1 of 4
Domain ID = IPUFM  ----- INGVOTE -----          Date = 05/09/00
Operator ID = MSCH          Sysplex = AOC9PLEX          Time = 14:13:14

Resource ==> MSCSK1/APL/AOC9
System ==>          System name, domain id or sysplex name

Cmd: C cancel request  K Kill request  S show request details
Cmd Action WIN Request/Vote Data
-----
C   STOP   Y Request   : MakeUnAvailable
          Originator : OPERATOR(MSCH)
          Priority   : 005A0000   Must Be Down - Operator
          Status    : Winning/Satisfied

Command ==>
PF1=Help      PF2=End          PF3=Return      PF6=Roll
              PF9=Refresh      PF12=Retrieve

```

Figure 75. INGVOTE Output

5. As this request is persistent and can only be beaten by any other request with priority **FORCE**, you must cancel it to allow the resource to become available again. (The request obviously stems from an operator's INGREQ command with high priority which is the strongest request you can issue with SA OS/390, see also "Automation Concepts" on page 17 for the documentation of the hierarchy of requests). Therefore you enter action code **C** into the **CMD** column next to the request as indicated in Figure 75.
6. On the INGVOTE command dialog, you will see the confirmation that the request has been cancelled. Now press PF3 to go back to the INGLIST command dialog and press the PF9 key to refresh the information shown for resource *MSCSK1*. Let us assume you see the output as shown in Figure 76 on page 183.

```

INGKYST0          SA OS/390 - Command Dialogs          Line 1 of 1
Domain ID = IPUFM ----- INGLIST -----          Date = 05/09/00
Operator ID = MSCH          Sysplex = AOC9PLEX          Time = 14:16:00
CMD: A Update   B Start   C Stop   D INGRELS   E INGVOTE   F INGINFO
      G Members   H DISPTRG I INGSCHED J INGGROUP          / scroll
CMD Name      Type System   Compound   Desired   Observed   Nature
-----
F  MSCSK1     APL AOC9     AWAITING  AVAILABLE  SOFTDOWN

                                Refresh INGLIST
                                status with PF9

Command ==>
PF1=Help   PF2=End   PF3=Return PF4=DISPSTAT PF5=Filters PF6=Ro11
PF9=Refresh PF10=Previous PF11=Next PF12=Retrieve

```

Figure 76. Refreshed INGVOTE Output

What you now see is that the compound status for *MSCSK1* is **AWAITING** (awaiting automation) and the observed status is still **SOFTDOWN** which is not exactly what you might have wanted or expected. You want observed and desired status to be **AVAILABLE**. There must be something else that inhibits this. Maybe there are dependency relationships to supporting resources that are not fulfilled.

7. You now use INGINFO (action code F) to display more information about why *MSCSK1* is still awaiting automation. Scroll down the INGINFO output panel until you reach a panel similar to the one shown in Figure 77.

```

INGKYIN0          SA OS/390 - Command Dialogs          Line 29 of 145
Domain ID = IPUFM ----- INGINFO -----          Date = 05/09/00
Operator ID = MSCH          Sysplex = AOC9PLEX          Time = 14:17:37

Resource ==> MSCSK1/APL/AOC9          format: name/type/system
System ==>          System name, domain ID or sysplex name

Schedule          : -None-

Backward Relationships :
AOC9/SYG/AOC9          HasMember

Forward Relationships :
MSCSK2/APL/AOC9          HasParent
NETVIEW/APL/AOC9          HasParent

Requests          :

Votes             :

Command ==>
PF1=Help   PF2=End   PF3=Return PF4=DISPINFO          PF6=Ro11
PF7=Back   PF8=Forward PF9=Refresh          PF12=Retrieve

```

Figure 77. INGINFO Output

From this output panel you find out that *MSCSK1* has a *HasParent* dependency on the supporting resource *MSCSK2/APL/AOC9*.

Figure 78 illustrates the current situation as you have investigated it until now using the various commands: An operator has made *MSCSK1* unavailable by issuing a *SOFTDOWN* request. *MSCSK1* is dependent upon *MSCSK2*.

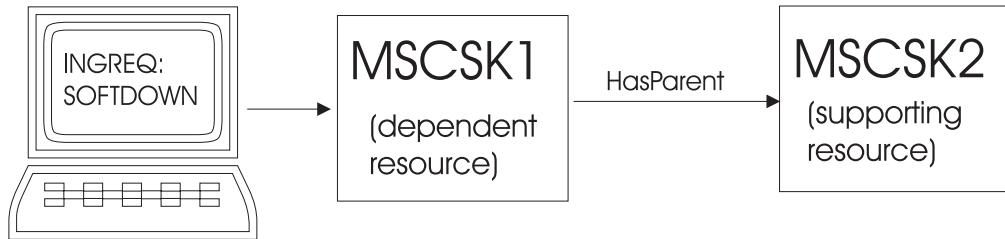


Figure 78. Current Automation Situation

8. You now need to find out more about *MSCSK2*. To do this, proceed as in step 1 on page 181 using the *INGLIST* command:

```
INGLIST MSCSK*
```

You may get an output similar to the one shown in Figure 79

```

INGKYST0                SA OS/390 - Command Dialogs                Line 1    of 2
Domain ID = IPUFM        ----- INGLIST -----                Date = 05/09/00
Operator ID = MSCH      Sysplex = AOC9PLEX                    Time = 14:19:32
CMD: A Update          B Start          C Stop           D INGREL          E INGVOTE         F INGINFO
   G Members          H DISPTRG         I INGSCHED        J INGGROUP
CMD Name              Type System      Compound          Desired          Observed         Nature
-----
MSCSK1                APL  AOC9         AWAITING          AVAILABLE         SOFTDOWN
E  MSCSK2                APL  AOC9         SATISFACTORY      UNAVAILABLE       SOFTDOWN

Which
votes are
involved?

Command ==>
PF1=Help   PF2=End       PF3=Return  PF4=DISPSTAT  PF5=Filters   PF6=Roll
PF9=Refresh PF10=Previous PF11=Next   PF12=Retrieve

```

Figure 79. *INGLIST* Output for *MSCSK** Resources

This panel informs you that *MSCSK2* is also not available (observed status is *SOFTDOWN*), and that this even conforms to its desired status. This is obviously not what you want, so now you must find out the reason for this.

9. As in step 3 on page 182, you use action code **E** to find out the votes that unexpectedly caused the *MSCSK2* resource to be unavailable (*SOFTDOWN*). *SA OS/390* might display a panel like shown in Figure 80 on page 185.

```

INGKYRQ0          SA OS/390 - Command Dialogs          Line 1 of 4
Domain ID = IPUFM  ----- INGVOTE -----           Date = 05/09/00
Operator ID = MSCH          Sysplex = AOC9PLEX         Time = 14:20:43

Resource ==> MSCSK2/APL/AOC9
System ==>          System name, domain id or sysplex name

Cmd: C cancel request  K Kill request  S show request details
Cmd Action WIN Request/Vote Data
-----
STOP  Y Request   : MakeUnAvailable_Only
        Originator : SCHEDULE
        Priority    : 00520000      Must Be Down - Schedule
        Status     : Winning/Satisfied

Command ==>
PF1=Help      PF2=End          PF3=Return      PF6=Roll
PF9=Refresh   PF12=Retrieve

```

Figure 80. INGVOTE Output for MSCSK2

From this panel you can see that there has been a request (MakeUnAvailable) generated by a service period (SCHEDULE) to stop the resource MSCSK2. This obviously has been satisfied.

- To find out more about the service period defined for MSCSK2, on the INGLIST panel, type action code I into the **CMD** column next to MSCSK2. Suppose, you see a display as shown in Figure 81 on page 186. From this figure, you can see that the resource MSCSK2/APL/AOC9 is scheduled with high priority to be down on Tuesdays between 14:10 PM and 16:00 PM and that the current time is 14:21:50, which is actually within the requested down-time (and indeed, the indicated date of 05/09/00 was a Tuesday).

```

INGKYSP2          SA OS/390 - Command Dialogs
Domain ID   = IPUFM   ----- INGSCHED -----   Date = 05/09/00
Operator ID = MSCH    Sysplex = AOC9PLEX          Time = 14:21:50

Resource . . . : MSCSK2/APL/AOC9          Schedule . . . : MSCSCED8
Starting date => 05 / 09 / 2000          (mm/dd/yyyy)

C Date          Pri  Strt/Stop  Strt/Stop  Strt/Stop  Strt/Stop  Strt/Stop
-----
05/09/00 Tue UP  H   1320 1340  1400 1402
                   DN  H   1300 1319  1341 1359   1410 1600
05/10/00 Wed UP  H   1320 1340  1400 1402
                   DN  H   1300 1319  1341 1359
05/11/00 Thu UP  H   1320 1340  1400 1402
                   DN  H   1300 1319  1341 1359
05/12/00 Fri UP  H   1320 1340  1400 1402
                   DN  H   1300 1319  1341 1359
05/13/00 Sat UP  H   1320 1340  1400 1420  1500 1520  1540 1600  1640 2359
                   DN  H   1300 1319  1341 1359  1440 1459  1521 1539  1620 1639

Command ==>
PF1=Help      PF2=End      PF3=Return      PF6=Roll
PF7=Backward  PF8=Forward    PF9=Refresh     PF12=Retrieve

```

Figure 81. INGSCHED for MSCSK2

- To allow automation to make the MSCSK2 available and keep it available for the rest of the day, you could now specify an additional up-time schedule for Tuesdays, starting from now (14:26 PM) until midnight (24:00) as shown in Figure 82 on page 187. This method is called a schedule override (as it overrides a schedule defined by automation policy).

Note: Schedule overrides done by INGSCHED are permanent.


```

INGKYSP2          SA OS/390 - Command Dialogs
Domain ID = IPUFM ----- INGSCHED ----- Date = 05/09/00
Operator ID = MSCH Sysplex = AOC9PLEX Time = 14:25:18

Resource . . . : MSCSK2/APL/AOC9 Schedule . . . : MSCSCED8
Starting date => 05 / 09 / 2000 (mm/dd/yyyy)

C Date          Pri Strt/Stop Strt/Stop Strt/Stop Strt/Stop Strt/Stop
-----
05/09/00 Tue UP H 1320 1340 1400 1402 1426 2400
                   DN H 1300 1319 1341 1359 1410 1426
05/10/00 Wed UP H 1320 1340 1400 1402
                   DN H 1300 1319 1341 1359
05/11/00 Thu UP H 1320 1340 1400 1402
                   DN H 1300 1319 1341 1359
05/12/00 Fri UP H 1320 1340 1400 1402
                   DN H 1300 1319 1341 1359
05/13/00 Sat UP H 1320 1340 1400 1420 1500 1520 1540 1600 1640 2359
                   DN H 1300 1319 1341 1359 1440 1459 1521 1539 1620 1639

AOF099I FUNCTION SUCCESSFULLY COMPLETED
Command ==>
PF1=Help PF2=End PF3=Return PF6=Ro11
PF7=Backward PF8=Forward PF9=Refresh PF12=Retrieve

```

Figure 82. Schedule Override for MSCSK2

- Now with PF3, go back to the INGLIST command dialog and press PF9 to see if any changes have occurred. From Figure 83 you can see that MSCSK2 is now available, but MSCSK1 is still SOFTDOWN, AWAITING automation.

```

INGKYST0          SA OS/390 - Command Dialogs Line 1 of 2
Domain ID = IPUFM ----- INGLIST ----- Date = 05/09/00
Operator ID = MSCH Sysplex = AOC9PLEX Time = 14:26:23
CMD: A Update B Start C Stop D INGRELS E INGVOTE F INGINFO
      G Members H DISPTRG I INGSCHED J INGGROUP / scroll
CMD Name Type System Compound Desired Observed Nature
-----
MSCSK1 APL AOC9 AWAITING AVAILABLE SOFTDOWN
MSCSK2 APL AOC9 SATISFACTORY AVAILABLE AVAILABLE

Command ==>
PF1=Help PF2=End PF3=Return PF4=DISPSTAT PF5=Filters PF6=Ro11
PF9=Refresh PF10=Previous PF11=Next PF12=Retrieve

```

Figure 83. Refreshed INGLIST Output

As a consequence, you might suppose that for this resource, some automation flag inhibits startup or automation.

- So in a next step, you check the automation flags for MSCSK1. You can do this by scrolling the INGLIST output from Figure 83 to the right with PF11 until you reach a display similar to Figure 84 on page 188.

```

INGKYST0          SA OS/390 - Command Dialogs          Line 1 of 2
Domain ID = IPUFM ----- INGLIST -----          Date = 05/09/00
Operator ID = MSCH          Sysplex = AOC9PLEX          Time = 14:27:20
CMD: A Update   B Start   C Stop   D INGRELS   E INGVOTE   F INGINFO
      G Members   H DISPTRG   I INGSCHED   J INGGROUP   / scroll
CMD Name      Type System      Automation Startable   Auto Hold   Category
-----
MSCSK1       APL AOC9       IDLE       YES       YES NO
MSCSK2       APL AOC9       IDLE       YES       YES NO

Command ==>
PF1=Help    PF2=End    PF3=Return  PF4=DISPSTAT  PF5=Filters  PF6=Ro11
PF9=Refresh PF10=Previous PF11=Next   PF12=Retrieve

```

Figure 84. Checking Automation Flags with INGLIST

However, the result shows that *MSCSK1* is startable and automation is allowed for it (*Auto=YES* and *Hold=NO*). So what else can be the reason that prevents *MSCSK1* from starting?

14. You probably guessed right: there might be a trigger for *MSCSK1* with the events for its startup condition not set, thus preventing the resource from starting. Scroll horizontally in your current INGLIST output until you see the column **Trigger** as shown in Figure 85.

Note: The DISPSTAT command cannot be used as it only displays service periods and triggers from downlevel SA OS/390 systems.

```

INGKYST0          SA OS/390 - Command Dialogs          Line 1 of 2
Domain ID = IPUFM ----- INGLIST -----          Date = 05/09/00
Operator ID = MSCH          Sysplex = AOC9PLEX          Time = 14:28:33
CMD: A Update   B Start   C Stop   D INGRELS   E INGVOTE   F INGINFO
      G Members   H DISPTRG   I INGSCHED   J INGGROUP   / scroll
CMD Name      Type System      Starttype Stoptype   Trigger   Schedule
-----
MSCSK1       APL AOC9              MSCTRG1
MSCSK2       APL AOC9              MSCSCED8

Command ==>
PF1=Help    PF2=End    PF3=Return  PF4=DISPSTAT  PF5=Filters  PF6=Ro11
PF9=Refresh PF10=Previous PF11=Next   PF12=Retrieve

```

Figure 85. Checking Triggers with INGLIST

From this panel, you see that indeed, a trigger *MSCTRG1* is connected to *MSCSK1*.

Now let us have a look at Figure 86 on page 189 to see the automation scenario for resource *MSCSK1*:

- *MSCSK1* is dependent upon *MSCSK2*. So *MSCSK2* must be up before *MSCSK1* can be started.
- Availability of *MSCSK2* is controlled by a schedule. So the time of day must be within one of the up-time schedules defined for this resource.
- *MSCSK1* has a connected trigger. On top of all the other prerequisites for starting this resource, at least one startup condition for that trigger must be fulfilled to make this resource available.

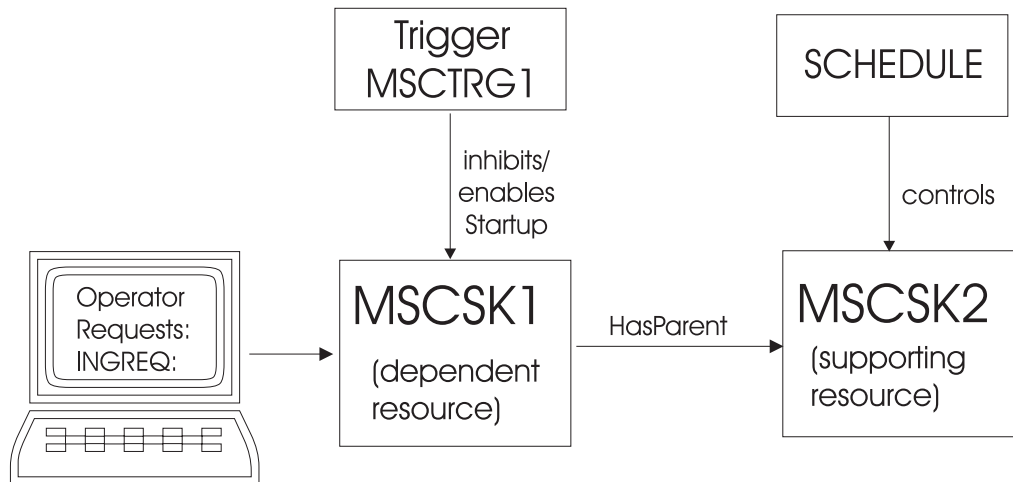


Figure 86. Complete Automation Environment for MSCSK1

- Now in this step, you will check the startup conditions for trigger *MSCTRG1*. You achieve this by entering action code **H** (for **DISPTRG**) into the **CMD** column next to *MSCSK1*. This will display triggers and their events for the selected resource. In this scenario, we get the **DISPTRG** output shown in Figure 87.

```

AOFLT000          SA OS/390 - Command Dialogs          Line 1 of 2
Domain ID = IPUFM  ----- DISPTRG -----          Date = 05/09/00
Operator ID = MSCH          System = AOC9              Time = 14:29:47

Resource ==> MSCSK1/APL/AOC9
System ==>          System name, domain id or sysplex name
Trigger. . . : MSCTRG1          Observed status : SOFTDOWN

Cmd: S show details
Cmd Type      Events
-----
S  STARTUP   MSCEVTUP
   SHUTDOWN  MSCEVTDN

Command ==>
PF1=Help      PF2=End          PF3=Return      PF6=Roll
               PF9=Refresh      PF12=Retrieve
  
```

Figure 87. *DISPTRG* Command Dialog

In this output, you can see that trigger *MSCTRG1* has a startup condition, which will be fulfilled if event *MSCEVTUP* is set. This is what you need to find out in the next step.

- To see more details about an event (or about the condition), type action code **S** into the **CMD** column next to the startup condition (event *MSCEVTUP*). This produces the following output:

```

AOFLT100          SA OS/390 - Command Dialogs      Line 1 of 1
Domain ID = IPUFM  --- Trigger Condition List ---- Date = 05/09/00
Operator ID = MSCH          System = AOC9          Time = 14:30:46

Trigger . . . . : MSCTRG1
Condition type. : STARTUP
Resource. . . . : MSCSK1/APL/AOC9          Observed status : SOFTDOWN

Cmd: D show resources  S set event for resource  U unset event for resource
Cmd Event  Status      Unset  Description
-----
S  MSCEVTUP  UNSET    UP    scheduling test event UP

Command ==>
PF1=Help    PF2=End      PF3=Return   PF6=Roll
              PF9=Refresh  PF12=Retrieve

```

Figure 88. Trigger Condition List

17. From Figure 88, we see at a glance that the event *MSCEVTUP* is not set (column **Status** contains UNSET). By typing action code **S** (set event for resource) into the **CMD** column next to the event *MSCEVTUP*, you now set this event to fulfill the startup condition for trigger *MSCTRG1*, thus allowing resource *MSCSK1* to start.

By magic, SA OS/390 will now put your environment into the status you desired.

After a few minutes, you should be able to verify this. Go back to the INGLIST command dialog for both resources involved (INGLIST MSCSK*):

```

INGKYST0          SA OS/390 - Command Dialogs      Line 1 of 2
Domain ID = IPUFM  ----- INGLIST ----- Date = 05/09/00
Operator ID = MSCH          Sysplex = AOC9PLEX          Time = 14:32:52
CMD: A Update      B Start      C Stop      D INGRELS  E INGVOTE  F INGINFO
      G Members    H DISPTRG  I INGSCHED  J INGGROUP / scroll
CMD Name          Type System  Compound   Desired   Observed  Nature
-----
MSCSK1           APL AOC9    SATISFACTORY AVAILABLE AVAILABLE
MSCSK2           APL AOC9    SATISFACTORY AVAILABLE AVAILABLE

Command ==>
PF1=Help    PF2=End      PF3=Return  PF4=DISPSTAT  PF5=Filters  PF6=Roll
              PF9=Refresh  PF10=Previous PF11=Next     PF12=Retrieve

```

Figure 89. Verifying Automation Status

Now you see that both resources have AVAILABLE for the observed and desired status which is SATISFACTORY for SA OS/390 as the compound status and, hopefully, for you , too.

Chapter 9. Using I/O Operations

I/O operations is a highly flexible connection environment that expands the distance for channel and control unit communication.

You can use the SA OS/390 I/O operations component:

- to get a single point of logical control for managing connectivity in your active I/O configurations.
- to have information presented on the operator console from which you issue a command or from the I/O Operations ISPF dialog. You can also use the I/O operations application program interface (API) to get information via a user-written call.
- as a tool for automating these I/O configurations. I/O operations takes an active role in detecting unusual conditions and lets you view and change paths between a processor and an I/O device, using dynamic switching (the ESCON director).

To fulfil the tasks of managing and automating I/O configurations, various commands are available, like for example, a command to define a dynamic connection between ports, commands to block or permit data transfer through ports or a series of commands to display I/O configuration information.

You can issue these commands either through the ISPF dialog (see “Appendix C. Using the I/O Operations ISPF Dialog” on page 277) or from the operator console.

More features of the I/O operations are, for example:

- For an I/O resource that passes through a dynamic switch, I/O operations can detect and report several types of I/O configuration mismatches. It reports these mismatches when the program is started or when the configuration is dynamically reconfigured.
- You can use I/O operations as a single point of control:

I/O operations lets you change the connectivity of I/O resources. From any one system where I/O operations is running, you may affect the I/O connectivity of a target system on which I/O operations is also operating, thereby providing a single point of control.

I/O operations performs these functions when you enter, or send, one of its connectivity commands to one of the hosts on which the program is running. That host issues the commands to the affected hosts. The hosts that can be affected by the command depend on several factors, including the domain of the issuing host.

With the feature of a single point of control, you can:

- remove the dependency on a dynamic switch
- manage the devices across hosts; that is, you can vary devices on or off
- remove and restore channel paths among system images and have the pathing status automatically adjusted
- manage switchable paths in a system-integrated manner

With I/O operations, you can display and control the following I/O resources:

- **Channels** of the following types:
 - ESCON channels

- Parallel channels
- Coupling facility channels
- *Dynamic switches*, such as the ESCON Directors
- *Ports*, which are the interfaces on a dynamic switch
- *Control units*
- *I/O devices*
- and other objects

Making Connectivity Changes

With I/O operations you can easily perform the following connectivity changes:

- Remove and restore channel paths: These commands not only instruct OS/390 to reconfigure a CHPID, they also issue the appropriate vary path requests. In these commands, you can specify any CHPID that is defined to one of the hosts in the issuing host's group. The CHPID can be either switchable or point-to-point, ESCON or parallel.
- Remove and restore devices: These commands allow you to remove one, a range, or an array of devices from - and restore them to - one or an array of hosts in a group. These commands therefore expand the capabilities of the analogous Vary Device system commands, so that devices can be varied across system images—all within the issuing host's group.
- Use switching commands, like:
 - Commands that affect only ports
 - Remove Switch
 - Restore Switch
 - Commands that define a chained path and remove these definitions

Display Commands To Obtain Data About I/O Resources

With such commands, you can for example, retrieve data about one or all channels (CHPIDs) defined to the host image on which the command was issued. Or you can retrieve data about one, a range, or all the devices and their paths defined to the host image. You can also display data about the addressable port(s) on one or all switches allocated, or attached, to the issuing host.

Examples for this category of commands are:

- DISPLAY CHP
- DISPLAY DEVICE
- DISPLAY PORT
- DISPLAY RESULTS

Connectivity Commands That Affect a Switch

With commands of this category you can for example permit or prohibit dynamic communication between two specified ports or between one port and all other ports on the same switch or the same ports on all the switches allocated to, or attached to, the issuing host.

Or, you can establish or remove a static, or dedicated, connection between two ports on the same switch or the same two ports on all the switches allocated to, or attached to, the issuing host.

Examples for this category of commands are:

- ALLOW
- PROHIBIT
- CONNECT
- DISCONNECT
- BLOCK
- UNBLOCK
- CHAIN
- UNCHAIN

Display and Utility Commands Related to Connectivity Commands

With commands of this category you can for example display the specified number or all of failed vary path requests as a result of the last connectivity command.

Or you can build a list of the vary path requests that would be needed to synchronize path status with the physical settings of the specified switch.

You can also display or reset the number of seconds that the issuing hosts (I/O operations) will wait to receive votes from the I/O operations that from its voting set.

Examples for this category of commands are:

- DISPLAY VARY
- SYNC SWITCH
- RESET HOST
- DISPLAY TIMEOUT
- RESET TIMEOUT

Utility Commands for General Processing

With such commands, you can for example, acquire or release exclusive control of I/O operations command processing for a specified user ID.

Or you can instruct the switch(es) to send their log data to the host on which the issuing I/O operations is running.

Another usage of such a command would be to ensure that the issuing I/O operations's configuration map is correlated with the active configuration on the switch(es).

Examples for this category of commands are:

- GETLOCK
- UNLOCK
- LOGREC
- RESET SWITCH

Using the I/O Operations ISPF Dialog

A set of REXX EXECs is shipped with SA OS/390 that – when installed as the I/O operations Interactive System Productivity Facility (ISPF) dialog – offers you a simple way to enter the same commands to I/O operations that you can enter at an OS/390 operator console.

In addition to entering I/O operations commands, you can create entire switch configurations, starting with the default matrix of switch ports that is shipped with the dialog.

Detailed information about the I/O operations ISPF dialog is included in “Appendix C. Using the I/O Operations ISPF Dialog” on page 277. The information in this section helps you get started using the dialog. For more information, refer to the online tutorial and online help panels supplied with the dialog.

Using the OS/390 Operator Console for I/O Operations Commands

Some I/O operations commands can be entered at the OS/390 operator console. To enter a command in the OS/390 environment, use the *Modify* command, which can be shortened to F. Specify the I/O operations procedure name that has been created as a member in your SYS1.PROCLIB. The member name for the procedure as supplied by SA OS/390 is *INGEIO*.

- If you did not append an OS/390 identifier to the Start command when I/O operations was started, the syntax is as follows:

```
/modiFy procname,I/O_operations_command
```

- If you did append an OS/390 identifier to the Start command when I/O operations was started, the syntax is as follows. (NOTE: if the SA OS/390 I/O operations component was started automatically by the automation supplied with SA OS/390, an identifier of "IO" was used by the Start command.)

```
/modiFy identifier,I/O_operations_command
```

For example, */F IO,D N CU.C00* ** instructs I/O operations to display names of, and salient data about, the port or ports that have been assigned names with the common character string 'CU.C00' on the dynamic switches allocated to the issuing instance of I/O operations.

The NetView program provides an OS/390 interface that allows a NetView REXX EXEC or an operator at a NetView console to issue OS/390 operator commands. For example, the following Display Switch command can be coded in a REXX EXEC or issued at a NetView console:

```
MVS /F IO,D S *
```

(The output of this Display Switch command is displayed on the NetView console, not the OS/390 operator console.)

When you use the NetView console to enter I/O operations commands, keep the following points in mind:

- Control authorization is not checked. The same I/O operations commands can be entered that can be entered at the OS/390 operator console.

- Commands can be entered from different consoles to the same system operator ID. You should, therefore, have a central point of control for I/O operations processing, especially for its connectivity and utility commands.

Part 3. Using SA OS/390 on Workstations

Chapter 10. Using the NetView Management Console for SA OS/390

The NetView Management Console (NMC) is a part of the NetView product and is used for monitoring network resources. As SA OS/390 is based on NetView, it also exploits the graphical capabilities of the NMC.

You can monitor and control your whole enterprise with the NMC. It is also possible to monitor your enterprise from a single workstation (single point of control). This is valid for system operations as well as for processor operations. For general information about the NMC see *NetView Management Console User's Guide*. This chapter only describes the extensions that have been added for monitoring SA OS/390 resources.

Introduction

The communication between SA OS/390 and the NMC is maintained by the SA OS/390 topology manager. An SA OS/390 topology agent on each target system retrieves the enterprise data from the automation manager. The SA OS/390 topology manager on the focal point provides the information into RODM. GMFHS takes care that the information in RODM is converted to graphical information on the NMC workstation. The following sketches the main tasks of the SA OS/390 topology manager for system operations. For processor operations, the mode of operation is similar.

At initialization time, the SA OS/390 topology manager retrieves SA OS/390 information for one or more sysplexes from the respective automation managers. To do that, it contacts an SA OS/390 topology agent that resides on a system within the sysplex to be monitored. The SA OS/390 topology agent obtains the information from the automation manager of the sysplex and passes it to the SA OS/390 topology manager. For down level SA OS/390 systems, the SA OS/390 topology manager acquires the information directly from the respective systems.

The retrieved information includes all resources, for example, applications (type APL), application groups (type APG), systems (SYS), and groups of systems (GRP) with their mutual dependencies, and relationships. The SA OS/390 topology manager stores these resources together with their dependency information within RODM.

The SA OS/390 topology manager calls BLDVIEWS to build the views that are necessary for these resources to be displayed on the NMC. The definitions for the views must be supplied by the users.

This process is illustrated in Figure 90 on page 200. The arrows with broken lines represent requests, those with solid lines stand for delivery of information. This figure shows an idealized system configuration. Any constellation of systems is supported according to the abilities of SA OS/390. For example, all components can be installed on a single system.

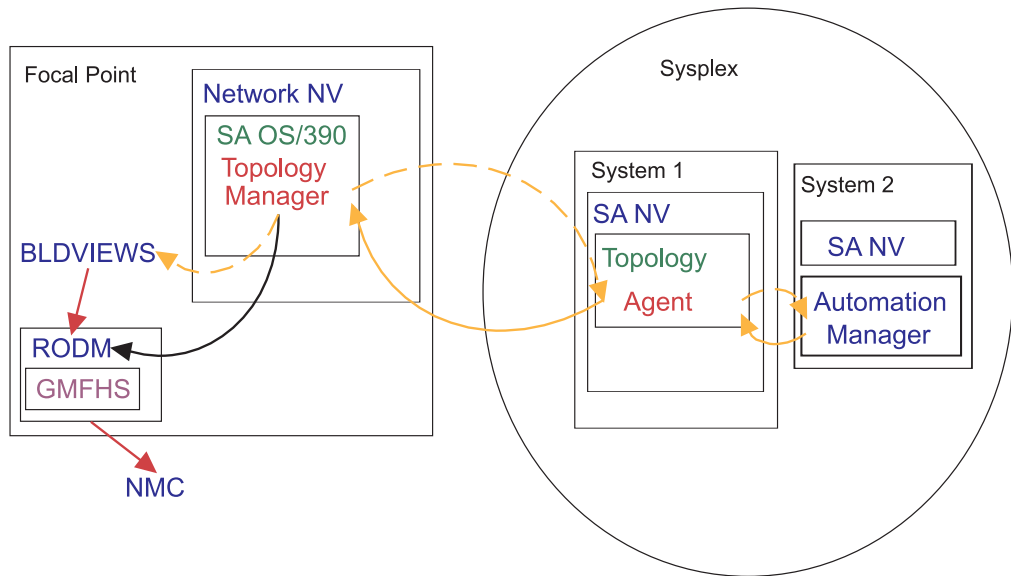


Figure 90. Topology Manager Overview

Note: In SA OS/390, a single system can be regarded as a special sysplex with one system only.

At runtime, the SA OS/390 topology manager performs the following tasks:

- It dynamically actualizes the NMC whenever the status of a displayed resource changes.
- It dynamically displays events like WTORs or tape mount requests on the NMC.
- Users can issue SA OS/390 commands from the NMC which the SA OS/390 topology manager routes to the appropriate system for processing.
- It resynchronizes its resource structure for one or more sysplexes with the respective automation managers. When this happens, the views affected by eventual changes are rebuilt.

Starting the NMC

Before you start the NMC, make sure that the following conditions are satisfied:

- The NMC server must be up and running and must be communicating with NetView.
- Before an NMC session can be initiated, you need to be logged on to NetView for the focal point system. However, you can also configure NetView in a way that you can skip this step. Then the NMC client itself will be initiating the session to NetView.
- In order to issue interactive commands (see “Interactive Commands” on page 210), you must have set up your NetView 3270 Management Console correctly. See *System Automation for OS/390 Planning and Installation* for details.

After you have started the NMC, the **Sign On** panel is displayed. Enter the user ID and the password in the respective fields. The user ID must be identical to that of an active NetView host session. In the **Host Machine** field you must enter the address of the NMC server. If you do not know the correct address, contact your system administrator.

When you have signed on successfully, the **Tivoli NetView for OS/390 Management Console** is displayed. The left part of that window contains the *Business Tree*. If you select a view from the *Business Tree*, it is displayed in the right part. The SA OS/390 views are descendants of the **Networking** view as shown in the following figure.

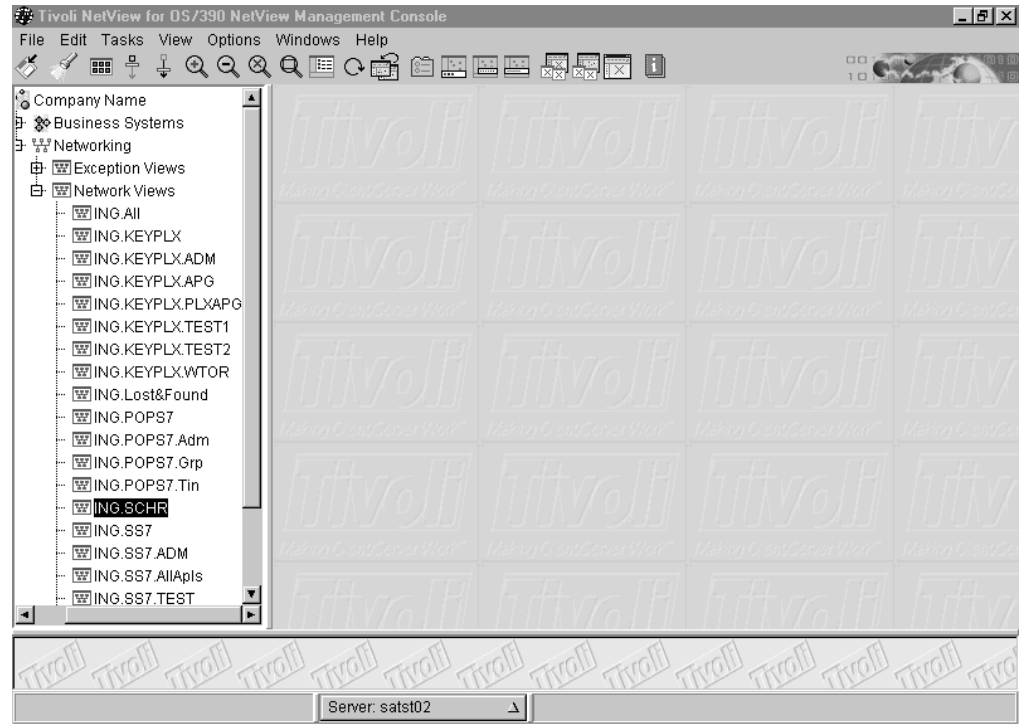


Figure 91. Tivoli NetView for OS/390 Management Console

Monitoring SA OS/390 on the NMC

On the NMC workstation, you can see the graphical visualization of what is automated in system operations and processor operations.

For system operations, the automation manager knows about the configuration of the sysplex and the resources running in it. The SA OS/390 topology manager communicates with these automation managers.

For processor operations, it is the processor operations focal point which knows about the processor operations configuration and therefore, the SA OS/390 topology manager communicates with it.

Besides the resource information retrieved from the automation managers, the SA OS/390 topology manager maintains SA OS/390 objects that have no counterpart within the automation manager. The following sections explain the representation of these two types of SA OS/390 resources on the NMC.

Regular Resources

SA OS/390 resources in RODM that also exist within the automation manager are called *regular*. For example, systems (SYS resource type), system groups (GRP), applications (APL), and application groups (APG) are regular resources. Figure 92 on page 202 shows a network view of regular resources.



Figure 92. Network View for Regular Resources

The members of a group are represented on the NMC by subviews. For instance, if you double click on the application group SS7.AOC7.APG.CICSGRPJSHIP of Figure 92, the following view will be displayed:

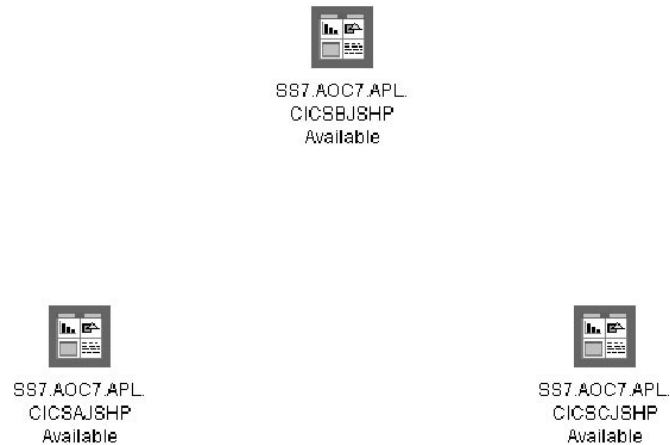


Figure 93. Subview with Applications of an Application Group

Minor Resources, Anchors and Tokens

The SA OS/390 topology manager distinguishes between *major* and *minor* resources. Major resources, such as applications or systems, exist independently. Minor resources are subcomponents of applications (or MVS components) that cannot exist independently, but are always associated with a major resource. Typical examples for minor resources would be the spool of a JES application or transactions of a CICS application. Minor resources have their own automation

flags so that you can, for example, switch on automation for an application, but switch it off for one of its subcomponents. This is one main reason for introducing the distinction between major and minor resources.

The minor resources that are defined in the policy database and known to SA OS/390 are a special type of regular resources. They are retrieved by the SA OS/390 topology manager from an automation manager (either during initialization of the SA OS/390 topology manager or when the information in RODM must be resynchronized with the automation manager).

In addition to regular minor resources, the SA OS/390 topology manager also knows *dynamic* minor resources. Dynamic minor resources are posted to the SA OS/390 topology manager at runtime with the INGPOST command. You can also change the state of an existing dynamic resource with INGPOST. For more information on the INGPOST command, see *System Automation for OS/390 Programmer's Reference*. In contrast to regular resources, you can delete dynamic minor resources in RODM from the NMC.

To post a dynamic minor resource to the SA OS/390 topology manager, you must specify the major resource to which this minor resource belongs, and also the sysplex for the major resource. When the SA OS/390 topology manager finds the major resource within the specified sysplex in RODM it connects the new minor resource with the major resource and displays it immediately in all (network) views that contain the major resource.

The major resource specified to INGPOST can be a regular resource or a so called *anchor*. Anchors are special objects that exist in RODM, but not in the automation manager. They play the role of major resources and serve two purposes:

- They are used to display dynamic minor resources for which either the specified major resource or the specified sysplex does not exist in RODM. See ““Lost&Found’-Anchors” on page 205.
- Anchors are used to display and group minor resources that derive from events such as WTORS and tape mount requests; see “Anchors and Events”.

Anchors and Events

The SA OS/390 topology manager is able to represent events such as WTORs or tape mount requests on the NMC. The events are posted to it with the INGPOST command. The SA OS/390 topology manager treats them as special (dynamic) minor resources; these resources are called *event resources*. Event resources are connected to an anchor as their major resource. All events connected to one anchor belong to the same event type. Thus there are, for example, anchors for WTORS, and anchors for tape mount requests.

The SA OS/390 topology manager automatically creates one anchor per sysplex for several event types, for example for WTORS and tape mount requests. Whenever an event of such a type is posted to the SA OS/390 topology manager, it is attached to the appropriate anchor of the respective sysplex, and all views that include this anchor are immediately updated.

Thus, when a WTOR originating from system AOC7 is posted to the SA OS/390 topology manager and AOC7 belongs to sysplex SS7, this WTOR is attached as a minor resource to the (automatically generated) WTOR anchor of sysplex SS7 and dynamically added to any view that includes the WTOR anchor of SS7.

Besides these automatically created anchors, in the INGTOPOF file, you can define your own anchors for any events. You must post these events to the SA OS/390 topology manager with the INGPOST command.

Figure 94 shows a view that contains all the automatically created anchors for the sysplex SS7 with event resources attached to some of them.

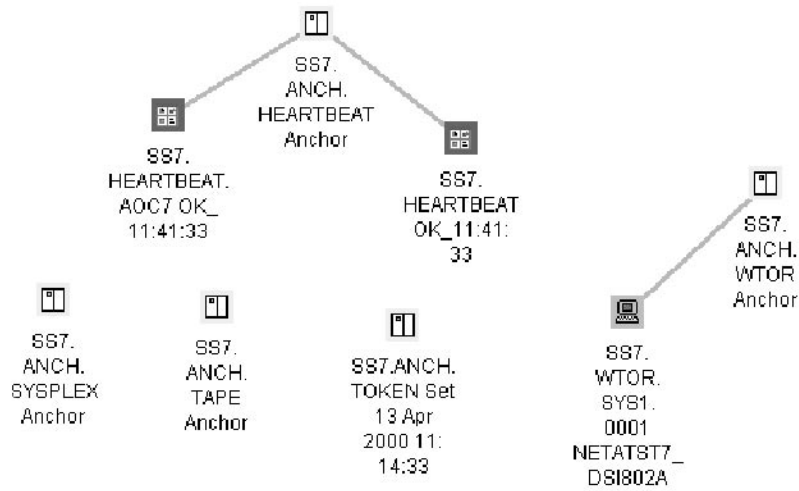


Figure 94. Anchor View

The anchors and their minor resources have the following function:

Heartbeat

These resources represent the connection between the SA OS/390 topology manager and the sysplex. Usually, two minor resources are attached to the heartbeat anchor. One stands for the focal point system (the right one in Figure 94), the other for the system that acts as the current representative for the sysplex (the left one in Figure 94).

Note that heartbeats, in contrast to other event resources, cannot be deleted by the operator. For more information on heartbeats, see *System Automation for OS/390 Defining Automation Policy*.

Note: When the communication between the SA OS/390 topology manager and the target system(s) fails, icons are created to represent the status: you will find a heartbeat icon with a corresponding label, such as *APLX.HEARTBEAT.NOTARGET* and a sysplex group labelled for example, *APLX.GRP.NoTarget NoCommunication*. The heartbeat icon is there to represent the state. On the sysplex group you can initiate an *INGTOPO REBUILD <system>* or an *INGTOPO SWEEPSYS <system>*.

Location

The location anchor can be used to group events, for example, geographically rather than logically.

Net The network anchor can be used to hold network alerts as minor resources. A network anchor is created for exactly those systems whose domain IDs are listed in the SYSPLEX statement of the INGTOPOF file.

For the description of the INGTOPOF file syntax, see *System Automation for OS/390 Planning and Installation*.

WTOR

Write To Operator with Reply (WTOR) messages are OS/390 messages that inform you of various conditions and require a reply of the operator. In Figure 94 on page 204, one WTOR is attached to the WTOR anchor.

In the label of this WTOR, 'WTOR' is the major resource name, and 'SYS1.0001' the minor resource name. The additional information is the message content.

By defining a view that contains the WTOR anchors of all sysplexes in the enterprise, you can monitor all WTORS at a single glance. For defining views, see "Creating Views" on page 213.

Tape mount request

When a tape mount request for sysplex SS7 is posted to the SA OS/390 topology manager, it is attached to the tape mount request anchor of this sysplex.

'Lost&Found'-Anchors

To post a new minor resource to the SA OS/390 topology manager, you must specify the major resource to which this minor resource belongs, and also the sysplex for this major resource. When the SA OS/390 topology manager cannot find the major resource in RODM, it attaches the minor resource to one of several special anchors that serve to display such unconnected minor resources. These anchors are also automatically generated.

There is one such anchor at sysplex level, which collects minor resources whose major resource does not exist in RODM, but whose sysplex is known to the SA OS/390 topology manager. If even the sysplex is unknown, the SA OS/390 topology manager attaches the minor resource to an anchor with the prefix 'Lost&Found'. There are 'Lost&Found'-anchors for WTORS, tape mount requests, heartbeats, and for sysplex related resources.

Figure 95 on page 206 displays a view that comprises the 'Lost&Found'-anchors.



Figure 95. View with 'Lost&Found'-Anchors

Tokens

A token is an object, which is generated automatically by the SA OS/390 topology manager. The date and time when the SA OS/390 topology manager was initialized is appended to the name of the token, In the *Data1* field of the resource properties, you can find the original ACF token or the processor operations token of the monitored system. This can be used for diagnostic purposes.

Properties of SA OS/390 Objects on the NMC Workstation

All resources are represented by icons. Dependencies are displayed as lines; no difference is made between start and stop dependencies. Association of a minor resource to a major resource is also represented through a line. The state of the resources is indicated by the color of the icon. The colors are mapped to the compound states of the resource as follows:

GREEN	Satisfactory
LIME	InAutomation
CYAN	Awaiting
WHITE	Inhibited
YELLOW	Degraded
PINK	Denied
RED	Problem
GREY	Status not known (NMC specific)
BLACK	Resource deleted in RODM (NMC specific)

For more information on the compound status, see "Compound Status" on page 38.

The labels of the icons consist of three (four) parts, namely

1. The sysplex name as defined in the INGTOPOF file.

For the INGTOPOF file, see *System Automation for OS/390 Planning and Installation*.

2. A derivative of the major resource name.

This part of the label differs from the resource name within the automation manager in that the order of its components is reversed and the slashes are replaced by dots (for example, the standard resource name JES2/APL/SYS1 becomes SYS1.APL.JES2). The reason for this reversal is explained in “Names” on page 214.

3. Possibly a minor resource name.

The minor resource name of the JES2 spool in Figure 92 on page 202 is SPOOL. When a minor resource name contains more than one part, the separator slashes are also replaced by dots, but no reversal of the components takes place (for example, TRAN/ABC123 would become TRAN.ABC123).

4. Additional information.

With major resources, this additional information is essentially the compound status. In most cases, it is supplemented by a suffix that indicates whether the status refers to starting or stopping the resource. Thus there is an INHIBITED_START state and an INHIBITED_STOP state. The SATISFACTORY compound state is replaced by the pair AVAILABLE and UNAVAILABLE.

For the minor resource in Figure 92 on page 202, the additional information is ‘OK’.

For more information on the labels, see “Names” on page 214.

If you have the appropriate CPE profile setup for your user ID, you can view and possibly edit the **Resource Properties** of the displayed resources (see also *NetView Management Console User’s Guide*).

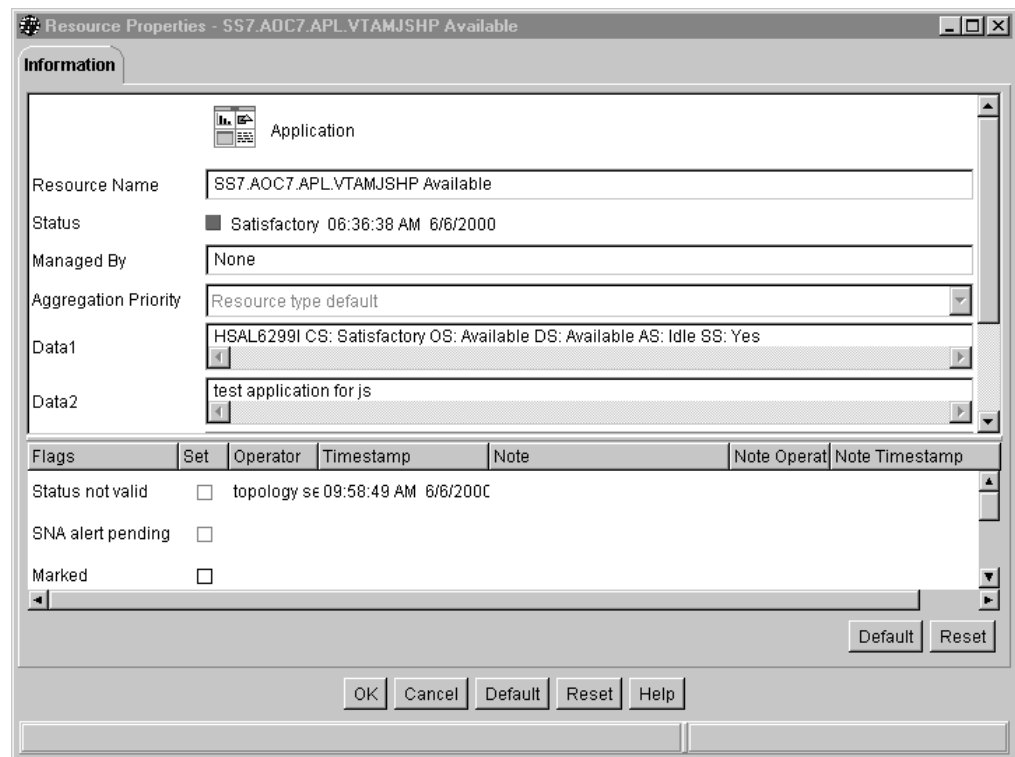


Figure 96. Resource Properties Window

For regular major resources, the **Data 1** field contains detailed status information, and the **Data 2** field can contain a comment, for example by an operator. For dynamic minor resources (see “Minor Resources, Anchors and Tokens” on page 202), the **Data 1** field corresponds to the message parameter of the INGPOST command, **Data 2** corresponds to the userdata parameter of the INGPOST command; see *System Automation for OS/390 Programmer’s Reference* for more information on INGPOST. **Data 3** and **Data 4** are currently not used.

SA OS/390 information is presented on the NMC in *network* views or in *exception* views. Network views represent the topology of resources, that is, grouping of resources and their connections. Figure 92 on page 202 is an example for a network view. Exception views display resources that have certain properties in common.

Dynamic Behaviour of the SA OS/390 Topology Manager

In a running SA OS/390 enterprise, you can imagine scenarios where new systems are IPLed while the SA OS/390 topology manager is already running, or new systems are added to a sysplex and so on. The following sections describe how the SA OS/390 topology manager behaves in these events.

SA OS/390 Topology Manager Initialization: INGTOPO INIT

If the systems are set up accordingly, SA OS/390 automatically issues the INGTOPO INIT command after it received the completion code of the start of the MSM (Multi Systems Management). If this is not the case, you have to start the SA OS/390 topology manager manually by issuing the INGTOPO INIT command.

With the INGTOPO INIT call, the SA OS/390 topology manager queries the INGTOPOF file and contacts each of the specified target systems (the specified sysplexes or the processor operations focal point). For the contacted target systems, it creates the according objects in RODM.

System Detection

When a system on which SA OS/390 is installed becomes active, it sends a signal to the SA OS/390 topology manager. The SA OS/390 topology manager, which is already running, checks whether the system belongs to a sysplex or a processor operations focal point it knows (i.e., that is defined in the INGTOPOF file) and whether this sysplex or processor operations focal point was incommunicative until now. If both conditions are fulfilled, the SA OS/390 topology manager performs the initialization process for this sysplex or processor operations focal point. In all other cases the SA OS/390 topology manager ignores the signal. Note that these signals never reach any operator when the SA OS/390 topology manager is not present.

The Heartbeat Function

When the SA OS/390 topology manager makes contact with a system that can act as a representative of a sysplex, it launches a *heartbeat* timer on that system and a *deadman’s* timer for that sysplex on the focal point system. The heartbeat timer sends a generic alert to the focal point system at a regular interval to indicate that the target system is still in good health. This alert resets the deadman’s timer on the focal point. If the alert does not arrive before the deadman’s timer expires, the SA OS/390 topology manager assumes that the current representative cannot respond. The processing in such a case is described in “Takeover when a System Goes Down” on page 209.

Takeover when a System Goes Down

If the SA OS/390 topology manager needs to assume that the sysplex representative cannot respond, it tries to find another one according to the specified systems in the in the SYSPLEX statement in the INGTOPOF file. Therefore the sequence of the specified SYSPLEX and PROCOPS statements and the sequence of the specified systems is relevant. If it finds a new representative, communication continues with the new one and the representation on the NMC continues. If it finds none, it considers the communication with the respective sysplex interrupted; all resources of the sysplex assume the color representation of the status *Unknown*.

Issuing Commands from the NMC

In order to issue a command against a resource, click on this resource with the right mouse button to open a context menu. This menu contains only those system operations or processor operations commands that are applicable to the respective resource. Some SA OS/390 commands are not provided because they cannot be reasonably connected to a resource.

When the state of the resource is affected by the command, the state information (event component of the label, color of the icon) is actualized on the NMC.

The following sections describe the different command types.

Direct Commands

Some commands, for example INGINFO, need no user specified parameters. They are immediately executed after having been selected in a command submenu. Their output is displayed in the log of the NMC.

Dialog Commands

Most SA OS/390 commands accept or need parameters that you must specify. When you select such a command from a submenu, a window will open where you can enter the appropriate values. Their output is displayed in the log of the NMC.

If you select, for example, the command INGTHRES for the resource SS7.AOC7.APL.VTAMJSHP in the view of Figure 92 on page 202, the appropriate parameter window is opened as shown in Figure 97 on page 210.

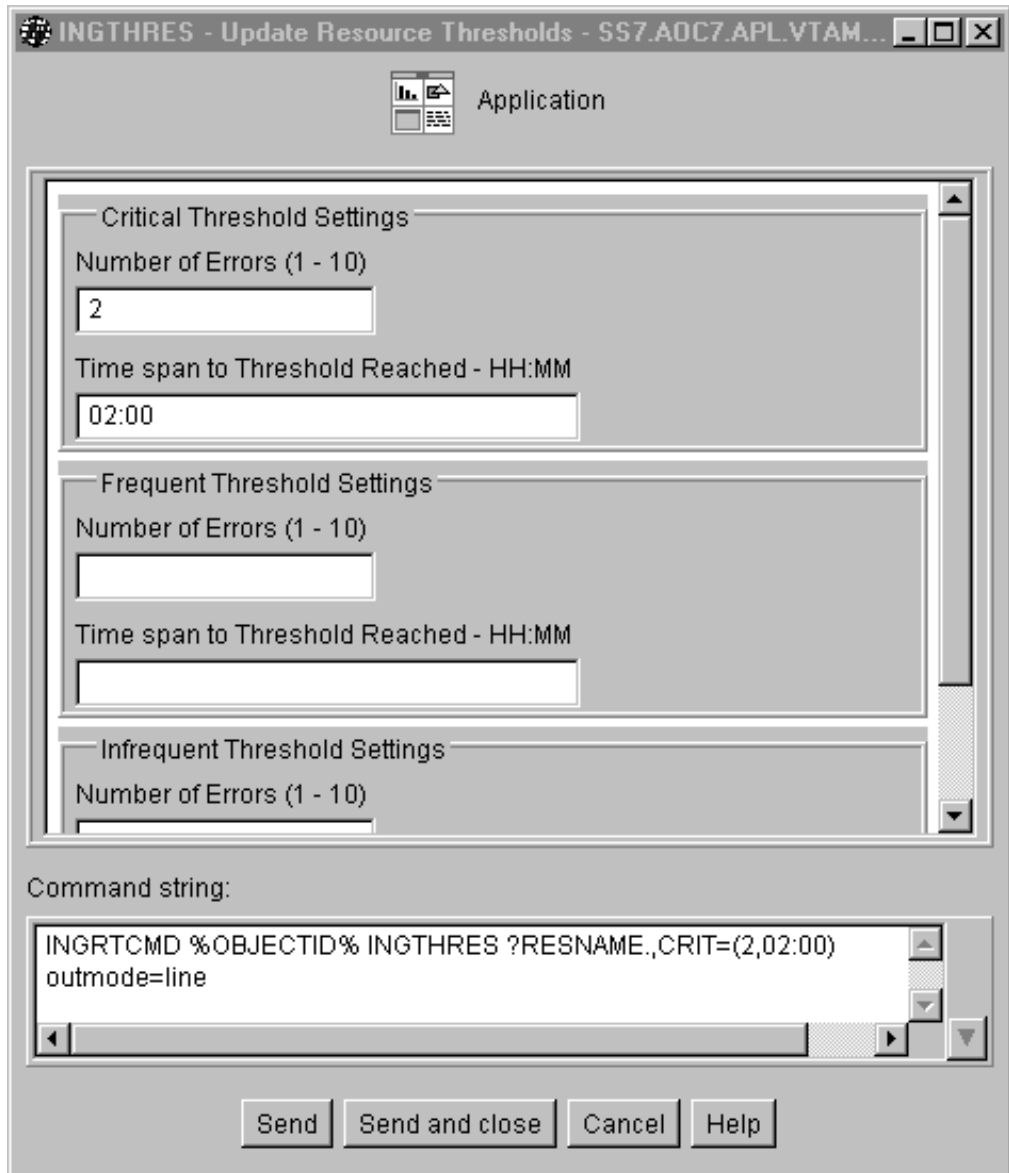


Figure 97. Parameter Window for INGTHRES

All parameter windows consist of two parts. The upper part contains the fields where you can enter the parameter values. The lower part displays the operator command that is generated from your input in the upper part. All you have to do is to enter the required values or choose the required option in the parameter fields (which has already been done in Figure 97) and issue the command by clicking on one of the two **send** buttons.

You can edit the command string in the **Command string** box at the bottom of the window. However, this is not necessary and may even lead to errors if you do not have a thorough understanding of the INGRTCMD command. “The INGRTCMD Command” on page 212 contains a brief summary of the INGRTCMD mechanism.

Interactive Commands

There are commands that require a continued dialog before they can be processed. Such commands are routed to a NetView 3270 Management Console and are processed there; this presupposes that you have set up the 3270 console correctly.

The INGREQ STOP command provides an example:

After clicking on the resource SS7.AOC7.APL.VTAMJSHP in Figure 92 on page 202 and selecting the entry **SA Operations Commands**, a submenu is opened which includes the **INGREQ Stop** entry. If you select this command, the request is forwarded to a NetView 3270 console, which would look as follows:

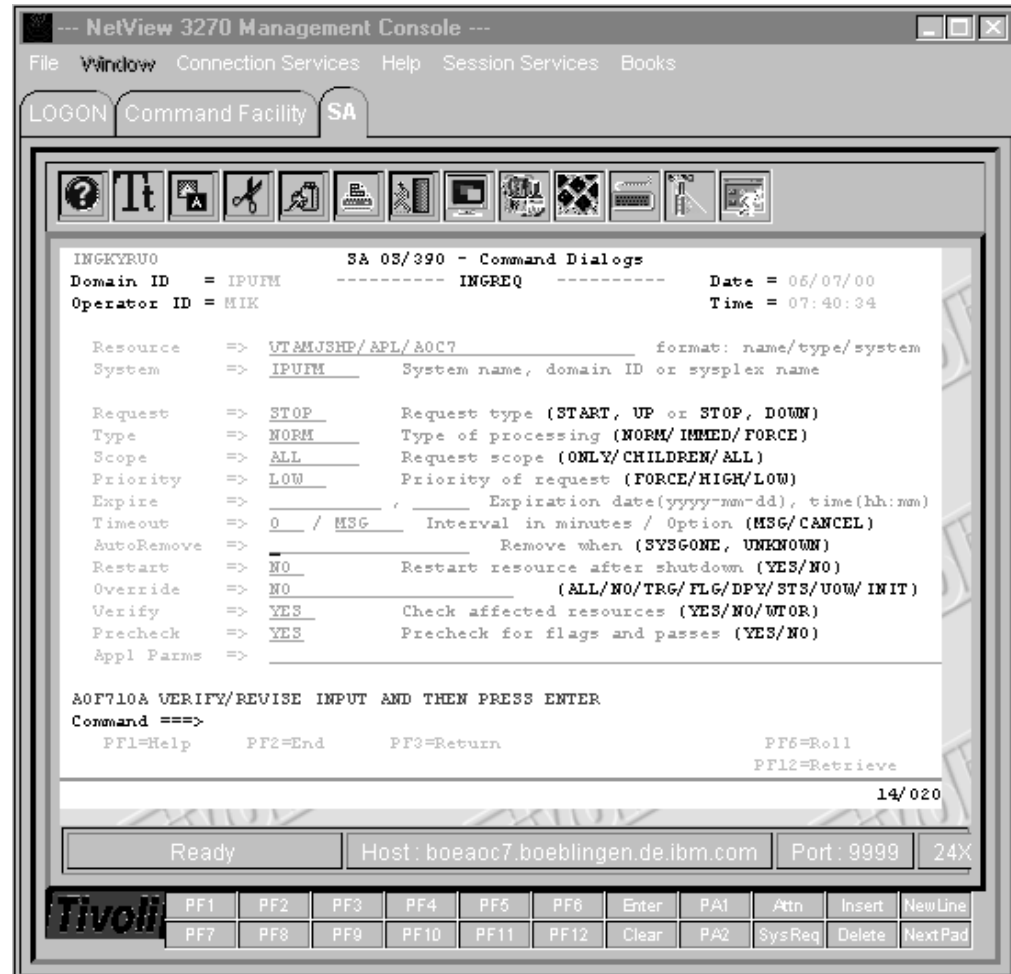


Figure 98. NetView Console with INGREQ Panel

After pressing ENTER you are presented with a list of the resources affected by the command (SS7.AOC7.APL.VTAMJSHP and SS7.AOC7.APG.CICSGRPJSHP) . If you confirm the request the resources are stopped. The view of Figure 92 on page 202 is actualized, and now looks as follows:



Figure 99. Actualized View

Note the modified event components in the label of the resources SS7.AOC7.APL.VTAMJSHP and SS7.AOC7.APG.CICSGRPJSHP.

Note: Depending on your setup, at the initial start of the NetView 3270 Management Console, triggered by an SA OS/390 command that needs to be transferred to the NetView 3270 Management Console, you might be confronted with messages, or even problems (e.g. failing logon), that are not related to the original SA OS/390 command. Handle these messages or problems as appropriate and retry the command.

The INGRTCMD Command

When you select a resource and then choose an operator command, a template of that command is generated. In this template, a place holder value is specified for all parameters of the command to which an attribute of the selected resource can be assigned as its value. The place holder points to this attribute. The place holders all have the format *?name..*. Thus, for example, *?RESOURCE.* refers to the resource name (which would be VTAMJSHP/APL/AOC7 in our example) of the object you clicked on.

Before the command is forwarded to the appropriate target system, these place holders must be replaced by real values. This is done by the command INGRTCMD. In order to be able to substitute the placeholders, INGRTCMD must be passed the ID of the object whose attributes are to supply the parameter values, so that the format of the command is as follows:

```
INGRTCMD object_id command_string
```

In the parameter window, the *object_id* is specified in the form %OBJECT_ID%, which is a reference to the RODM object ID of the selected resource. The command string displayed in Figure 97 on page 210 would thus be converted by INGRTCMD into

```
INGTHRES VTAMJSHP/APL/AOC7,CRIT=(2,02:00) outmode=line
```

and would be routed to the system representing the sysplex SS7.

Creating Views

The RODM objects representing SA OS/390 resources must be included in a view in order to be displayed on the NMC. The definition of these views is up to you. The SA OS/390 topology manager, however, offers some support for executing view definitions and updating the views whenever necessary. In order to exploit this feature, you must specify your view definitions in the format required by the NetView BLDVIEWS tool. Some familiarity with this tool and with the terminology and class structure of RODM (see *Tivoli NetView for OS/390 Resource Object Data Manager and GMFHS Programmer's Guide*) will be assumed in the following description.

The files containing your BLDVIEWS view definitions can be introduced to the SA OS/390 topology manager in the INGTOPOF configuration file (for information on the INGTOPOF file, see *System Automation for OS/390 Planning and Installation*). When the SA OS/390 topology manager is started, it will, after constructing the SA OS/390 objects, create the views in RODM by calling BLDVIEWS for all the definition files that it finds in the INGTOPOF file. BLDVIEWS will create a view object in RODM for every definition and connect every resource that meets the selection criteria specified in the definition with this view object.

At runtime, it will be necessary to rebuild the views for certain sysplexes when their SA OS/390 objects in RODM are not, or no longer, current. In such a case, it is desirable that the views be rebuilt only for those sysplexes whose SA OS/390 structure has in fact changed. For this reason, the definition files are associated in the INGTOPOF file with sysplexes. Thus, when defining a sysplex specific view, be sure to put it into a file that is associated in INGTOPOF with this sysplex. The same consideration applies to sets of target processors. For more information, see "Network Views and Exception Views".

Note: You can also call the BLDVIEWS tool independently of the SA OS/390 topology manager to update views or create further views. However, these will not be automatically updated when new major resources are created in RODM.

Network Views and Exception Views

NetView provides different types of views. For displaying SA OS/390 resources, only *network views* and *exception views* are used.

Network views are intended to display the structure of a network. Therefore, all relationships between resources are displayed on the NMC. Furthermore, network views are static with regard to their structure; unless the link between a view element and the view object is removed or a new link is established, they always contain the same elements.

Exception views, on the other hand, display resources that have certain properties in common, for example, all resources that are in an exception state and marked by an operator. The relationships are not displayed in an exception view. Exception views are dynamic; although the underlying structure does not change, new elements are included in the view when a resource acquires the appropriate combination of properties (for example, when an operator marks a resource that is in an exception state), and elements are removed when they change any of their relevant properties (for example, when the resource is unmarked again).

A BLDVIEWS definition of a view typically consists of two parts. With the VIEW (for network views) or EVIEW (for exception views) statement you specify the type and properties of the view.

The second part of the definition specifies the resources that are to appear in the view. All SA OS/390 resources in RODM are Non-SNA (GMFHS Managed Real) resources. Thus, you can use either the **MyName** or the **DisplayResourceName** field as a selection criterion for the Non-SNA resources to be included in the view. Note that you can specify more than one selection criterion.

Following are a typical network view and a typical exception view definition. First the network view:

```
VIEW=ING.SS7.APPL,ANNOTATION='Sysplex SS7'  
NONSNA='SS7.AOC7.*',QUERYFIELD=DRN
```

The NONSNA statement must be read as "Include in the view all Non-SNA resources whose **DisplayResourceName** field contains a value beginning with SS7.AOC7.". For more information on view definitions for the BLDVIEWS tool see the online help which is shipped with NetView.

Now a typical exception view:

```
EVIEW=ING.SS7.EXC,ANNOTATION='Exceptions SS7',DSF=NOXCPT,MF=OFF  
NONSNA='SS7.AOC7.APL.*',QUERYFIELD=DRN
```

Note the interplay between the selection criterion of the NONSNA statement and the filter parameters of the EVIEW statement. In contrast to the network view, the NONSNA statement for an exception view only specifies the *candidates* for appearance in the view. Which of these candidates are in fact included depends on the filter parameters. In the example definition, the exception state filter (DSF parameter) and the mark filter (MF parameter) are set so that only those candidate resources are displayed that are in an exception state and marked by an operator.

In order to be able to specify the selection criteria correctly, you must know how the names of the SA OS/390 resources in the RODM **MyName** and **DisplayResourceName** fields are constructed. This is explained in the following section.

Names

Every SA OS/390 resource in RODM has two names, an *object name* (RODM **MyName** field) and a *display name* (RODM **DisplayResourceName** field). The object name identifies the object uniquely within RODM, the display name appears as the label of the icon that represents the object on the NMC. When defining a view to BLDVIEWS, you can use either of these names as a selection criterion for the objects to be included in the view.

Since the names for system operations objects and for processor operations objects are rather different, they are described separately.

Names for System Operations Objects

The object names for system operations objects have the following format:

```
sysplex_name.{name/type/system | name/type | anchor_name / ANCH}[minor_res_name]
```

Here *sysplex_name* is the name of a sysplex as defined by a SYSPLEX statement in the INGTOPOF file.

The display names have the following format:

```
sysplex_name.{system.type.name | type.name | ANCH.anchor_name}[minor_res_name]  
[ev_summ]
```

Here again, *sysplex_name* is the name of a sysplex as defined in the INGTOPOF file. Note that the order of the component names for major resources is reversed in the display name. This is done to provide more flexibility when specifying filter criteria for views. Note further that slashes (/) are replaced by dots in the names of minor resources. *ev_summ* stands, in the case of a regular major resource, for the current compound status of the resource. With minor resources it stands for various information, for example for the message content of a WTOR or the timestamp of a heart beat.

The following are some examples for both name types:

1. Application TSO on system AOC7 in sysplex SS7:

Object Name:

SS7.TSO/APL/AOC7

Display Name:

SS7.AOC7.APL.TSO

2. Regular minor resource SPOOL of application JES2JSHP on AOC7 in sysplex SS7 in state OK:

Object Name:

SS7.JES2JSHP/APL/AOC7.SPOOL

Display Name:

SS7.AOC7.APL.JES2.SPOOL OK

3. WTOR outstanding on system AOC7 in sysplex SS7:

Object Name:

SS7.WTOR.AOC7/0007

Display Name:

SS7.WTOR.AOC7.0007 NETCTST7_DSI802A

Names for Processor Operations Objects

The object names for processor operations objects have the following format:

```
procops_name.name/type[/focal_point_system]/1st_level_min[/2nd_level_min[/3rd_level_min]]
```

Here *procops_name* is the name of a focal point configuration as defined by a PROCOPS statement in the INGTOPOF file.

The display names have the following format:

```
procops_name.{focal_point_system}.type.name.1st_level_min[.2nd_level_min[.3rd_level_min]]  
[ev_summ]
```

Here again, *procops_name* is the name of a focal point configuration as defined in the INGTOPOF file. As with the system operations names, the order of the major resource component names is reversed, and slashes (/) are replaced by dots. *ev_summ* stands for the current processor operations state of the resource.

SA OS/390 Topology Manager Commands

There are two commands through which you can communicate with the SA OS/390 topology manager, namely INGTOPO and INGPOST. For more

information on these commands, also refer to *System Automation for OS/390 Programmer's Reference* and *System Automation for OS/390 Operator's Commands*.

INGTOPO Command

This command gathers SA OS/390 information about one or more sysplexes (systems) or sets of target processors from the respective automation manager(s) or focal point processor(s) and updates the SA OS/390 structure for these sysplexes (systems) within RODM accordingly. You must call it with a parameter that specifies its mode of operations. The following parameters are valid:

INIT *task_name*

In INIT mode, INGTOPO sets up the sysplex (processor operations focal point) for monitoring and builds or updates the SA OS/390 objects in RODM in accordance with the automation managers of all sysplexes (systems) that are defined in the INGTOPOF file. INIT is the mode which you must specify at the very first call of INGTOPO. In this case, you must also specify the name of the autotask under which the SA OS/390 topology manager runs.

You may call INGTOPO with INIT any time. INGTOPO will then either rebuild the SA OS/390 objects from scratch or just perform the necessary update operations.

REBUILD *sysplex_name_or_procops_name*

In REBUILD mode, INGTOPO removes all SA OS/390 objects in RODM for the specified sysplex (or processor operations focal point) and rebuilds them from scratch. You can use this call to rebuild the SA OS/390 information for a sysplex (or processor operations focal point) when the RODM data for this sysplex (or processor operations focal point) appear to be incomplete or damaged.

RESYNC *sysplex_name_or_procops_name*

In this mode, INGTOPO resynchronizes the SA OS/390 information in RODM with the specified sysplex (or processor operations focal point). The INGTOPO command with the RESYNC option is typically initiated automatically by the target system. This may only involve a status update, but can also mean a complete rebuild of the SA OS/390 information, if this is necessary.

SWEEPSYS *sysplex_name_or_procops_name*

In this mode, INGTOPO removes all SA OS/390 objects in RODM for the specified sysplex or processor operations focal point and stops all monitoring services.

SWEEP

In this mode, INGTOPO removes all SA OS/390 objects in RODM for all sysplexes and all processor operations focal point and stops all monitoring services.

For more information, see *System Automation for OS/390 Operator's Commands*.

INGPOST Command

This command is normally invoked from within a program. It is used to dynamically display subsystems or other events. For example, if you have a CICS running, and one of its transaction runs into problems, you could specify an INGPOST which links a corresponding minor resource of this transaction to the CICS major resource, specifying the event and indicating its status by a corresponding color.

The purpose of INGPOST is to enhance problem management. You can also use INGPOST to visualize any other alerts or events and to create or manipulate minor resources.

For more information on INGPOST, see *System Automation for OS/390 Programmer's Reference*.

Processor Operations on the NMC

Processor operations deals with controlling operations of the processor hardware. One or more of these processors are controlled from a focal point. There can be more than one focal point. It is these focal points that the SA OS/390 topology manager contacts for gathering information. A focal point with its associated target processors is called a processor operations focal point configuration or, if no confusion is likely to arise, simply a *focal point configuration*.

Processor operations is independent from system operations. Accordingly, when the same enterprise component (for example, a system) is integrated into processor operations and also into system operations, the SA OS/390 topology manager creates two representations of it in RODM. For these reasons it will usually be advisable to keep the processor operations objects apart from the system operations objects in the NMC views. See "Creating Views" on page 213 for defining views.

The following figure shows a network view of a processor operations configuration.

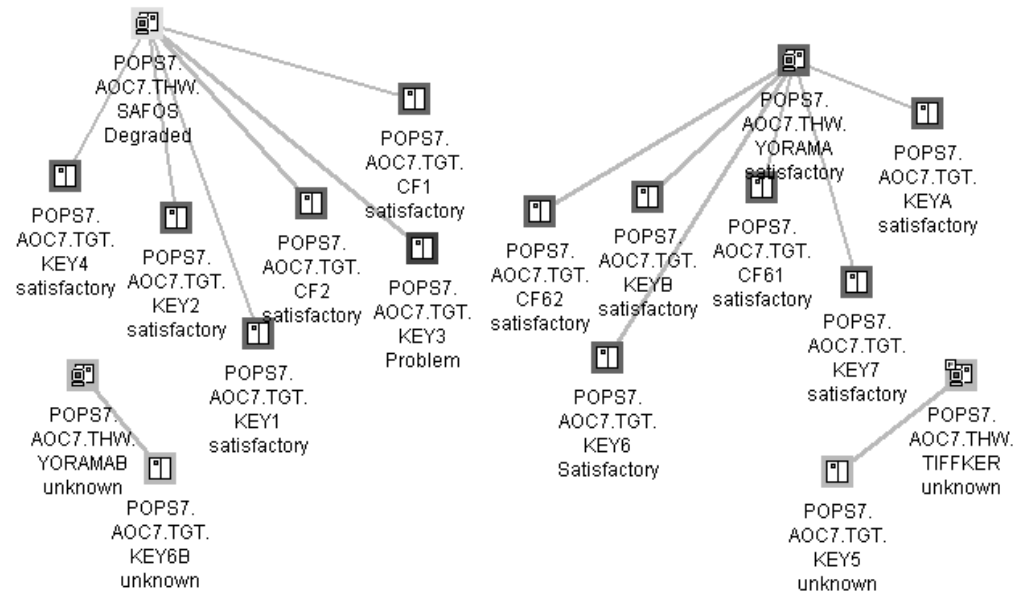


Figure 100. Processor Operations View

The SA OS/390 topology manager knows four kinds of processor operations objects which can be distinguished by the type component of their labels. This label is constructed as follows:

1. The name of a focal point configuration as defined in the INGTOPOF file.
For the INGTOPOF file, see *System Automation for OS/390 Planning and Installation*.

2. The resource name.

This consists of the name itself, the type identifier, and optionally a system name.

There are four resource types, whose names are derived (with one exception) from the corresponding processor operations type names by omitting the prefix ISQ. The names have the following meanings:

TGT This characterizes a target system.

THW This characterizes a target processor.

PGR This characterizes a group of target systems.

Note: This type identifier is different from the second part of the corresponding processor operations type name, which is ISQGRP. The reason for this deviation is that GRP is already used within system operations.

SBG This characterizes a subgroup of target systems.

3. A minor resource name consisting of one, two or three parts. The parts are separated by dots.

The states of processor operations objects are interpreted in terms of NMC states. You can view the complete processor operations status in the **Data 2** field of the **Resource Properties** window.

Monitoring Sysplex Resources

The SA OS/390 topology manager detects and provides objects that represent sysplex resources (for example, coupling facilities and couple data sets). Also sysplex resource specific commands are provided so that you can issue them in the same way as described in “Issuing Commands from the NMC” on page 209.

Problem Management

Problem management facilities offered by the NMC workstation consist of the following aspects described in the subsequent sections:

- “Exception Views”
- “Marked and Unmarked Resources” on page 219
- “Updating Operator Data” on page 219
- “Problem Management of Minor Resources” on page 220

These sections are an outline of suggestions how you can use the combination of these facilities to establish an efficient problem management.

Exception Views

Exception views are typically used for problem management. It is recommended that you define your exception views in pairs, where the difference between the two views is that one of them contains only unmarked resources, and the other only marked resources. For example, the marked resources could be those being worked upon by an operator, the unmarked ones are not yet handled. The exception views are actualized dynamically; if you mark a resource within a view that contains only unmarked resources, the resource is immediately removed from that view and added to the corresponding view with marked resources.

The following view, for example, shows one of the resources also occurring in Figure 92 on page 202 that is in an exception state.



Figure 101. Exception View

For more information on network and exception views, see “Network Views and Exception Views” on page 213.

Marked and Unmarked Resources

The feature of marked and unmarked resource as introduced in “Exception Views” on page 218 is provided for every resource via the resources command menu. The NMC workstation just lets you mark resources. Marked resources are displayed with a flag. You define within your enterprise what the meaning of the mark should be. So for example, you can distinguish resources in different states of attendance. Marked and unmarked resources dynamically change within the appropriately defined views according to your marking actions.

Markings processed through the SA OS/390 marking commands (offered in the pop-up menu) are persistently stored by SA OS/390. This is the advantage over the standard marking function as provided by native NMC.

Updating Operator Data

You can write messages into the **Data 2** field of the **Resource Properties** window from the NMC. This can be used for problem management. For example, when you mark a resource that is in an exception state in order to indicate that you are working on the problem you can add in this way a comment for your colleagues.

You call this function by selecting **SA Icon Commands** and then **Update Operator Data**. A window appears where you can enter your comment. This will immediately be written into the **Data 2** field of the selected resource.

The advantage of this function, as compared to the standard function for information exchange between operators in the lower part of the **Resource Properties** window is that the comments are persistently stored.

Problem Management of Minor Resources

Minor resources inherit the view properties of the related major resources. Thus they appear in the same views as the major resource.

For example, if a major resource could appear in an exception view, and now a minor resource of this major resource runs into a problem, then this minor resource will appear in the exception view (independently of whether the major resource is visible). However, as minor resources are bound to a major resource, they can only appear in views where you would expect the major resource.

You can apply problem management on minor resources just as you would do for major resources; that is, you can mark and unmark minor resources and you can also append a comment to them as described in "Updating Operator Data" on page 219. Additionally, in contrast to major resources, you can delete minor resources.

Chapter 11. Using the LAN Passthru PC

The System Automation for OS/390 folder is located on the desktop.



Figure 102. SA OS/390 Folder

If you open this folder, you see the following icon:



Figure 103. LAN Passthru

Clicking on this icon invokes the *LAN Passthru* function, from which you can establish sessions to control remote consoles.

SA OS/390 provides a host-based passthru facility which allows you to access a target system's operator or system console remotely.

- Access to the system console allows you to initialize, reconfigure, and monitor resources within the central processor complex. You can initiate an IPL at the system console.
- Access to the operator console allows you to control the software tasks to start, stop, and run the operating system, subsystems, and applications of a data processing enterprise. Examples of operator consoles are the MVS master console and VM operator console.

The passthru facility provides images of the system console or the operator console of a specified target system. In passthru mode, your console at the focal-point system seems as if it is directly connected to the target system. Your console also seems to be the type of console specified when the passthru connection was established. This means:

- The screens are dynamically refreshed.
- The command line is the same as on the console at the target system (for example, you can tab to a field and fill it in).
- You can issue commands as if you were issuing them from the console at the target system.

The only difference between passthru mode and a console directly connected to a target system is that of key definitions and the rate at which your screen is updated. When using passthru, be aware of the following:

- When SA OS/390 accepts the information to be passed to the target console, XSYSTEM is cleared.

- When the first console update has been received after passing input to the target console, the input area is cleared. On a busy target console, the update might be unrelated to the input request.
- If a target console update is received before target console acceptance of the input, input might reappear in the input area.
- Target console input acceptance is confirmed when the expected solicited screen updates are reflected on the screen. If the updates are not received after you account for target processing time and network delay, you must reenter the input. This condition should only occur when the target console is busy and does not accept the input. Use the "PC command wait limit" value (specified at customization time when a communications task is defined) as a guideline for detecting this condition. The default value of the command wait limit is 60 seconds,

Note: Full-screen passthru is not supported for target systems accessed via a NetView connection. You may use the HMC and its remote operations capabilities to operate remote CMOS target hardware or target systems. Netfinity® or Desktop On-Call installed on the HMC provide this desired functionality. Refer to "Chapter 13. Using Netfinity in an SA OS/390 Environment" on page 229 and "Chapter 14. Using Desktop On-Call in an SA OS/390 Environment" on page 237 for more information.

If an OCF-based processor is configured with an optional processor operations PC for its operator console connection, the passthru facility may be used to access the operator console.

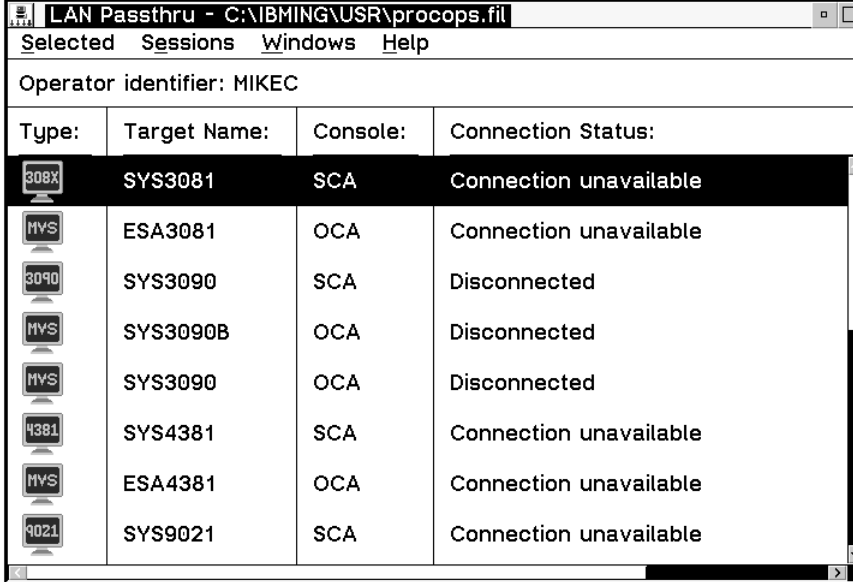
Only one operator at a time can establish a passthru connection to either the system console or the operator console of a target system. However, one operator can establish passthru sessions to multiple consoles. PF6 (Roll) cycles through the established passthru sessions, in the order they were established. The maximum number of active passthru sessions you can have is usually installation-dependent and controlled by a NetView setting.

Should the processor operations focal-point system not be operational, the host-based passthru facility is not available. It is still possible to passthru to a target system or operator console using the *LAN Passthru* function. The *LAN Passthru* function provides target console emulation at a local, token ring LAN-attached operator workstation (in this case, the SA OS/390 workstation). LAN Passthru allows an operator to manipulate the contents of all consoles attached to the processor operations PCs that are on the same local or wide area network. *LAN Passthru* is a non-host based console access mechanism: the processor operations focal point system does not have to be operational in order to utilize the *LAN Passthru* functions.









Passthru from an SA OS/390 Workstation and from a NetView Console

To establish a *LAN Passthru* session, click on the *LAN Passthru* icon in the System Automation for OS/390 folder (illustrated in Figure 102 on page 221). The window *Select a Control File for this session*, will be displayed from which you must select the proper control file. The control file used should match the Processor Operations control file that was generated from the customization dialog and downloaded to the workstation. You will then be prompted for a user ID and password after which the *LAN Passthru* window will be displayed. Select a LAN session from this

window:



The screenshot shows a window titled "LAN Passthru - C:\IBMING\USR\procops.fil" with a menu bar containing "Selected", "Sessions", "Windows", and "Help". Below the menu bar, it displays "Operator identifier: MIKEC". The main area contains a table with four columns: "Type:", "Target Name:", "Console:", and "Connection Status:". The table lists several sessions with their respective processor icons, target names, console types, and connection statuses.

Type:	Target Name:	Console:	Connection Status:
	SYS3081	SCA	Connection unavailable
	ESA3081	OCA	Connection unavailable
	SYS3090	SCA	Disconnected
	SYS3090B	OCA	Disconnected
	SYS3090	OCA	Disconnected
	SYS4381	SCA	Connection unavailable
	ESA4381	OCA	Connection unavailable
	SYS9021	SCA	Connection unavailable

Use the Selected menu bar item to open, initialize, close, reboot, send commands, or end your LAN session.

The connection status might be:

connection established

Attached; might be followed by :port initialized or :passthru session active

disconnected

APPC session not active

connection unavailable

Does not have the necessary link and partner LU definitions

connection not supported

Icon is for an OCF-based processor

Passthru from a NetView Console

To establish a passthru connection from a focal-point processor to a specific target system, type `ISQTC` with no parameters on the command line of a NetView console. The ISQTC/Target Communications Control Facility panel will be displayed.

```

...ISQTCC/TARGET COMMUNICATIONS CONTROL FACILITY ...
Type an S or 0 before the desired TARGET and select function

- TARGET01 - TARGET02 - TARGET03 - TARGET04
- TARGET05 - TARGET06 - TARGET07 - TARGET08
- TARGET01 - TARGET02 - TARGET03 - TARGET04
- TARGET05 - TARGET06 - TARGET07 - TARGET08
- TARGET09 - TARGET10 - TARGET11 - TARGET12
- TARGET13 - TARGET14 - TARGET15 - TARGET16
- TARGET17 - TARGET18 - TARGET19 - TARGET20
- TARGET21 - TARGET22 - TARGET23 - TARGET24
or enter

Destination ----->          Port/Console -----> S
Passthru Escape          Passthru Screen Update
function PFKey -----> PF12    delay in seconds ----->

...
...

PF1=Help      PF2=Status      PF3=End      PF4=Passthru      PF6=Roll
PF7=Backward  PF8=Forward      PF9=Control  PF11=Other-list

```

Figure 104. ISQTCC/Target Communications Control Facility Panel

On the Target Communications Control Facility panel, select a target system. Fill out the panel and press PF4 to make the connection.

Or type ISQTCC followed by the *target_system* name and SC (for system console) or OC (for operator console) on a NetView console.

To exit the passthru session, press the Escape key (by default, PF12). Press Escape (PF12) again on the Extended Key Facility panel.

An escape key is defined when you establish a passthru connection. (This key defaults to PF12, but can be defined from the ISQTCC/Target Communications Control Facility panel.) Pressing the escape key takes you to the passthru "Extended Key Facility" panel, from which you can end the passthru session by pressing the PF12 key.

To change the passthru escape key, change the setting on the Target Communications Control Facility panel (which you see after you have typed the ISQTCC command).

Simulate Keys on the Keyboard

Press the Esc key (by default, PF12) when in 3270 passthru mode. On the Extended Key Facility panel, type the number for the key you want to simulate (for example, type 14 for the Stop key).

Extended Key Facility : Target Console Key Assignments - 3090
User DUNLAP Time 00:00:04 ESC PF12 Delay 0 second

1)	ASSIGN CONSOLE	2)	SWAP CONSOLE
3)	BACKWARD	4)	FORWARD
5)	CANCEL	6)	END
7)	INDEX	8)	INTERRUPT
9)	LEFT	10)	RIGHT
11)	REFRESH	12)	RESTART
13)	START	14)	STOP
15)	INSTRUCTION STEP	16)	PA1
17)	SvPCE	18)	TOD (TIME OF DAY)
19)	VIEW LOG	20)	PRINT
21)	RESET KEYBOARD		

Chapter 12. Using the Processor Operations PC

This chapter contains information on how to start and stop processor operations PCs and PC ports.

Starting Processor Operations PCs

Initializing a processor operations PC consists of establishing communications between the focal point system and the personal computer, and setting the PC status to CLEAR TO SEND. If you want to initialize only a processor operations PC, issue the ISQXIII command, specifying the PC name as the only parameter. The ISQXIII command can be used to initialize (or re-initialize) a target system, a PC, or a PC port. When initializing a target system, ISQXIII starts the processor operations distributed feature code and all associated sessions and PCs, and it enables all the required target ports. (Refer to *System Automation for OS/390 Operator's Commands* for details of the ISQXIII command).

Both the ACTIVATE common command and the ISQXIPL host-based command initialize the associated PC (if necessary) as part of their larger procedures.

Starting a PC Port

Initializing a PC port consists of setting up the port according to the port and screen handler specifications defined in the customization dialog for that port, and setting the PC port status to ACTIVE. Initializing a PC port also initializes the associated PC if it is not already initialized.

If you want to initialize only one specific PC port, issue the ISQXIII command, specifying the PC name and the port letter as parameters. (Both the ACTIVATE common command and the ISQXIPL host-based command initialize associated PCs and PC ports (if necessary) as part of their larger procedures. Issuing the ISQXIII host-based command to initialize a target system also initializes the associated PC and PC ports (if necessary) as part of its larger procedure.) Refer to *System Automation for OS/390 Operator's Commands* for details of the ISQXIII command.

Stopping Processor Operations PCs

You use the ISQXCLS command to close a PC. Closing a PC ends the communications between the focal-point system and the PC, updates the PC status to DEALLOCATED, and updates the status of any initialized ports on the PC computer to PC UNAVAILABLE. Closing a PC and specifying the SHUTDOWN keyword ends the processing of the processor operations distributed feature code. Refer to *System Automation for OS/390 Operator's Commands* for details of the ISQXCLS command.

Stopping a PC Port

You use the ISQXCLS command to close the port to a console. Closing a target console port removes the screen handler definitions for that port and changes the port status to UNDEFINED. Once the command has been processed, unsolicited messages are no longer received from that port. No commands can be routed to the console, including ISQSEND. However, the port remains associated with the target system.

Closing a port does not power off the 3270 card. The card remains in the power-on condition and appears to an operating system as being online. To turn off the 3270 card, issue the #POWEROFF command before closing the port. Refer to *System Automation for OS/390 Operator's Commands* for details of the ISQXCLS and the #POWEROFF commands.

Chapter 13. Using Netfinity in an SA OS/390 Environment

In order to use Netfinity and its functions, it must first be started on both, the manager- and the client-workstation. In an SA OS/390 environment, the Netfinity manager can be started on an operator workstation used because of its 3270 emulation capability to operate one or more NetView operator sessions. Depending on additional programs running on the workstation, for example, the NetView Management Console (NMC) client application, such a workstation is a versatile operator tool to manage and control your OS/390 automation environment.

Starting Netfinity on a Manager Workstation

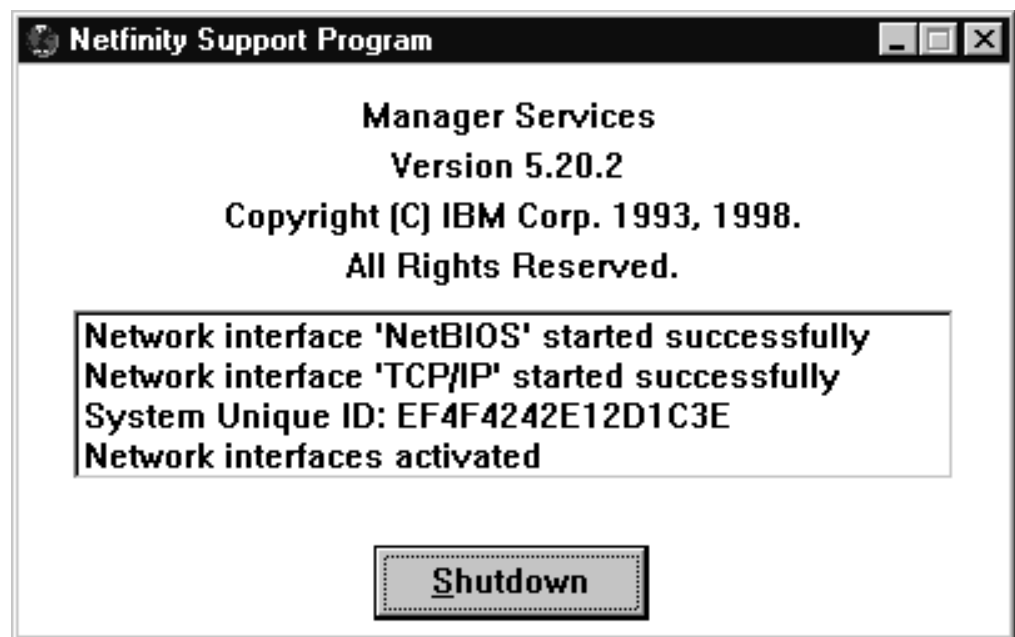


Figure 105. Netfinity Support Program Window

If the NetView network driver is configured, the Netfinity Support program will start during the workstation startup. The available services can be used from the Netfinity Folder from an OS/2[®] or with the Start/Programs/Netfinity Button from a Windows[®] platform workstation.

Starting Netfinity on a Processor Operations PC



Figure 106. Netfinity Support Program Window of a Client Workstation

If the Netfinity network driver is configured, the Netfinity Support program must start during the workstation startup. Make sure this is working, otherwise you will not be able to communicate with the clients from your Netfinity manager workstation without manual intervention on the client location.

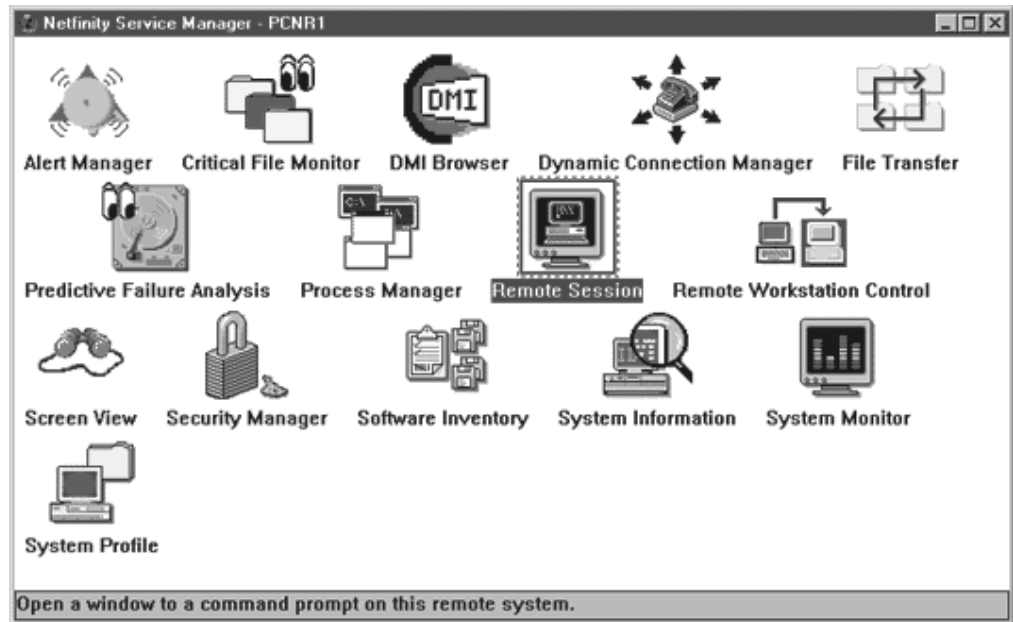


Figure 107. Clients Service Manager Window displayed on the Manager Workstation

You may use the available services on the client workstation by invoking the Remote System Manager on the Netfinity manager workstation and selecting the appropriate client system.

Use Cases of Netfinity in an SA OS/390 Environment

The following sections gives you some ideas on how to use the functions provided by Netfinity in the SA OS/390 processor operations environment.

Software Maintenance and Configuration

After adding a new 3270 connection card to the processor operations PC *PCNR1* by technical support personal, the adjusted version of the processor operations stand-alone function profile has to be transferred to this workstation. All processor operations profiles are kept on a central maintenance workstation *TSCFMASTER* which has the Netfinity Manager code installed. On the Netfinity Manager workstation, the following services are used:

- Remote System Manager - Used to invoke a session with client *PCNR1*
- File Transfer

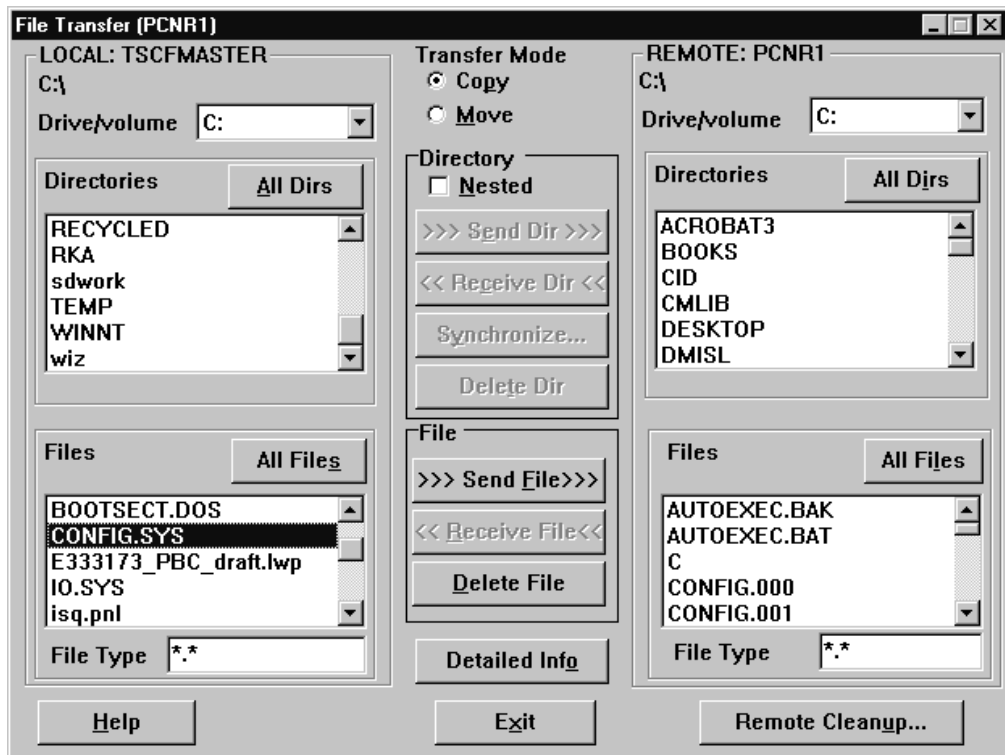


Figure 108. File Transfer Window of Client PCNR1

After selecting client *PCNR1*, the File Transfer function in the clients Netfinity Service Manager window is selected. In this window you can specify directories or files to be transferred between the Netfinity manager and a client or vice versa. You may use this service to transfer a new or changed processor operations stand-alone profile to your ISQUSR subdirectory. Another application could be to install the processor operations distributed feature code on a client from your Netfinity manager workstation, which serves as a processor operations master system.

Processor Operations PC Operation

Due to a networking problem, the SNA/APPC session between the processor operations client *PCNR1* and its NetView focal point is not available. A verification should be made if it is possible to use the processor operations local passthru function to access a connected console in case of emergency.

- Remote Workstation Control

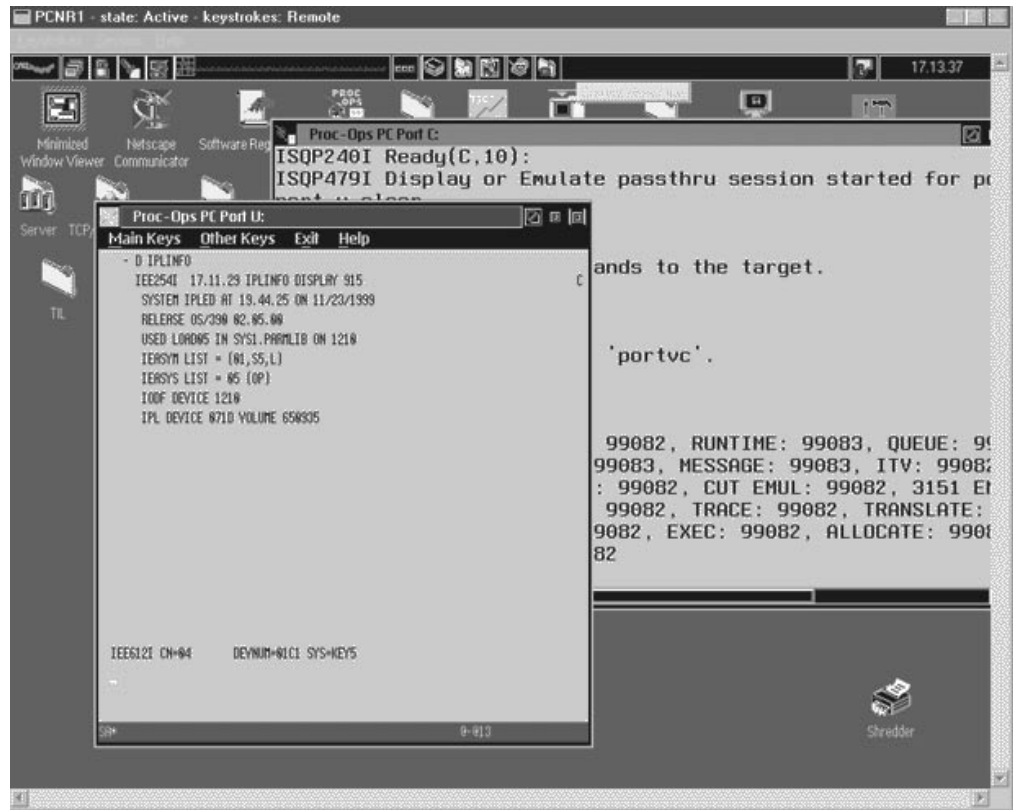


Figure 109. Remote Workstation Control Window of Client PCNR1

With this service you have full control over the desktop of the client workstation and the keyboard. By this, the processor operations local passthru function can be used to manually operate a 3270 console.

Note: Depending on the networking protocol, this service may perform too slowly. In such cases consider combining the services of Screen View, Remote Session, and the Process Manager to accomplish the task you want to perform. The processor operations local passthru function can only be used when the Remote Workstation Control service is running.

Problem Determination

On client *PCNR1* a 3270 card seems not to work or may not be defined correctly.

- Remote Session

```

Remote Session - PCNR1
Help
OS/2      Ctrl+Esc = Window List      Type HELP = help
RUN=C:\IBMLAN\NETPROG\LSDAEMON.EXE
RUN=C:\OS2\SYSTEM\LOGDAEM.EXE
RUN=C:\OS2\EPWROUT.EXE 1
DEVICE=C:\OS2\LOG.SYS
SET DLSINI=C:\IBMLAN\NETPROG\NETGUI.INI
SET INIT_FILE_NAMES=netgui
SET INIT_FILE_RANGES=200
SET WPS_COMMUNICATION=YES
SET LANINSTEP=G:\CID\SERVER\ibnlb
SET TCPLANG=de_DE
DEVICE=C:\TCPIP\bin\vdostcp.sys
SET TMP=C:\TCPIP\TMP
RUN=C:\IBMCOM\PROTOCOL\LANDLL.EXE
DEVICE=C:\CMLIB\ACSLANDD.SYS
DEVICE=C:\CMLIB\CMKFMDE.SYS
DEVICE=C:\CMLIB\ACSHPRDD.SYS
SET CMPATH=C:\CMLIB
SET HOSTNAME=t1l2
SET USER=TIL
DEVICE=C:\ISQ\IBMING\ISQ\ISQXSITU.SYS
rem DEVICE=C:\ISQ\IBMING\ISQ\ISQXSCUT.SYS 1=CA 2=CC 3=P 4=P
DEVICE=C:\ISQ\IBMING\ISQ\ISQXSCUT.SYS 1=CA 2=CC 3=P
[C:\_]

```

With the help of a Remote Session, the command TYPE CONFIG.SYS is entered on the client workstation to display the content of the config.sys file. This allows verification of the device statements for the 3270 cards.

- Process Manager

Name	Process ID	Parent Process ID	Session ID	Num. Threads
MING\ISQ\ISQXEMON.EXE	0020h	0000h	0011h	3
MING\ISQ\ISQXEPC.EXE	002Eh	001Eh	0016h	3
C:\ISQ\IBMING\ISQ\ISQXESH.EXE	0032h	0000h	0011h	5
C:\ISQ\IBMING\ISQ\ISQXESH.EXE	002Fh	0000h	0011h	3
C:\ISQ\IBMING\ISQ\ISQXESH.EXE	0030h	0000h	0011h	3
C:\ISQ\IBMING\ISQ\ISQXESH.EXE	0031h	0000h	0011h	3
C:\MMOS2\MIDIDMON.EXE	000Ah	0000h	0000h	1

Figure 110. Process Manager Window of Client PCNR1

As part of the problem determination, the Process Manager Service may be used to control the processes running on the client. If necessary, a process of the processor operations distributed feature can be stopped that way.

Recovery

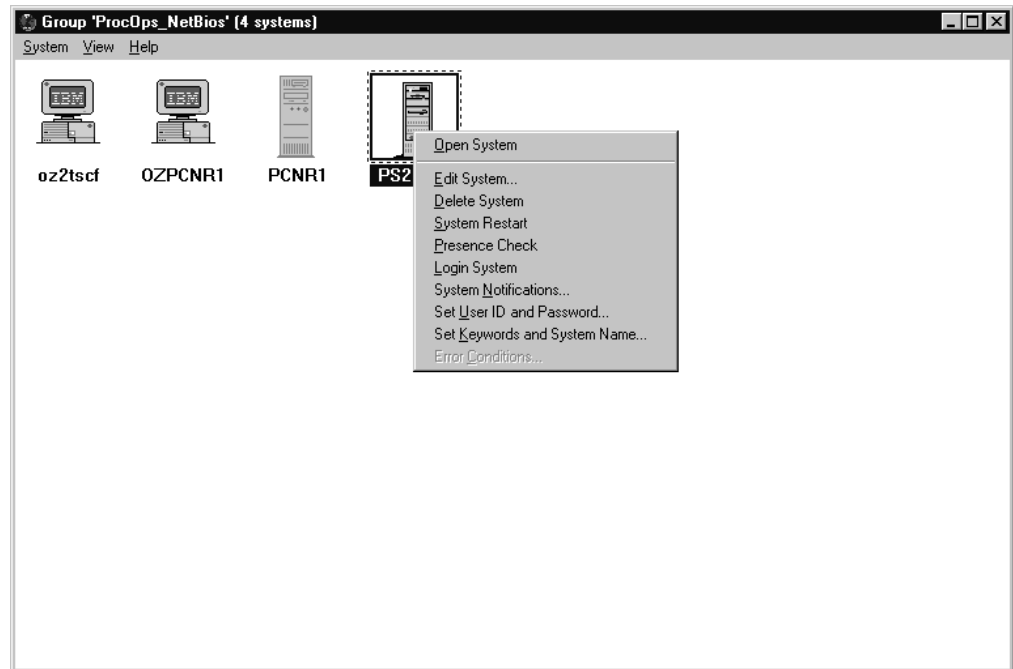


Figure 111. Group Window

In cases where you cannot shutdown the processor operations client workstation from the NetView host, you may use the *System Restart* option in the client workstations selection window of its group, displayed on the Netfinity manager workstation.

Using Netfinity for a HMC

After customizing the Netfinity client code to start the Netfinity support program at HMC startup time and after selecting the appropriate network drivers with the NFIG utility, you can access the HMC for systems management purposes from a Netfinity manager workstation. Do not forget to restrict Netfinity user access using the Security Manager Tool.

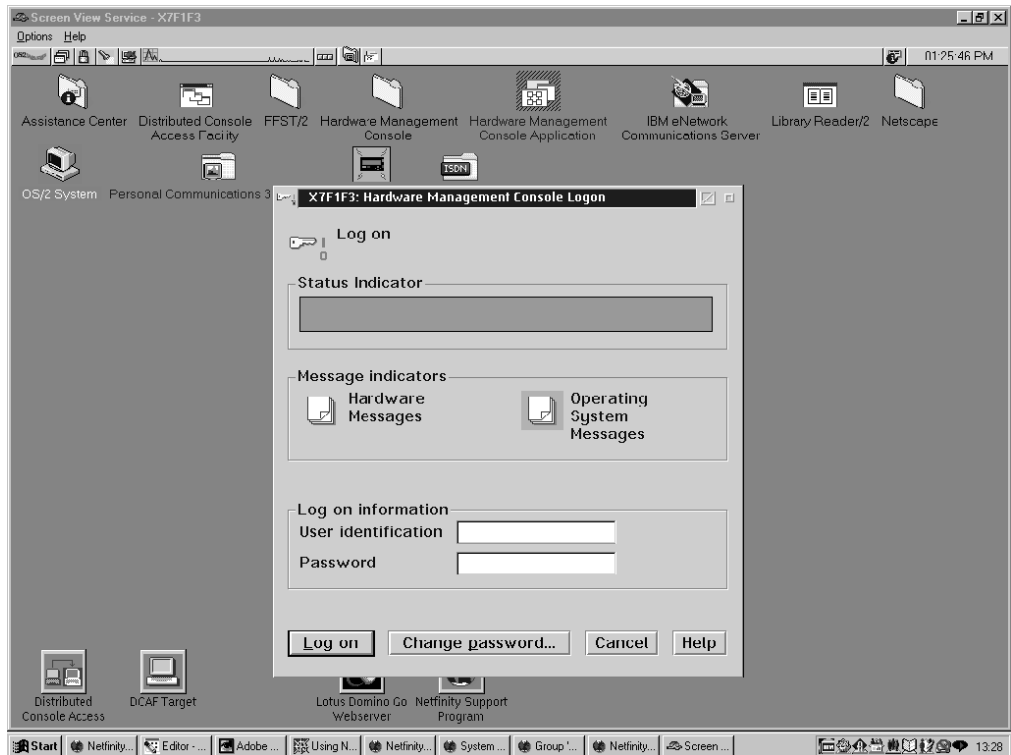


Figure 112. Screen View of a HMC

The Hardware Management Console Application uses code from the DCAF product. The Netfinity Remote Workstation Control function and DCAF on the HMC are not compatible. Because of that, you cannot control the keyboard and the desktop of an HMC from the Netfinity manager workstation.

You can use the Netfinity Screen View service together with other services to perform availability checking or problem determination. Note, that the userID and password you enter to login to a remote HMC from the Netfinity manager workstation, does not log you on to the Hardware Management Console Application.

Chapter 14. Using Desktop On-Call in an SA OS/390 Environment

In order to use Desktop On-Call and its functions, it must be started on the remote Host-PC. This can be customized to happen automatically at startup time of the Host-PC. In an SA OS/390 environment, you can use the Desktop On-Call Guest-PC function from your operator workstation. Usually this workstation supports 3270 emulation capability to monitor multiple NetView operator sessions. Depending on additional programs running on your workstation, for example, the NetView Management Console (NMC) client application, the operator workstation can be a versatile operator tool to manage and control an OS/390 automation environment including your remote processor operations PCs or HMCs.

Starting a Desktop On-Call Session



Figure 113. Desktop On-Call Session Control

After starting the web browser on your workstation, enter the URL of the Host PC to which you want to establish a remote session. The Desktop On-Call main page is then displayed allowing you to logon to the Host PC. The main page indicates the current connection status and allows you to start a file transfer session and a remote control session.

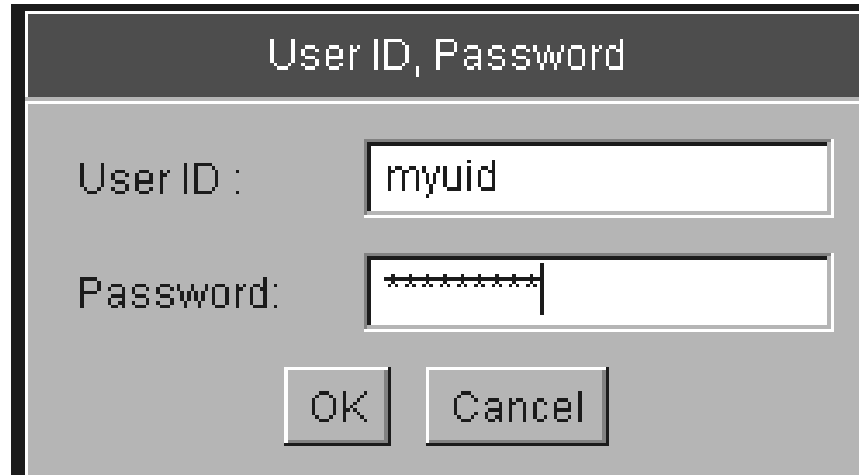


Figure 114. user ID Prompt

When prompted (see Figure 114), enter a valid user ID and password as defined on the Host-PC.

Launch Map

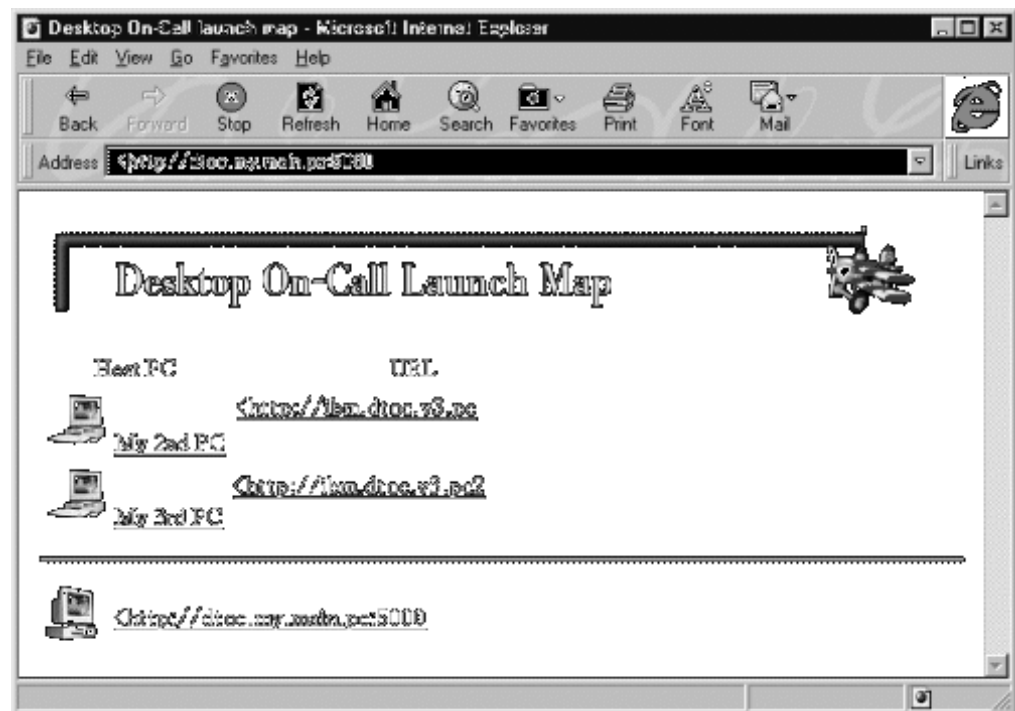


Figure 115. Desktop On-Call Launch Map

In an SA OS/390 environment with multiple remote processor operations PCs or Hardware Management Consoles, you can use the Launch Map function of Desktop On-Call to organize a central launch place for all remote connections. See the Desktop On-Call online documentation for more information on how to customize and use this function.

Use Cases of Desktop On-Call in an SA OS/390 Environment

The following section gives you some ideas on how to use the functions provided by Desktop On-Call in the processor operations environment.

Software Maintenance and Configuration

After adding a new 3270 connection card to the processor operations PC *PCNR1* by technical support personal, the adjusted version of the processor operations stand-alone function profile has to be transferred to this workstation. All processor operations profiles are kept on a central maintenance workstation which acts as the Desktop On-Call Guest-PC. On this Guest-PC the WWW browser is started and the following steps are performed:

- From the Desktop On-Call main panel login to Host-PC *PCNR1*
- Start a File Transfer session

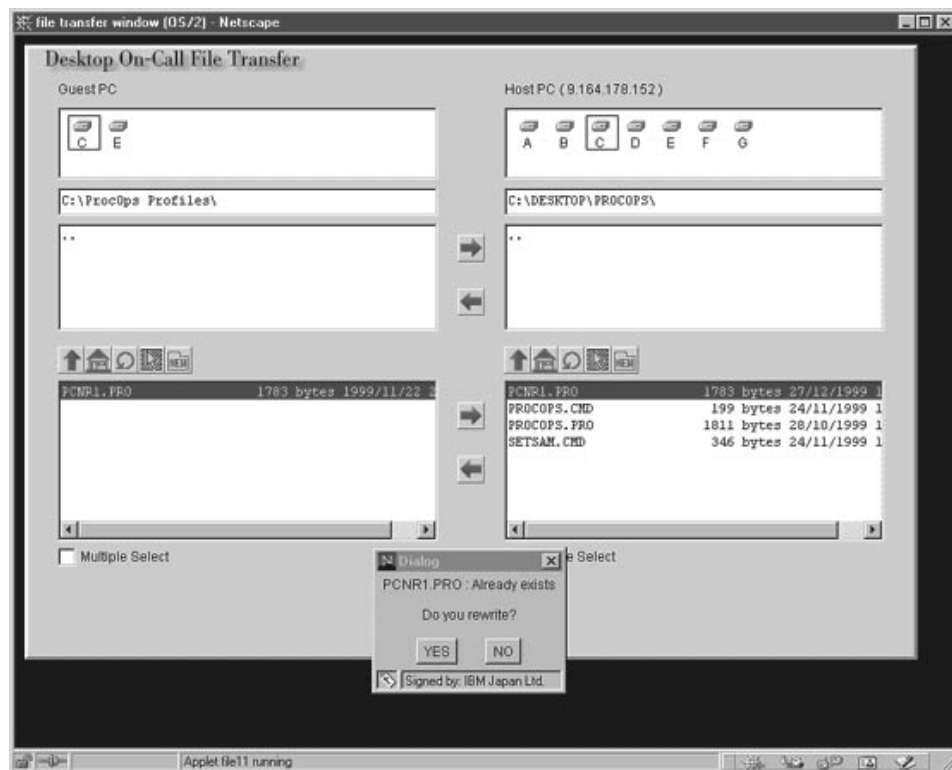


Figure 116. File Transfer Window

After starting a Desktop On-Call session to Host-PC *PCNR1*, the File Transfer session function is activated from the Guest-PCs browser, which starts a new browser window. In this window you can specify directories or files to be transferred between the Guest and the Host-PC or vice versa. You may use this service to transfer a new or changed processor operations stand-alone profile to your client workstation. Another application could be to install the processor operations distributed feature code on a Host-PC from your Desktop On-Call Guest-PC, which serves as a processor operations master system.

Processor Operations PC Operation

Due to a networking problem, the SNA/APPC session between the processor operations PC *PCNR1* and its NetView focal point is not available. A verification

should be made if it is possible to use the processor operations local passthru function to access a connected console in case of emergency.

- Remote Desktop Control:

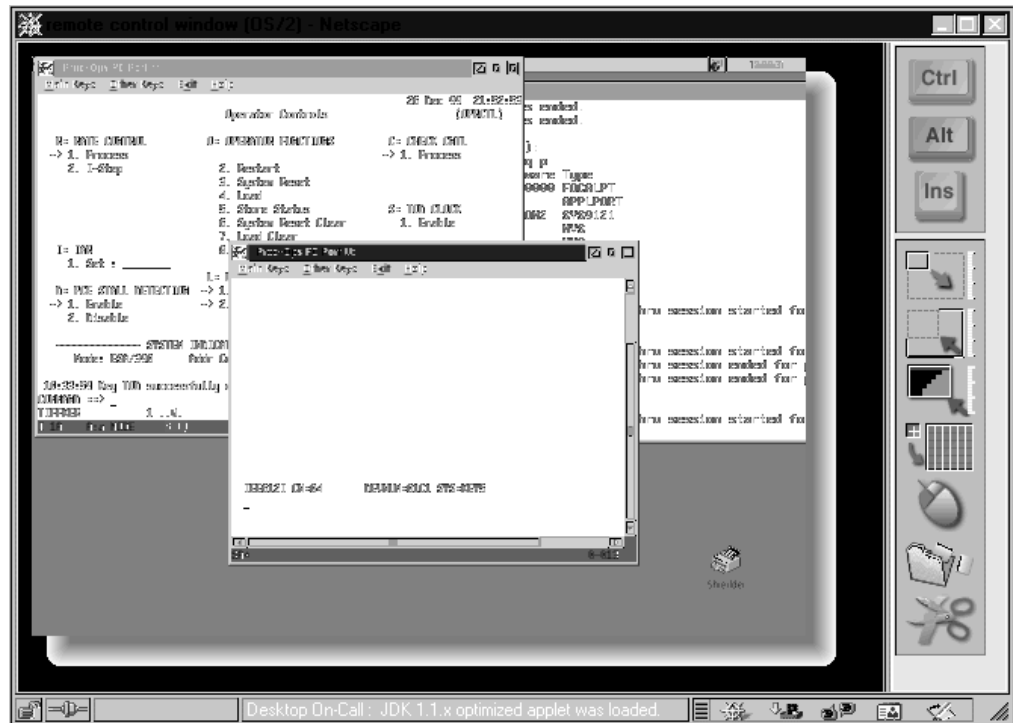


Figure 117. Remote Control Window (1)

With this service you have full control over the desktop of the client workstation and the keyboard. By this, the processor operations local passthru function can be used to manually operate a 3270 console.

Note: Depending on the networking performance, this service may perform slowly. In such cases consider customizing the PC-Host settings. One way to improve performance of Desktop On-Call is to choose monotone instead of color in the PC-Host properties window.

Problem Determination

On Host PC *PCNR1*, the SNA local LU cannot establish a processor operations APPC session with its Focal Point NetView.

- Remote Control:

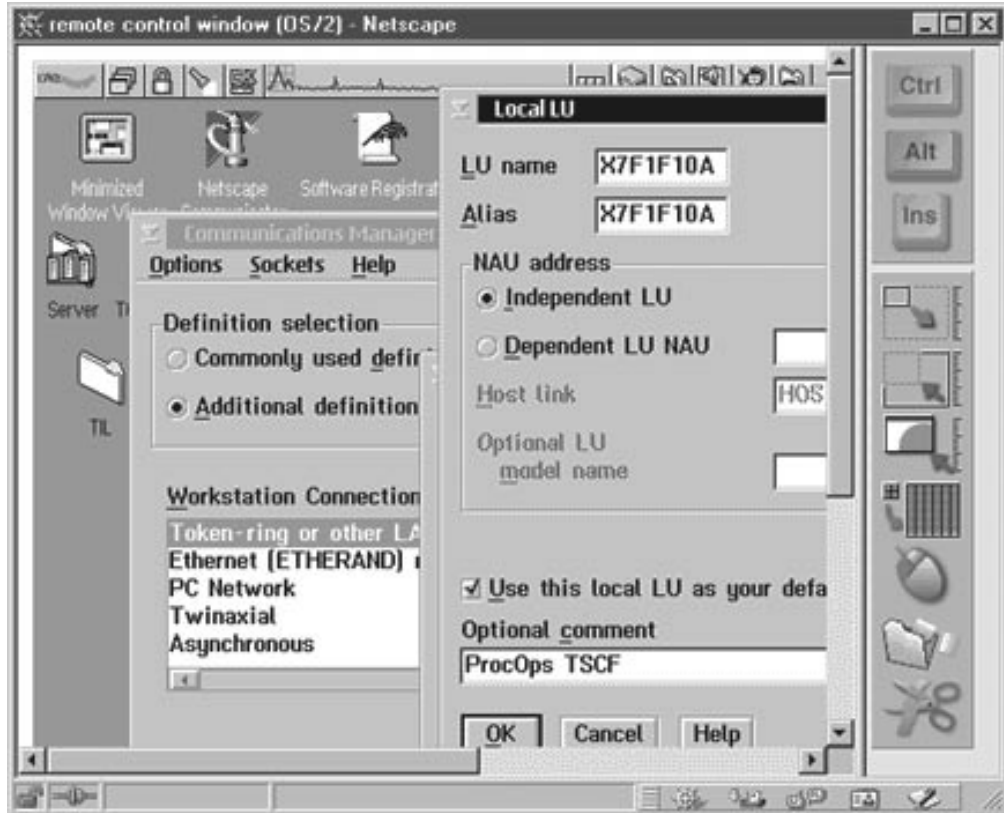


Figure 118. Remote Control Window (2)

With the help of a remote control session, the *Communications Manager Setup* window is used to check the local LU SNA name. Since it has been changed in the SNA Network definitions, the new name can be entered here to fix the problem.

Recovery

After the processor operations distributed feature code has been updated on *PCNR1*, the PC needs to be rebooted from remote.



Figure 119. Remote Control Window (3)

In cases where you cannot shutdown the processor operations PC from the NetView host, you can use the OS/2 command *SETBOOT* to force a reboot of the workstation. Keep in mind that once this command is executed, any processor operations session and the Desktop On-Call session are terminated. You should have configured Desktop On-Call to be automatically started at workstation startup time, otherwise you may have lost control. Please refer to an OS/2 command reference for more information about the *SETBOOT* command.

Using Desktop On-Call for a HMC

After customizing the Desktop On-Call program to start automatically at HMC startup time and after defining the authorized users, you can access the HMC for remote control purposes from a Desktop On-Call Guest PC.

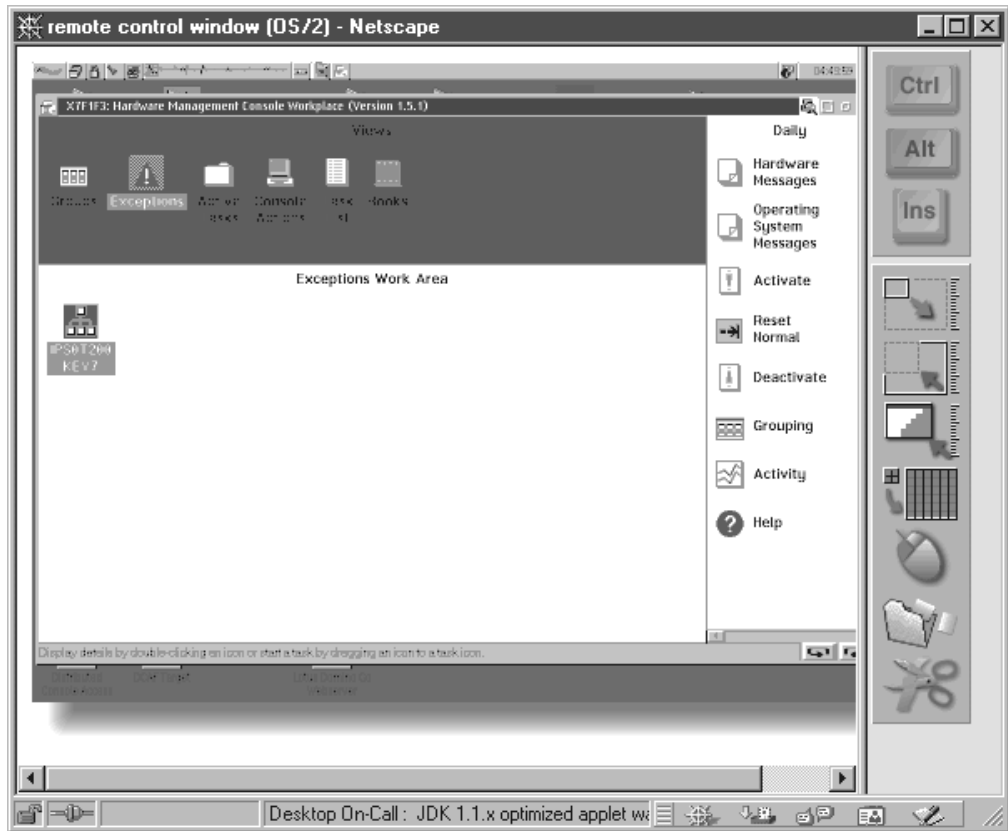


Figure 120. Remote Control Window (3)

Note, that the user ID and password you enter to login to a remote HMC from the Guest-PC, does not log you on to the Hardware Management Console Application. For this, a separate logon is required. One of the HMC features is the color coded status indication of its managed objects. If you customize a Desktop On-Call session to use monotone color mode, you will not have this visibility aid available because all HMC colors appear as shades of gray on your Guest-PC.

Part 4. TEC Notification by SA OS/390

Chapter 15. Using TEC Notification by SA OS/390

This chapter describes how to use TEC Notification by SA OS/390. After an introduction, “SA OS/390 Messages, Alerts and Tivoli Events” on page 248 describes how SA OS/390 messages and NetView alerts are mapped to Tivoli events. “Operation of TEC Notification by SA OS/390” on page 257 contains the information required to monitor Tivoli events from the Tivoli desktop. You find information on how to install TEC Notification by SA OS/390 in *System Automation for OS/390 Planning and Installation*.

Understanding the Use of TEC Notification by SA OS/390

SA OS/390 is an availability management product and covers several aspects of automation and enterprise monitoring of OS/390 for a single system as well as in a sysplex environment.

However, automation may fail and in such cases, messages or alerts indicate that administrator intervention is required. In those cases, SA OS/390 sends out messages to the NetView operators and/or the system operator. The system operator is responsible for handling all events reported by SA OS/390 from a single point of control for systems automation.

It may be desirable, however, to run SA OS/390 integrated with Tivoli, so that events reported by SA OS/390 as well as other events reported in a distributed heterogeneous environment are received at and handled from a single point of control. So SA OS/390 is enhanced in a way that SA OS/390 notifies the Tivoli Enterprise Console™ (TEC) in cases when SA OS/390 issues messages and alerts indicating critical situations. Such messages and alerts are forwarded to the TEC event server.

Thus, a Tivoli administrator running the Tivoli Enterprise Console may become aware of this event. The Tivoli administrator may also be notified when such an event is received by running an appropriate TEC rule which for example triggers a Tivoli notice to be sent to the Tivoli administrator’s notice board.

You may also correlate such an event with other events from the distributed heterogeneous environment so that the coincidence of correlated events may trigger a certain action.

Thus, a Tivoli administrator can use the Tivoli Enterprise Console as a single point of control for monitoring and handling events from both the distributed environment and SA OS/390.

This function of SA OS/390 is called *TEC Notification by SA OS/390*. This notification is taking advantage of the *Tivoli GEM Event/Automation Service*. In this environment, the source of notification is of no importance. All events occurring in your enterprise, originating from Tivoli, NetView or SA OS/390 and so on, are handled from the Tivoli Enterprise Console which is the single point of control for Tivoli administrators.

The *GEM Event/Automation Service* allows you to effectively manage both distributed and OS/390 events from a single interface on a single console. You can exploit the event correlation and automation capabilities of the Tivoli Enterprise

Console for all events in the enterprise. You can find more information on the GEM Event/Automation Service in *Tivoli Global Enterprise Manager User's Guide* and *Tivoli Global Enterprise Manager Adapter Guide*.

A Note on Terms:

A selection of SA OS/390 messages is mapped to Tivoli events. In contrast to traditional Tivoli events, these new events mapped from SA OS/390 messages will be called **SA OS/390 events** in this documentation.

Introduction of TEC Notification by SA OS/390

The SA OS/390 notification may notify Tivoli Enterprise Console (TEC) about an automation problem on OS/390 by sending an event to the TEC event server.

For this purpose, on OS/390 systems, messages or alerts are transformed into Tivoli events and sent to the *TEC event server* which is running on a Tivoli managed node in your network.

These events in turn may cause a notification of a Tivoli administrator on the TEC, may be correlated with other events on the TEC event server, or may result in opening a trouble ticket for example, dependent on what you programmed at the TEC event server.

The TEC event server is a notification target for SA OS/390. Note that not all messages, but only messages indicating critical situations and alerts are forwarded as TEC events to the TEC event server using the respective Tivoli GEM Event/Automation Service Adapter.

A Tivoli administrator who wants to deal with a problem indicated by an event forwarded to the TEC event server by SA OS/390 needs access to the affected OS/390 system. For this purpose, you may use the Tivoli NetView 3270 Management Console. With TEC Notification by SA OS/390, the TEC administrator may log on to the NetView operator console by starting the NetView 3270 Management Console from the TEC console by executing a task. See "How TEC Notification by SA OS/390 Works" on page 259 for a description on how to achieve that.

Note: Forwarding of SA OS/390 messages to TEC will not start until SA OS/390 and the GEM Event/Automation Service are up and running. SA OS/390 messages issued during SA OS/390 startup will not be forwarded to TEC.

SA OS/390 Messages, Alerts and Tivoli Events

Not the complete set of SA OS/390 messages is mapped to Tivoli events, but only an appropriate selection is handled by TEC Notification by SA OS/390. Table 9 on page 249 shows which messages and alerts are mapped to Tivoli events. Table 10 on page 252 shows a list of available new Tivoli events mapped from SA OS/390 messages and how they are integrated into the existing Tivoli event class structure. For details on the format of message mapping or alert mapping see the respective shipped files: *INGMFMT* for message mapping and *INGACDS* for alert mapping.

Section "TEC Rules for SA OS/390 Events" on page 255 describes the correlation rules between certain SA OS/390 events defined by TEC Notification by SA OS/390.

Mapping SA OS/390 Messages to Tivoli Events

In this section:

- you find information about the Tivoli event class structure,
- Table 9 shows how SA OS/390 messages are mapped to Tivoli events (SA OS/390 events)
- Table 10 on page 252 shows for all involved SA OS/390 events, how SA OS/390 messages are mapped to them.

For more information about the meaning of SA OS/390 messages, refer to *System Automation for OS/390 Messages and Codes*.

Event classes are defined hierarchically, with child classes inheriting attribute value defaults from the parent. The SA OS/390 event classes follow a simple hierarchy.

All SA OS/390 events are instances of event classes which inherit from *NV390MSG_SA* which in turn inherits from event class *NV390MSG_Event*, the top level class of all event classes. All event classes defined for the NetView message adapter inherit from this class. This inheritance structure is outlined in Figure 121 on page 252.

The following attributes are used in event group filters. They are set by the NetView OS/390 Message Adapter and overridden by TEC Notification by SA OS/390:

sub_source

All events originating from SA OS/390 messages are issued by SA OS/390 system operations. This is indicated by `sub_sources="SA0S390_Sys0ps"`.

The following attributes are new with *NV390MSG_SA* and common for all SA OS/390 events:

date_msg

Gives the date and time when the message is generated. This may differ from the date and time the event to which it is mapped is generated - see attribute **date**. The format is "MMM dd, hh:mm:ss" as in date and date_reception, for example, **Nov 03, 18:34:27**.

system_id

Is a 1-8 character identifier of the OS/390 system image on which the message was issued.

sysplex_id

Is a 1-8 character identifier of the sysplex from which the message originated. As it is not always applicable the default is *N/A*.

os_version

OS/390 system product level of the OS/390 system on which the message was generated.

Table 9. Mapping SA OS/390 Messages to SA OS/390 Events

SA OS/390 Message	Tivoli Event Class	Tivoli Severity
AOF200I	SA390MSG_CmdUnexpectedCmdResult	CRITICAL
AOF201I	SA390MSG_ClistFailed	CRITICAL
AOF203I	SA390MSG_ClistAuthorizationFailed	WARNING
AOF204I	SA390MSG_ClistInvalidMissingParms	WARNING
AOF205A	SA390MSG_ClistFailedTimerExpired	CRITICAL

Table 9. Mapping SA OS/390 Messages to SA OS/390 Events (continued)

SA OS/390 Message	Tivoli Event Class	Tivoli Severity
AOF206I	SA390MSG_CmdFailed	CRITICAL
AOF211E	SA390MSG_ACFNoAutoOps	CRITICAL
AOF212I	SA390MSG_ACFNoPrimaryOperatorID	CRITICAL
AOF213E	SA390MSG_CFGLOCKFailed	CRITICAL
AOF214A	SA390MSG_EnvironmentNotInitialized	CRITICAL
AOF216I	SA390MSG_EnvironmentNotInitialized	CRITICAL
AOF218I	SA390MSG_CmdFailedACFSaveInProgress	WARNING
AOF221I	SA390MSG_ACFNoPrimaryFocalPoint	WARNING
AOF222I	SA390MSG_ACFNoBackupFocalPoint	WARNING
AOF228I	SA390MSG_NoInactiveResourceInScope	WARNING
AOF230I	SA390MSG_ACFNoTimeoutValue	WARNING
AOF231I	SA390MSG_ACFTimeoutValueInvalid	CRITICAL
AOF232I	SA390MSG_ACFNoTimeoutValue	WARNING
AOF241I	SA390MSG_ClistInvalidMissingParms	CRITICAL
AOF244I	SA390MSG_ShutdownDelayed	HARMLESS
AOF248I	SA390MSG_ShutdownAlreadyInProgress	WARNING
AOF253I	SA390MSG_TimerNotFound	WARNING
AOF255I	SA390MSG_ACFInvalidUserExit	CRITICAL
AOF256I	SA390MSG_ACFNoOptionalExits	CRITICAL
AOF292I	SA390MSG_CannotAssignReplyId	CRITICAL
AOF293I	SA390MSG_NoOutstandingReply	CRITICAL
AOF294I	SA390MSG_SpoolShortageCmdsExhausted	CRITICAL
AOF303I	SA390MSG_RequestedStateAlreadySet	WARNING
AOF305I	SA390MSG_ProcessorNotInControl	WARNING
AOF309I	SA390MSG_TimerForCatchupExecuted	HARMLESS
AOF312E	SA390MSG_AutoFlagAlreadyOff	WARNING
AOF314I	SA390MSG_TimerForCatchupNotExecuted	CRITICAL
AOF315I	SA390MSG_TimerDeleted	HARMLESS
AOF324A	SA390MSG_ACFInvalidEntry	CRITICAL
AOF350E	SA390MSG_ClistFailed	CRITICAL
AOF355E	SA390MSG_ClistFailed	CRITICAL
AOF356E	SA390MSG_ClistFailed	CRITICAL
AOF501I	SA390MSG_ThresholdActionTaken	WARNING
AOF561A	SA390MSG_ACFNoDrainCmds	WARNING
AOF562I	SA390MSG_JES2DrainFailed	CRITICAL
AOF563A	SA390MSG_UnknownResourceType	WARNING
AOF564A	SA390MSG_ShutdownHaltedActiveJobDev	WARNING
AOF565A	SA390MSG_DrainCmdOff	WARNING
AOF568I	SA390MSG_OutBoundGTWStatus	WARNING

Table 9. Mapping SA OS/390 Messages to SA OS/390 Events (continued)

SA OS/390 Message	Tivoli Event Class	Tivoli Severity
AOF569I	SA390MSG_InBoundGTWStatus	WARNING
AOF575A	SA390MSG_RecoveryNotInProgress	CRITICAL
AOF576A	SA390MSG_RecoveryAutoFlagOff	WARNING
AOF577E	SA390MSG_ThresholdRecoveryHalted	WARNING
AOF580I	SA390MSG_AutoFlagOff	CRITICAL
AOF582A	SA390MSG_RecoveryFailed	CRITICAL
AOF583I	SA390MSG_AutoFlagOff	CRITICAL
AOF584I	SA390MSG_ACFNoCmds	CRITICAL
AOF585I	SA390MSG_AutomationAlreadyInProgress	WARNING
AOF587I	SA390MSG_ThresholdRecoveryContinued	WARNING
AOF591E	SA390MSG_RecoveryAutoFlagOff	WARNING
AOF593A	SA390MSG_ShutdownCmdsExhausted	CRITICAL
AOF608A	SA390MSG_WarmStartFailure	CRITICAL
AOF609A	SA390MSG_InvalidReply	MINOR
AOF701A	SA390MSG_MsgTableNotLoaded	CRITICAL
AOF703E	SA390MSG_CmdsExhausted	CRITICAL
AOF719I	SA390MSG_ClistUnexpectedCmdResult	CRITICAL
AOF739I	SA390MSG_ACFNoJESSSubsystem	CRITICAL
AOF740A	SA390MSG_ShutdownAutoFlagOff	CRITICAL
AOF745E	SA390MSG_ShutdownNoFinalMsg	WARNING
AOF746A	SA390MSG_ShutdownSuspended	CRITICAL
AOF747A	SA390MSG_ShutdownStuck	CRITICAL
AOF748E	SA390MSG_ShutdownNoFinalMsgResume	WARNING
AOF750I	SA390MSG_ShutdownCmdRplyFailed	CRITICAL
AOF752E	SA390MSG_ShutdownAutoFlagOff	CRITICAL
AOF754A	SA390MSG_ShutdownHalfdown	CRITICAL
AOF759A	SA390MSG_RecoveryACFCMDFailed	CRITICAL
AOF760E	SA390MSG_ClistTrapped	CRITICAL
AOF766I	SA390MSG_ACFEntryMissed	CRITICAL
AOF768I	SA390MSG_ACFEntryMissed	CRITICAL
AOF797A	SA390MSG_ACFLoadStopped	CRITICAL
AOF859I	SA390MSG_ACFInstructionIncomplete	CRITICAL
AOF860I	SA390MSG_ACFInstructionRejected	WARNING
AOF861I	SA390MSG_ACFRetractRejected	WARNING
AOF862I	SA390MSG_ACFBadInstruction	CRITICAL
AOF863I	SA390MSG_ACFDuplicateAssert	WARNING
AOF864I	SA390MSG_ACFModifyToAssert	WARNING
AOF865I	SA390MSG_ACFInheritedDataModified	WARNING
AOF866I	SA390MSG_ACFInvalidKeyword	WARNING

Table 9. Mapping SA OS/390 Messages to SA OS/390 Events (continued)

SA OS/390 Message	Tivoli Event Class	Tivoli Severity
AOF867I	SA390MSG_ACFInconsistentData	CRITICAL
AOF868I	SA390MSG_ACFNoJESSubsystem	CRITICAL

Figure 121 outlines the inheritance structure of SA OS/390 event classes.

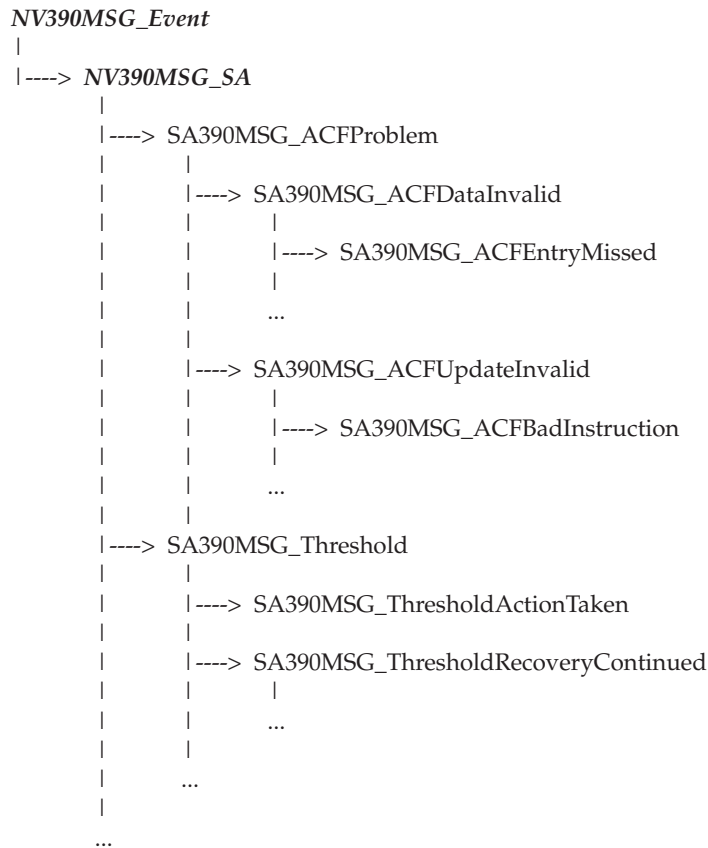


Figure 121. Tivoli Event Inheritance

In the example of Figure 121 you see that *SA390MSG_Threshold* is the base class for all SA OS/390 events indicating reached critical thresholds.

Table 10 gives the details of the inheritance structure of SA OS/390 event classes.

Table 10. SA OS/390 Events and Corresponding Mapped SA OS/390 Messages

Tivoli Event Class	SA OS/390 Message	Tivoli Severity
<i>SA390MSG_ACFLoadStopped</i>	AOF797A	CRITICAL
<i>SA390MSG_ACFProblem</i>	base class	
<i>SA390MSG_ACFDataInvalid</i>	base class	
SA390MSG_ACFEntryMissed	AOF766I AOF768I	CRITICAL
SA390MSG_ACFInconsistentData	AOF867I	CRITICAL

Table 10. SA OS/390 Events and Corresponding Mapped SA OS/390 Messages (continued)

Tivoli Event Class	SA OS/390 Message	Tivoli Severity
SA390MSG_ACFInstructionIncomplete	AOF859I	CRITICAL
SA390MSG_ACFInvalidEntry	AOF324A	CRITICAL
SA390MSG_ACFInvalidUserExit	AOF255I	CRITICAL
SA390MSG_ACFNoAutoOps	AOF211E	CRITICAL
SA390MSG_ACFNoBackupFocalPoint	AOF222I	WARNING
SA390MSG_ACFNoCmds	AOF584I	CRITICAL
SA390MSG_ACFNoDrainCmds	AOF561A	WARNING
SA390MSG_ACFNoJESSubsystem	AOF739I AOF868I	CRITICAL
SA390MSG_ACFNoOptionalExits	AOF256I	CRITICAL
SA390MSG_ACFNoPrimaryFocalPoint	AOF221I	WARNING
SA390MSG_ACFNoTimeoutValue	AOF230I AOF232I	WARNING
SA390MSG_ACFTimeoutValueInvalid	AOF231I	CRITICAL
<i>SA390MSG_ACFUpdateInvalid</i>	base class	
SA390MSG_ACFBadInstruction	AOF862I	CRITICAL
SA390MSG_ACFDuplicateAssert	AOF863I	WARNING
SA390MSG_ACFInheritedDataModified	AOF865I	WARNING
SA390MSG_ACFInstructionRejected	AOF860I	WARNING
SA390MSG_ACFInvalidKeyword	AOF866I	WARNING
SA390MSG_ACFModifyToAssert	AOF864I	WARNING
SA390MSG_ACFRetractRejected	AOF861I	WARNING
SA390MSG_AutoFlagAlreadyOff	AOF312E	WARNING
<i>SA390MSG_AutoFlagOff</i>	AOF580I AOF583I	CRITICAL
<i>SA390MSG_AutomationAlreadyInProgress</i>	AOF585I	WARNING
<i>SA390MSG_CannotAssignReplyId</i>	AOF292I	CRITICAL
<i>SA390MSG_CFGLOCKFailed</i>	AOF213E	CRITICAL
<i>SA390MSG_Clist</i>	base class	
SA390MSG_ClistAuthorizationFailed	AOF203I	WARNING
SA390MSG_ClistFailed	AOF201I AOF350E AOF355E AOF356E	CRITICAL
SA390MSG_ClistFailedTimerExpired	AOF205A	CRITICAL
SA390MSG_ClistInvalidMissingParms	AOF204I AOF241I	WARNING
SA390MSG_ClistTrapped	AOF760E	CRITICAL
SA390MSG_ClistUnexpectedCmdResult	AOF719I	CRITICAL
<i>SA390MSG_CmdFailed</i>	AOF206I	CRITICAL

Table 10. SA OS/390 Events and Corresponding Mapped SA OS/390 Messages (continued)

Tivoli Event Class	SA OS/390 Message	Tivoli Severity
<i>SA390MSG_CmdFailedACFSaveInProgress</i>	AOF218I	WARNING
<i>SA390MSG_CmdsExhausted</i>	AOF703E	CRITICAL
<i>SA390MSG_CmdUnexpectedCmdResult</i>	AOF200I	CRITICAL
<i>SA390MSG_DrainCmdOff</i>	AOF565A	WARNING
<i>SA390MSG_EnvironmentNotInitialized</i>	AOF214A AOF216I	CRITICAL
<i>SA390MSG_InBoundGTWStatus</i>	AOF569I	WARNING
<i>SA390MSG_InvalidReply</i>	AOF609A	MINOR
<i>SA390MSG_JES2DrainFailed</i>	AOF562I	CRITICAL
<i>SA390MSG_MsgTableNotLoaded</i>	AOF701A	CRITICAL
<i>SA390MSG_NoInactiveResourceInScope</i>	AOF228I	WARNING
<i>SA390MSG_NoOutstandingReply</i>	AOF293I	CRITICAL
<i>SA390MSG_OutBoundGTWStatus</i>	AOF568I	WARNING
<i>SA390MSG_ProcessorNotInControl</i>	AOF305I	WARNING
<i>SA390MSG_RequestedStateAlreadySet</i>	AOF303I	WARNING
<i>SA390MSG_SpoolShortageCmdsExhausted</i>	AOF294I	CRITICAL
<i>SA390MSG_SubsystemRecovery</i>	base class	
<i>SA390MSG_RecoveryACFCMDFailed</i>	AOF759A	CRITICAL
<i>SA390MSG_RecoveryAutoFlagOff</i>	AOF576A AOF591E	WARNING
<i>SA390MSG_RecoveryFailed</i>	AOF582A	CRITICAL
<i>SA390MSG_RecoveryNotInProgress</i>	AOF575A	CRITICAL
<i>SA390MSG_SubsystemShutdown</i>	base class	
<i>SA390MSG_ShutdownAlreadyInProgress</i>	AOF248I	WARNING
<i>SA390MSG_ShutdownAutoFlagOff</i>	AOF740A AOF752E	CRITICAL
<i>SA390MSG_ShutdownCmdsExhausted</i>	AOF593A	CRITICAL
<i>SA390MSG_ShutdownCmdRplyFailed</i>	AOF750I	CRITICAL
<i>SA390MSG_ShutdownDelayed</i>	AOF244I	HARMLESS
<i>SA390MSG_ShutdownHalfdown</i>	AOF754A	CRITICAL
<i>SA390MSG_ShutdownHaltedActiveJobDev</i>	AOF564A	WARNING
<i>SA390MSG_ShutdownNoFinalMsg</i>	AOF745E	WARNING
<i>SA390MSG_ShutdownNoFinalMsgResume</i>	AOF748E	WARNING
<i>SA390MSG_ShutdownStuck</i>	AOF747A	CRITICAL
<i>SA390MSG_ShutdownSuspended</i>	AOF746A	CRITICAL
<i>SA390MSG_Threshold</i>	base class	
<i>SA390MSG_ThresholdActionTaken</i>	AOF501I	WARNING
<i>SA390MSG_ThresholdRecoveryContinued</i>	AOF587I	WARNING
<i>SA390MSG_ThresholdRecoveryHalted</i>	AOF577E	WARNING

Table 10. SA OS/390 Events and Corresponding Mapped SA OS/390 Messages (continued)

Tivoli Event Class	SA OS/390 Message	Tivoli Severity
<i>SA390MSG_Timer</i>	base class	
SA390MSG_TimerDeleted	AOF315I	HARMLESS
SA390MSG_TimerForCatchupExecuted	AOF309I	HARMLESS
SA390MSG_TimerForCatchupNotExecuted	AOF314I	CRITICAL
SA390MSG_TimerNotFound	AOF253I	WARNING
<i>SA390MSG_UnknownResourceType</i>	AOF563A	WARNING
<i>SA390MSG_WarmStartFailure</i>	AOF608A	CRITICAL

Mapping NetView Alerts to Tivoli Events

SA OS/390 processor operations indicates severe failures which require operator intervention by issuing NetView alerts.

These alerts are forwarded to the Tivoli Enterprise Console exploiting the Tivoli GEM alert adapter. The generic mapping of the NetView generic alerts applies, that is, no new event classes are introduced, but those defined by the NetView OS/390 alert adapter.

The only attribute default changed in case of alerts issued by SA OS/390 processor operations is the default of the attribute *sub_source*. While the adapter fills in *NET* as default, the *sub_source* attribute has the value *SAOS390_ProcOps* in case of alerts issued by SA OS/390.

The following table describes the resulting mapping of SA OS/390 processor operations alerts to the Tivoli Enterprise Console event classes:

Table 11. Mapping SA OS/390 Messages to SA OS/390 Events

AlertId	SA OS/390 processor operations Alert	Tivoli Event Class
1	COMMUNICATION TASK FAILED	SNA_Software_Program_Error
2	LOST PS/2 SESSION	SNA_Link_Error
3	DCCF DETECTED	SNA_Software_Program_Error
4	WAIT STATE DETECTED	SNA_Software_Program_Error
5	CONSOLE LOST	SNA_Input_Output_Device_Error
6	CONSOLE ACCESS LOST	SNA_Input_Output_Device_Error
7	COULD NOT OBTAIN SYSTEM CONSOLE	SNA_Input_Output_Device_Error
8	TARGET HARDWARE PROBLEM	SNA_Equipment_Malfunction

TEC Rules for SA OS/390 Events

A selected set of SA OS/390 messages is mapped to Tivoli events and forwarded to the Tivoli Enterprise Console. Those events can be filtered at the Tivoli Enterprise Console, correlated with other events, and/or trigger an action.

With TEC Notification by SA OS/390 you receive a set of sample rules correlating SA OS/390 events.

The following sections list the SA OS/390 messages for which correlation rules are provided and the semantics of those rules is shortly described.

Correlation Rules for SA OS/390 Message AOF564A

SA OS/390 Message

```
AOF564A time : { JES2 SHUTTING DOWN - txt - OPERATOR INTERVENTION  
REQUIRED | title | {job_name } + | {task_name}+ | {device_name}+ }
```

Where '*txt*' is one of:

```
DEVICES NOT DRAINED  
JOBS STILL EXECUTING  
JOBS STILL EXECUTING, DEVICES NOT DRAINED  
TASKS STILL EXECUTING, DEVICES NOT DRAINED  
JOBS AND TASKS STILL EXECUTING  
JOBS AND TASKS STILL EXECUTING,DEVICES NOT DRAINED
```

and '*title*' is one of:

```
Tasks ...  
Devices ...  
Jobs ...
```

Description

JES2 is being shutdown and there are jobs, tasks and/or devices that have not been drained. This is indicated by :

```
AOF564A time : JES2 SHUTTING DOWN - txt -  
OPERATOR INTERVENTION REQUIRED.
```

This message is followed by a number of messages of type

```
AOF564A time : title  
AOF564A time : {device_name } + | {job_name }+ | {task_name }+
```

providing the jobs/tasks/devices causing the shutdown halt.

Event Class

```
SA390MSG_ShutdownHaltedActiveJobDev
```

Event Severity

```
WARNING
```

Correlation Rules:

```
sa390msg_related_564_rule1  
sa390msg_related_564_rule2  
sa390msg_related_564_rule3  
sa390msg_related_564_rule4  
sa390msg_related_564_rule5  
sa390msg_related_564_rule6
```

These rules link events originating from messages:

```
AOF564A time : {device_name } + | {job_name }+ | {task_name }+
```

to the event originating from a message

```
AOF564A time : JES2 SHUTTING DOWN - txt - OPERATOR INTERVENTION REQUIRED.
```

Further devices/jobs/tasks listed in the above message are copied to attribute *user2* of the event originating from

```
AOF564A time : JES2 SHUTTING DOWN - txt - OPERATOR INTERVENTION REQUIRED.
```

When events originating from messages of type

AOF564A time : title

are received, the information on the type of resource causing the shutdown halt is added to attribute *user1* of the event originating from

AOF564A time : JES2 SHUTTING DOWN - txt - OPERATOR INTERVENTION REQUIRED.

If the status of an event originating from a message of type

AOF564A time : {device_name } + | {job_name }+ | {task_name }+

is changed, this is propagated to the linked message originating from a message of type

AOF564A time : JES2 SHUTTING DOWN - txt - OPERATOR INTERVENTION REQUIRED.

by adding this information into attributes *user3* and *user4*.

Operation of TEC Notification by SA OS/390

This chapter describes the use of TEC Notification by SA OS/390. It is separated in the following sections describing the appropriate aspects of using TEC Notification by SA OS/390:

- “Startup of TEC Notification by SA OS/390”
- “How TEC Notification by SA OS/390 Works” on page 259
- “Termination of TEC Notification by SA OS/390” on page 262

The starting point for all Tivoli-related operations after a successful startup of TEC Notification by SA OS/390 is the Tivoli desktop.

Startup of TEC Notification by SA OS/390

This section lists:

- the actions you need to perform to prepare the monitored OS/390 systems for routing messages and alerts to Tivoli (see “Host Part”)
- the actions that need to be performed on the monitoring Tivoli Enterprise Console to let you see incoming events displayed (see “Tivoli Enterprise Console Part” on page 258).

Host Part

Prerequisites:

- Tivoli NetView for OS/390 is up and running.
- Automation table with fragment *INGMTEC* included is active.
- System Automation for OS/390 is initialized.

If all prerequisites are fulfilled, the autotask has been started and the notification classes for the autotask have been set. Message *AOF646I (Tivoli Enterprise Console Notification Service is initialized)* is issued to indicate that the system is correctly customized and initialized.

Actions and System Responses:

1. On the OS/390 focal point system where the message adapter is running, you need to start the GEM Event/Automation Service. Issue the command:

```
S IHSAEVNT
```

If you issue this command as shown here without any options, the GEM Event/Automation Service will use the defined initialization and adapter configuration files. For more information on this command, see *Tivoli Global Enterprise Manager User's Guide*.

- As a result of the previous step, the message adapter and, if configured, the alert adapter become initialized. If these initializations are complete, this is indicated by the *IHS0124I* messages:

IHS0124I: Message adapter task initialization complete.

IHS0124I: Alert adapter task initialization complete.

- The message *IHS0124I* for the message adapter triggers the execution of the Notification Service initialization procedure *INGRTIN*. This procedure sets the environment global variables and as a result of this procedure, the routing of SA OS/390 messages to TEC is enabled. This is indicated by message *AOF642I: Tivoli Enterprise Console Notification Service is enabled.*
- The alert routing must be enabled manually. Either on the SA OS/390 processor operations focal point system or on the SA OS/390 system operations focal point system, depending on where the GEM alert adapter is running, you need to issue the NetView command

NPDA SRFILTER TECROUTE PASS E NTFY

to set the alert filter for alerts of type *NOTIFICATION* to *PASS*.

The message *BNJ1341I SRF/SRFILTER COMMAND ACCEPTED* is returned. The correct setting for the filter can be verified by issuing the command ***NPDA DFILTER TECROUTE***. The output shown below should be displayed on the NetView console with the action for the *ETYPE NTFY* set to *PASS*.

```

N E T V I E W          SESSION DOMAIN: IPUFJ   BALI      06/10/97 10:33:57
NPDA-20A              * CURRENT FILTER STATUS *          REC 1 TO 2 OF 2
                      FILTER TYPE: ALERT FORWARDING TO T/EC

SEL# ACTION DATA  ETYPE FTYPE  ----- RESNAME, TYPE, OR ADAPTADR -----
( 1) PASS  ..... NTFY
**** DEFAULT ACTION **** BLOCK ****

```

Tivoli Enterprise Console Part

Prerequisites:

- Enter the appropriate Tivoli® command to have the Tivoli desktop up and running.
- TEC event server is started. If this is not the case, you can start it, for example, from the *Start-up* pull-down menu of the *EventServer* icon.

Sequence:

- Start the Tivoli Enterprise Console. Now your Tivoli desktop could look similar to Figure 122 on page 259.

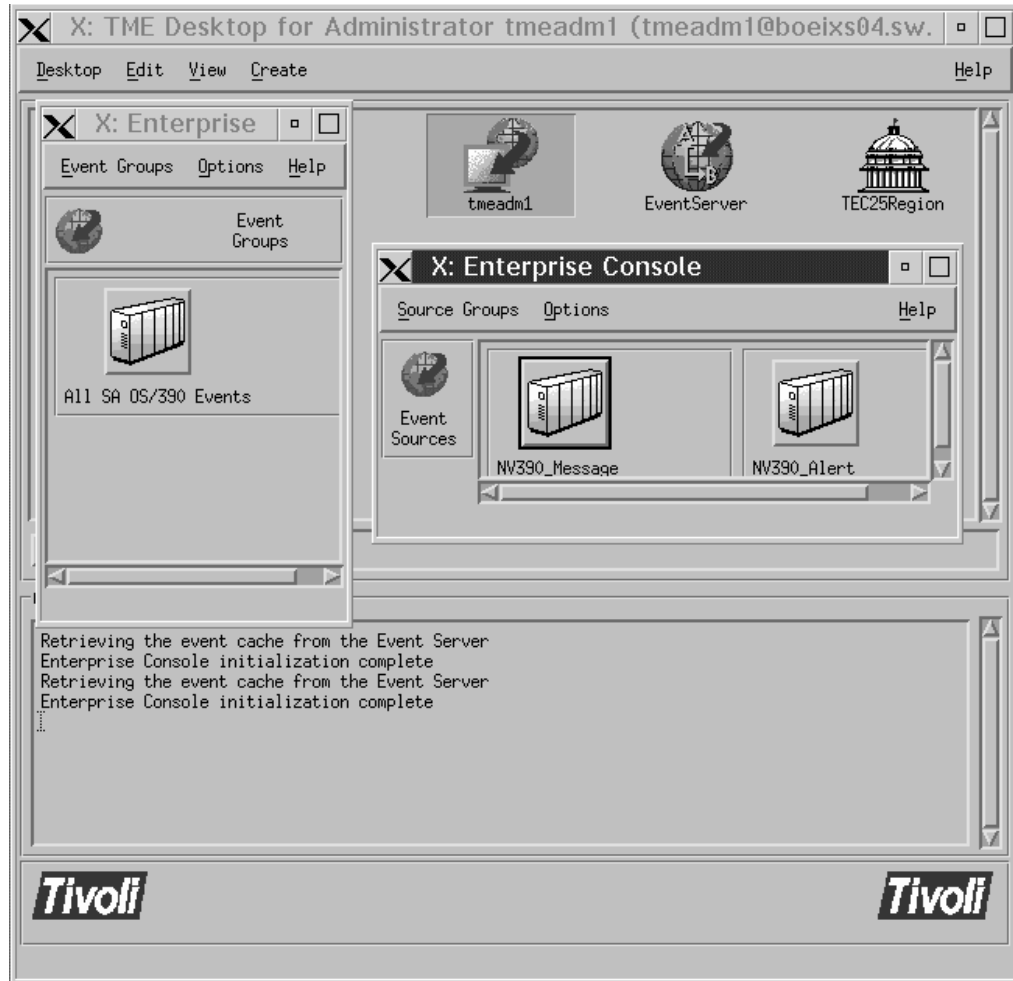


Figure 122. Tivoli desktop with started Tivoli Enterprise Console

2. Open the event groups specific for SA OS/390 to have incoming events displayed by double-clicking on the appropriate icon. In our sample Tivoli Enterprise Console from Figure 122, you would open the event group **All SA OS/390 Events**.

How TEC Notification by SA OS/390 Works

Host Part

SA OS/390 issues messages using the module *AOFMSG* which generates and forwards the messages to the registered auto operator task *%AOFTECTASK%*. This autotask processes the automation table fragment *INGMTEC*. If the message matches the filter criteria, it is either directly routed to TEC (in case you work in a local configuration) or via the focal point system (for a distributed configuration). You find a description of both the local and the distributed environment in *System Automation for OS/390 Planning and Installation*.

SA OS/390 alerts are forwarded to the Networking NetView focal point system and provided to the alert adapter, which routes them to TEC.

Tivoli Enterprise Console Part

Incoming events are displayed in the corresponding event groups (**All SA OS/390 Events**). Predefined correlation rules are applied if applicable. TEC Notification by

SA OS/390, provides a Tivoli task that enables you to invoke the NetView 3270 Management Console from the Tivoli Enterprise Console - no matter where the NetView 3270 Management Console is installed. As shown in Figure 123 you select an event for which you want to invoke the NetView 3270 Management Console and from the **Task** pull-down choice, you select action **Execute on Selected Event...**

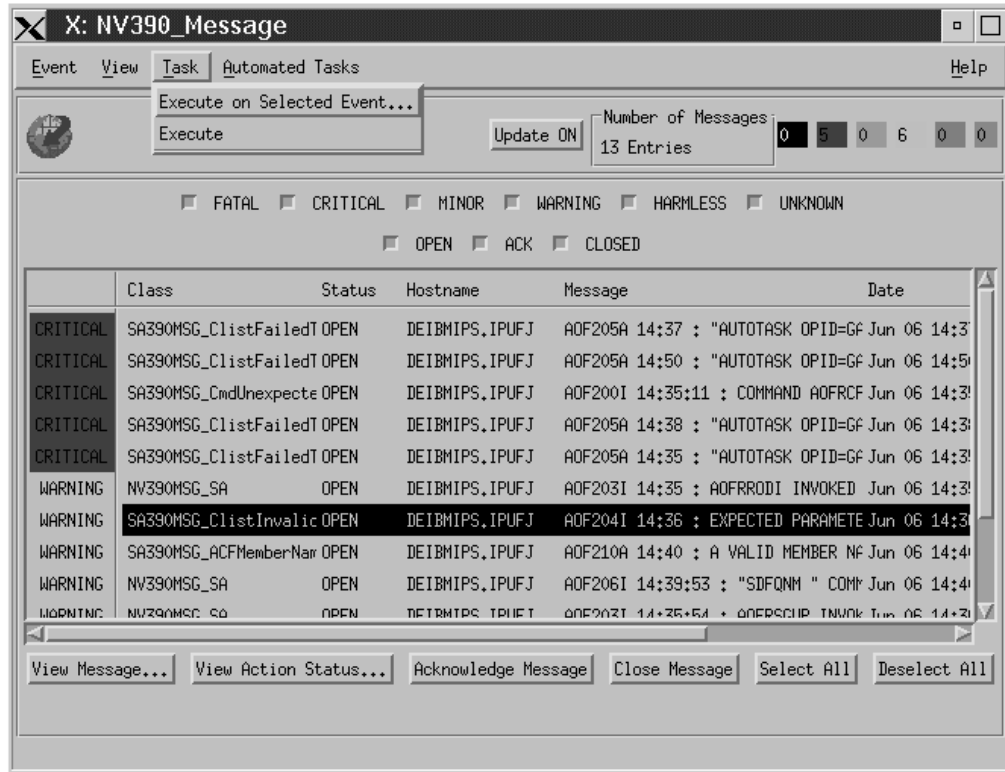


Figure 123. Invoking Predefined Actions for Events

This brings up another dialog, called the *TEC Tasks* dialog, shown in Figure 124 on page 261. From this dialog, you can now invoke the NetView 3270 Management Console:

- Double click on a task library (in our example: *SAOS390 Tasks*).
- Double click on a task (in our example: *Start NetView Console*).
- Optionally you can change the default configuration parameters for the startup of the NetView 3270 Management Console.
- Set the push button beneath the list of configuration parameters to *Execute Local*.
- Press the *Execute and Close* push button.

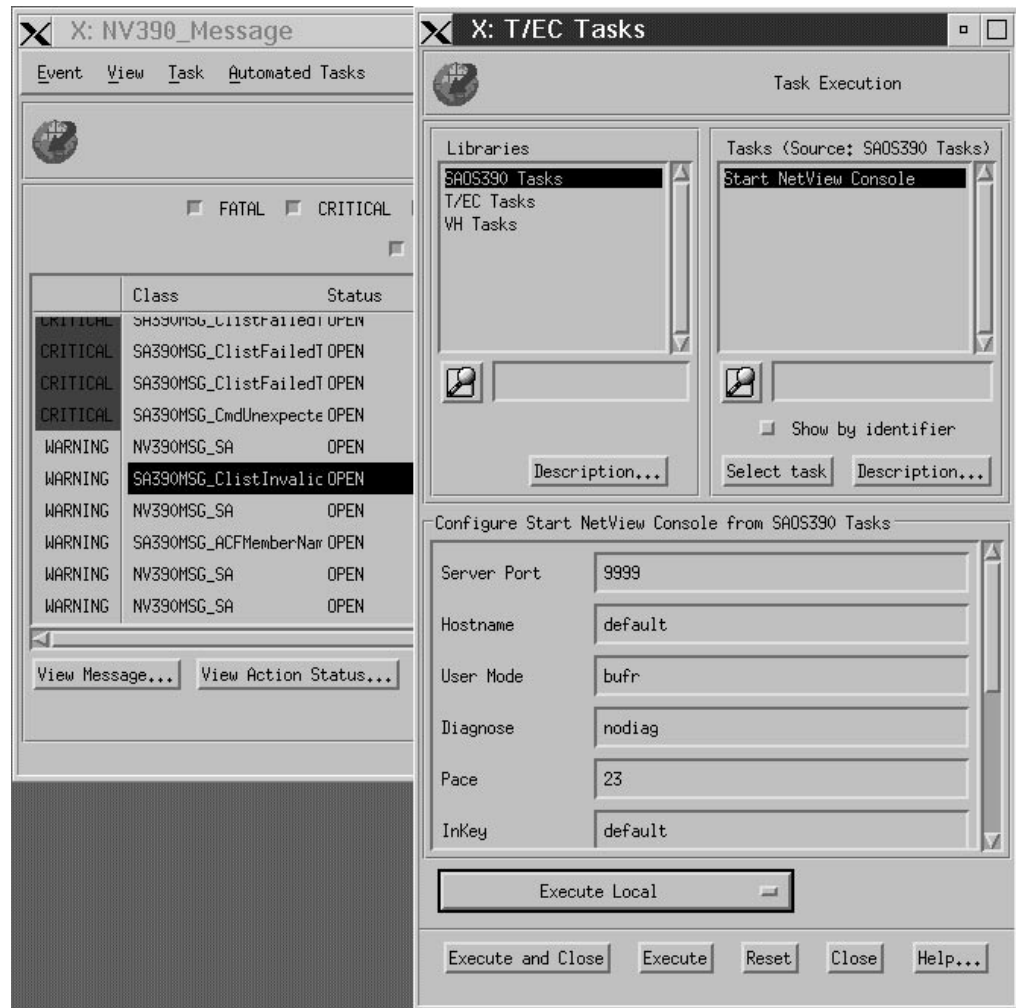


Figure 124. TEC Tasks Dialog

An example of a NetView 3270 Management Console screen is shown in Figure 125 on page 262. Before you reach this screen, a *NetView Logon Panel* prompts you to enter your operator ID and the password.

With the NetView 3270 Management Console you can logon to the NetView of the OS/390 system which, as the event source, triggered the event. In this way, you as a system operator or Tivoli administrator can repair damages on the monitored OS/390 system directly from your Tivoli Enterprise Console by entering NetView commands into the NetView 3270 Management Console.

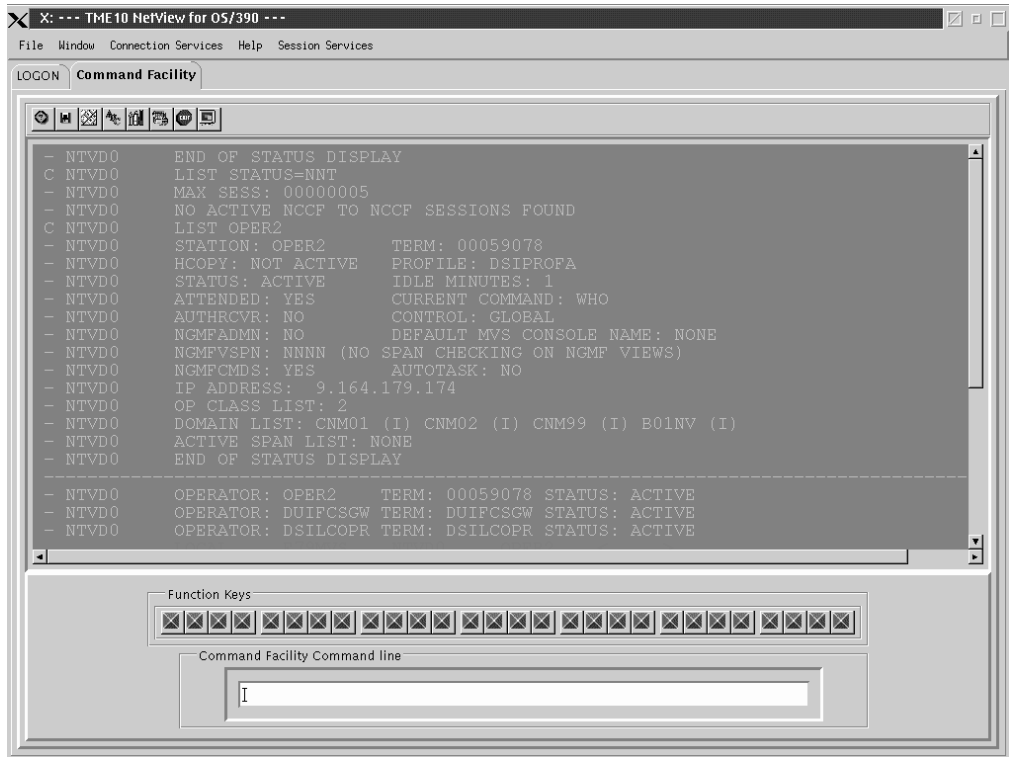


Figure 125. NetView 3270 Management Console

Termination of TEC Notification by SA OS/390

Host Part

Terminating the SA OS/390 message notification to TEC is achieved by deregistering the auto operator task *AUTOTEC* as a notification target for SA OS/390 messages. You cancel this notification for the auto operator *AUTOTEC* using the NetView command:

```
ingntfy off AUTOTEC
```

Terminating the NetView alerts notification is achieved by setting the *TECROUTE* filter to *BLOCKED*:

```
NPDA SRFILTER TECROUTE BLOCK E NTFY
```

Tivoli Enterprise Console Part

After terminating the notification of SA OS/390 messages and NetView alerts on the host, you will only see incoming traditional Tivoli events on the Tivoli Enterprise Console.

Part 5. Appendixes

Appendix A. Automation Initialization Options

At the start of SA OS/390 initialization a multiline write-to-operator (MLWTO) message, AOF767I, is issued describing the options available and system default names and actions. The lines of the MLWTO define the options that can be specified for SA OS/390 initialization. Each line is listed and explained below.

AOF767I is followed by either an AOF603D or an AOF606D WTOR. SA OS/390 replies automatically to an AOF603D after two minutes unless this has been changed as a part of your site's automation policy. SA OS/390 does not automatically reply to an AOF606D message.

The appearance of AOF767I, AOF603D and AOF606D can be suppressed by setting the variable AOFINITREPLY to 0 (see appendix *Global Variables to Enable Advanced Automation in System Automation for OS/390 Defining Automation Policy*).

A description of the options follows:

. STOP - CANCEL AUTOMATION

This line is always present. It indicates that you can reply **STOP**. Doing so causes SA OS/390 to issue an AOF605I and stop running. You must recycle NetView to restart SA OS/390.

. PAUSE - SUSPEND AUTOMATION

This line is present unless SA OS/390 initialization has previously been paused. It indicates that you can reply **PAUSE**. Doing so causes SA OS/390 to go into a paused state. An AOF604I message is issued, the AOF767I message is reissued, and an AOF606D WTOR is issued. You should not automate the reply to the AOF606D WTOR, as this disables the pause function.

If the automation manager is (re-)started or refreshed (via the INGAMS or MVS modify command) while the automation agent is paused, the reply is cancelled and the automation agent initialization is redriven from the beginning.

. TABLE= - OVERRIDE DEFAULT AUTOMATION TABLE

This line is always present. It indicates that you can reply **TABLE=new_table**. Doing so causes SA OS/390 to load the NetView message automation table *new_table* rather than the ones whose names are specified in the automation control file being loaded. The NetView message automation table name specified here overrides a table name stored in the warm start cache. The NetView message automation table name specified must exist. If SA OS/390 is unable to load the automation table it issues an AOF701I message telling you this, and an AOF715D WTOR asking you to specify the name of an alternative automation table.

. NOSTART - DO NOT AUTOMATE SUBSYSTEM STARTUP

This line is always present. It indicates that you can reply **NOSTART**. Doing so causes SA OS/390 to initialize the status of all subsystems to AUTODOWN, rather than DOWN and set the resource's hold flag on the automation manager to YES. This means that after initial status determination is complete, SA OS/390 does not go on to start the subsystems. When you do want the subsystems started, issue an appropriate SA OS/390 command to achieve this. If VTAM is up you can log onto NetView and issue the commands there.

. **NOSAVE - DO NOT SAVE DATA TO CACHE**

This line is present if the DSISVRT task, which is used for the warm start cache, is operational. It indicates that you can reply **NOSAVE**. Replying **NOSAVE** instructs SA OS/390 not to save the data loaded from the automation control file into the warm start cache. The default action (if you do not reply **NOSAVE**) after a cold start is to save the data into the warm start cache.

. **WARM - PERFORM A WARM START FROM CACHE**

This line is present if SA OS/390 has determined that the warm start cache is available and contains data from an automation control file that was generated by the SA OS/390 customization dialog. It indicates that you can reply **WARM**. Doing so causes SA OS/390 to start from the warm start cache.

. **REFRESH - PERFORM A WARM START FROM CACHE, REFRESH CHANGED DATA**

This line is present if SA OS/390 has determined that the warm start cache is available and contains data from an automation control file that was generated by the SA OS/390 customization dialog. This indicates that SA OS/390 has detected changed data on disk. Specifying **REFRESH** means that SA OS/390 starts from the warm start cache and picks up changed data from the disk.

. **COLD - PERFORM A COLD START FROM DISK**

If you specify **COLD**, SA OS/390 will start with data from the disk and will not use any data from the cache.

. **ENTER - CONTINUE WITH *default***

where *default* is one of **WARM**, **REFRESH** or **COLD**. Refer to the appropriate description in this list.

NOTE: COLD START NOT POSSIBLE, NO ACF MEMBER AVAILABLE

This line is present if no valid automation control file has been found on disk.

NOTE: WARM START NOT POSSIBLE, DSISVRT NOT AVAILABLE

This line is present if SA OS/390 has determined that the warm start cache is unavailable. It indicates that the DSISVRT task could not be started.

NOTE: NO USABLE ACF IN CACHE

This line is present if SA OS/390 has determined that the warm start cache is available, but the data in it cannot be used.

NOTE: CACHE NEEDS TO BE REFRESHED

This line is present if SA OS/390 has determined that the warm start cache is available, but needs refreshing.

NOTE: CACHE IS CURRENT, NO UPDATE REQUIRED

This line is present if SA OS/390 has determined that the warm start cache is available, and does not need refreshing.

NOTE: DEFAULT IS: *default*

This line indicates the default (one of **WARM**, **REFRESH** or **COLD**).

A sample of how the AOF767I message could look, is in Figure 126 on page 267.


```
AOF767I AUTOMATION OPTIONS: 497
. STOP - CANCEL AUTOMATION
. PAUSE - SUSPEND AUTOMATION
. NOSTART - DO NOT AUTOMATE SUBSYSTEM STARTUP
. NOSAVE - DO NOT SAVE AUTOMATION CONTROL FILE
. COLD - COLD START FROM DISK
. TABLE= - OVERRIDE DEFAULT AUTOMATION TABLE(S)
. ENTER - CONTINUE WITH 'COLD'
NOTE: NO USABLE ACF IN CACHE
NOTE: DEFAULT IS: COLD
68 AOF603D ENTER AUTOMATION OPTIONS - DOMAIN IPSNO
```

Figure 126. Sample AOF767I Message

If the message on your screen looks significantly different from the sample shown, ask your automation programmer whether he used the initialization exit *AOFEXI01* to modify the message.

Appendix B. Display and Emulate Processor Operations PC Window Interface

When you put the PC in pass-through mode by issuing the DISPLAY or EMULATE command, you see a windowed user interface for performing pass-through activities. This appendix describes the window interface for Display or Emulate pass-through mode. For descriptions of the DISPLAY and EMULATE commands, see *System Automation for OS/390 Operator's Commands*. Figure 127 shows an example emulate session window.

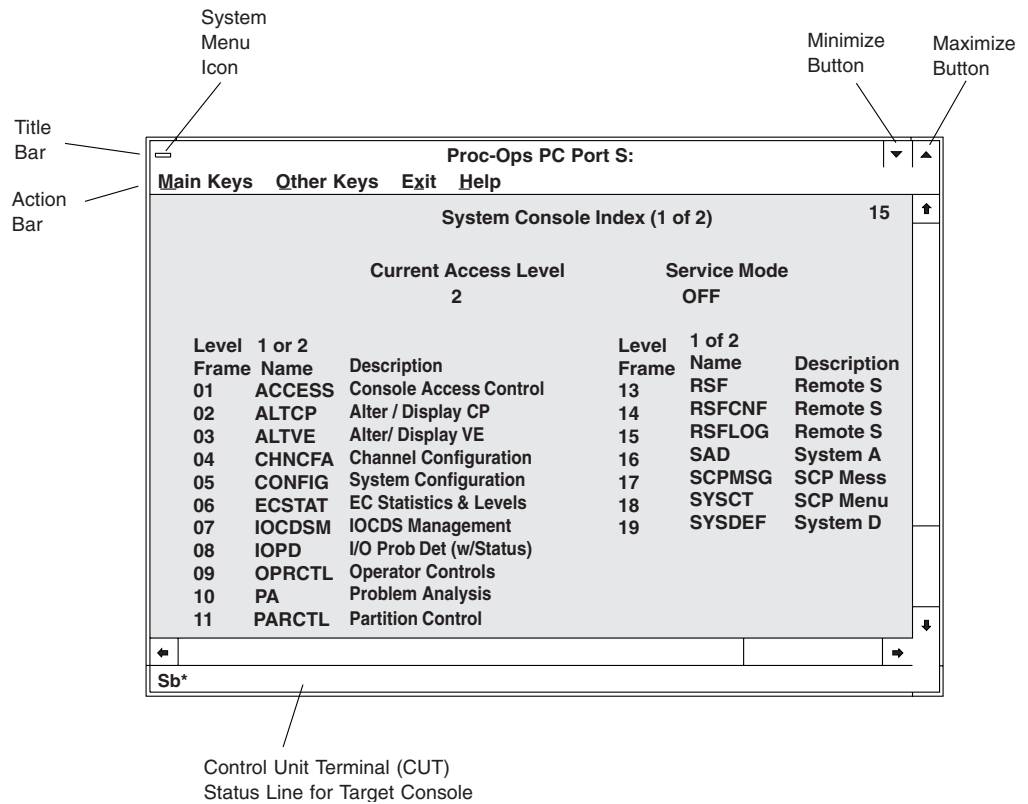


Figure 127. Sample Emulate Session Window

Action Bar

The action bar is on the second line in the window. From the action bar, you can select the following options:

- Main Keys
- Other Keys
- Exit
- Help.

Main Keys Option

The “Main Keys” option displays keys commonly used for an Emulate session. This option only appears when in Emulate mode.

To display the keys, select the Main Keys text from the action bar. (On a system without a mouse, press and release the ALT key to get to the action bar, use the cursor left and right keys to get to the Main Keys text, then press the Enter key). Figure 128 shows an example of an Emulate window with the Main Keys menu displayed.

The keys displayed depend on the type of connection to the target system, as

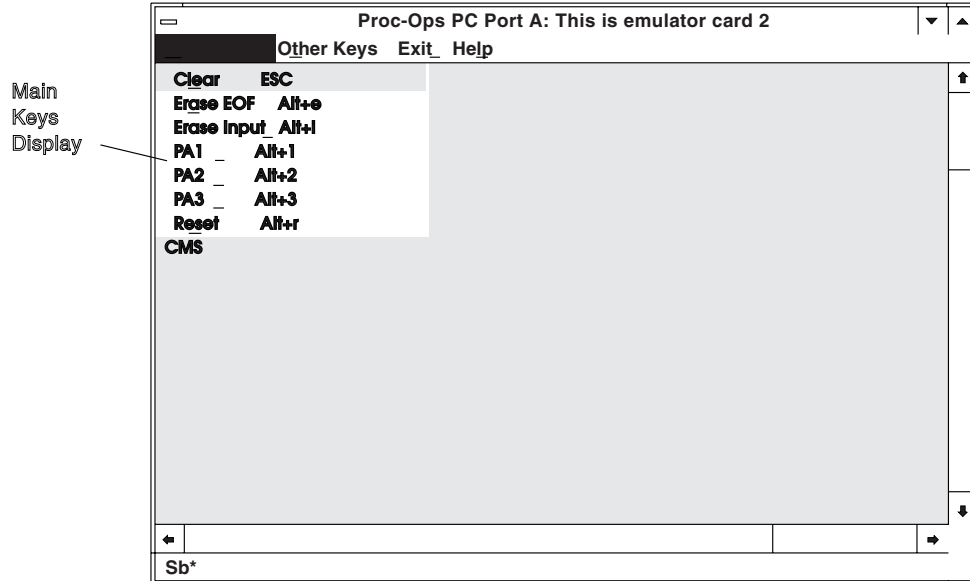


Figure 128. Sample Emulate Window with Main Keys Menu

shown in the following tables. The tables show the key name, the alternate combination of PC keyboard keys that can be used to perform the key's function, and a description of what happens when the key is pressed.

Table 12. Main Keys for a 3174 or 3274 Control Unit Connection

Key	Alternate Key Combination	Function
Clear	ESC	Presses the clear key
Erase EOF	Alt+e	Simulates Erase EOF
Erase Input	Alt+i	Simulates Erase Input. This only blanks out the input field where the cursor is currently located.
PA1	Alt+1	Presses the PA1 key
PA2	Alt+2	Presses the PA2 key
PA3	Alt+3	Presses the PA3 key
Reset	Alt+r	Presses the Reset key.

Table 13. Main Keys for a 9021, 9121, or 3090 Processor Controller Connection

Key	Alternate Key Combination	Function
Assign Cons		Presses the Assign Console key
End	End	Presses the End key
Erase EOF	Alt+e	Simulates Erase EOF

Table 13. Main Keys for a 9021, 9121, or 3090 Processor Controller Connection (continued)

Key	Alternate Key Combination	Function
Erase Input	Alt+i	Simulates Erase Input. This only blanks out the input field in which the cursor is currently located.
Index		Presses the Index key
Irpt		Presses the Irpt (interrupt) key
Refresh		Presses the Refresh key
Reset	Alt+r	Presses the Reset key
Restart		Presses the Restart key
Start		Presses the Start key
Stop		Presses the Stop key
Swap Cons		Presses the Swap Console key
TOD	Alt+t	Presses the TOD key
ViewLog	Alt+v	Presses the ViewLog key

Table 14. Main Keys for a 308x Processor Control Unit Connection

Key	Alternate Key Combination	Function
Attn	Alt+a	Presses the ATTN key
Cmd	Alt+c	Presses the CMD key
Erase EOF	Alt+e	Simulates Erase EOF
Erase Input	Alt+i	Simulates Erase Input. This only blanks out the input field in which the cursor is currently located.
Irpt		Presses the Irpt (interrupt) key
Msg		Presses the MSG key
Refresh		Presses the Refresh key
Reset	Alt+r	Presses the Reset key
Restart		Presses the Restart key
Start		Presses the Start key
Stop		Presses the Stop key
TOD	Alt+t	Presses the TOD key

Table 15. Main Keys for a 4381 Processor Control Unit Connection

Key	Alternate Key Combination	Function
ChgDply		Presses the Change Display key
Erase EOF	Alt+e	Simulates the Erase EOF key
Erase Input	Alt+i	Simulates Erase Input. This only blanks out the input field in which the cursor is currently located.

Table 15. Main Keys for a 4381 Processor Control Unit Connection (continued)

Key	Alternate Key Combination	Function
Intr		Presses the Intr (interrupt) key
Mode Sel	Alt+m	Presses the Mode Select key
Reset	Alt+r	Presses the Reset key
Start		Presses the Start key
Start Target		Presses the Shift-Start key
Stop		Presses the Stop key
Stop Target		Presses the Shift-Stop key

Other Keys Option

The Other Keys action bar option displays keys that are not commonly used during an Emulate session. This option appears only in Emulate mode.

To display the keys, select the Other Keys text from the action bar. (On a system without a mouse, press and release the ALT key to get to the action bar, use the cursor left and right keys to get to the Other Keys text, then press the Enter key.)

The keys displayed depend on the type of connection to the target system. The tables show the key name, and a description of what happens when the key is pressed.

Table 16. Other Keys for a 3174 or 3274 Control Unit Connection

Key	Function
Attn	Presses the ATTN key
Print	Presses the Print key
Super Reset	Presses the Super Reset key.
SysReq	Presses the SysReq key
Test	Presses the Test key

Table 17. Other Keys for a 9021, 9121, or 3090 Processor Controller Connection

Key	Function
Bkwd	Presses the Backward key
Clear	Presses the Clear key
Cncl	Presses the Cancel key
Fwd	Presses the Forward key
Istep	Presses the Instruction Step key
Left Page	Presses the Left Page key
PA1	Presses the PA1 key
Print	Presses the Print key
Right Page	Presses the Right Page key
Super Reset	Presses the Super Reset key
SVPCE ¹	Presses the SVPCE key

Table 17. Other Keys for a 9021, 9121, or 3090 Processor Controller Connection (continued)

Key	Function
Test	Presses the Test key

1: SVPCE is not supported for the 9121 processor. PRTCENCL is supported.

Table 18. Other Keys for a 308x Processor Control Unit Connection

Key	Function
Bkwd	Presses the Backward key
Clear	Presses the Clear key
Dmsg Bkwd	Presses the DMSG BKWD key
Dmsg Fwd	Presses the DMSG FWD key
Fwd	Presses the Forward key
Print	Presses the Print key
Super Reset	Presses the Super Reset key

Table 19. Other Keys for a 4381 Processor Control Unit Connection

Key	Function
Comm Req	Presses the Communications Request key
Copy	Presses the Copy key
Diag	Presses the DIAG key
Line Disc	Presses the Line Disconnect key
PA1	(Alt+1) Presses the PA1 key
PA2	(Alt+2) Presses the PA2 key
PageDown	Presses the Page Down key
PageUp	Presses the Page Up key
SP M/O	Presses the SP M/O key
Super Reset	Presses the Super Reset key

Exit Option

The “Exit” option ends a Display or Emulate session.

To select the “Exit” option, select the Exit text from the action bar. (On a system without a mouse, press and release the ALT key to get to the action bar, use the cursor left and right keys to get to the Exit text, then press the Enter key.)

Selecting the “Exit” option displays an Exit menu with the following options:

Option Function

Exit Program

Exits the Display or Emulate session.

Resume Program

Resumes the Display or Emulate session.

Help Option

The “Help” option displays help information about the Display or Emulate session window.

To select the "Help" option, select the Help text from the action bar. (On a system without a mouse, press and release the ALT key to get to the action bar, use the cursor left and right keys to get to the Help text, then press the Enter key.)

Selecting the "Help" option displays a Help menu with the following options:

Option Function

Help for help

Displays help for using online help.

Extended help

Displays help for the Display or Emulate session window.

Keys help

Displays keys for the Display or Emulate session window.

Help index

Displays the help index.

Scroll Bars

The following scroll bars may be displayed in a Display or Emulate session window:

- The vertical scroll bar, displayed if all rows cannot be displayed in the window
- The horizontal scroll bar, displayed if an entire row cannot be displayed in the window.

These are standard scroll bars. Selecting the arrow at either end moves the screen one character or row in that direction.

When scroll lock is on, you can also scroll the window using the following keys:

Key Function

Up arrow

Scrolls up one line

Down arrow

Scrolls down one line

Left arrow

Scrolls left one character

Right arrow

Scrolls right one character

PgUp Scrolls up one page

PgDn Scrolls down one page

Home Scrolls left one page

End Scrolls right one page

Keys Used in the Display or Emulate Window Interface

This section describes keys and key combinations you can use in the Display or Emulate window interface.

System Menu Keys

The following is a list of key combinations that change how the window is displayed (system menu options):

Keys Function

Alt+F4

Closes window

Alt+F5	Restores window
Alt+F7	Moves window
Alt+F8	Sizes window
Alt+F9	Minimizes window
Alt+F10	Maximizes window
Ctrl+Esc	Switches to (task list)

Scrolling Keys

The following is a list of keys you can use to scroll the window when scroll lock is on:

Key	Function
Up arrow	Scrolls up one line
Down arrow	Scrolls down one line
Left arrow	Scrolls left one character
Right arrow	Scrolls right one character
PgUp	Scrolls up one page
PgDn	Scrolls down one page
Home	Scrolls left one page
End	Scrolls right one page

Target Console Keys

In an Emulate session window, certain target console keys can also be pressed by a combination of PC keyboard keys. The mapping depends on the processor to which the target console is connected. The following tables show the key combinations used for each processor, and the effect of these keys at the target console.

Table 20. Target Console Keys for a 3174 or 3274 Control Unit Connection

PC Key Combination	Target Console Key
Esc	Clear key
Alt+e	Erase EOF
Alt+i	Erase Input
Alt+1	PA1 key
Alt+2	PA2 key
Alt+3	PA3 key
Alt+r	Reset key

Table 21. Target Console Keys for a 9021, 9121, or 3090 Processor Controller Connection

PC Key Combination	Target Console Key
Alt+e	Erase EOF

Table 21. Target Console Keys for a 9021, 9121, or 3090 Processor Controller Connection (continued)

PC Key Combination	Target Console Key
Alt+i	Erase Input
Alt+r	Reset key
Alt+t	TOD key
Alt+V	ViewLog key
End	End key

Table 22. Target Console Keys for a 308x Processor Control Unit Connection

PC Key Combination	Target Console Key
Alt+a	ATTN key
Alt+c	CMD key
Alt+e	Erase EOF
Alt+i	Erase Input
Alt+r	Reset key
Alt+t	TOD key

Table 23. Target Console Keys for a 4381 Processor Control Unit Connection

PC Key Combination	Target Console Key
Alt+e	Erase EOF
Alt+i	Erase Input
Alt+r	Reset key
Alt+1	PA1 key
Alt+2	PA2 key
Alt+m	Mode Select key

Appendix C. Using the I/O Operations ISPF Dialog

Notes:

1. Refer to *System Automation for OS/390 Planning and Installation* for instructions on how to install and to modify the ISPF dialog.
2. The IBM-supplied REXX code, including the EXECs, panels, messages, and tables, is supported, provided it has not been modified. Therefore, if you intend to modify IBM-supplied code, it is advisable to retain two copies: the IBM-supplied copy and the modified
3. Refer to the ISPF publications listed in Table 2 on page xv for more information on ISPF.

Getting Started

To use the I/O operations ISPF dialog:

- You must already be logged on to your user ID and using ISPF.
- The I/O operations ISPF dialog must be available.

To see whether the I/O operations ISPF dialog is available, display the ISPF/PDF *Primary Option* panel on the ISPF main menu.

- If I/O operations is displayed as an option on the ISPF main menu, select it.

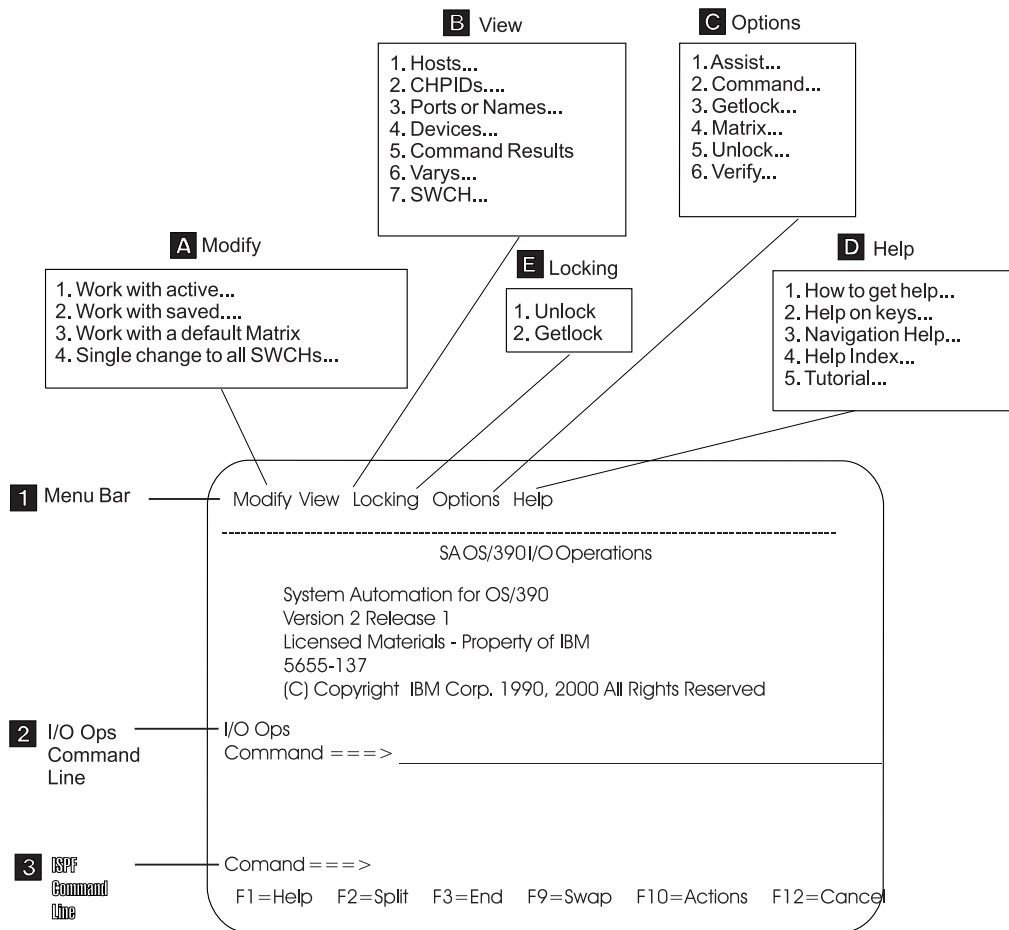
The I/O operations ISPF main menu, which is shown on the next page, should now be displayed. If it is not, consult your system administrator or *System Automation for OS/390 Planning and Installation* for further instructions.

- If I/O operations is not displayed on the ISPF/PDF *Primary Option* panel:
 1. Select option 6 (Command) on the ISPF/PDF *Primary Option* panel and press **Enter**.
 2. If the library required by the customization dialog (ING.CUSTOM.IHVCONF) has been allocated using the TSO logon procedure or using a CLIST of your own, type **INGDLG SELECT (IOCONNECT) ALLOCATE (NO)**

(To issue the INGDLG command, the data set ING.SINGIREX must be allocated in the SYSPROC DD statement of your logon procedure.)

The I/O operations ISPF main menu, which is shown on the following page, should now be displayed. If it is not, or if your TSO logon procedure is not set up to allocate the data set required by the ISPF dialog, consult your system administrator or *System Automation for OS/390 Planning and Installation* for further instructions.

Starting with the I/O Operations ISPF Main Menu



1 Menu Bar from which you select menus **A** through **E**

A Modify Menu

lets you modify a switch configuration in matrix format and issue a change to all switches allocated to the issuing SA OS/390 I/O operations. Place the cursor underneath **Modify** and press **Enter** See “A. If You Select the Modify Menu” on page 279 for more information.

B View Menu

prompts you for the operands of the Display commands and then displays the data you request. Place the cursor underneath **View** and press **Enter** See “B. If You Select the View Menu” on page 281 for more information.

C Options Menu

lets you customize the IBM-supplied defaults for your user ID. Place the cursor underneath **Options** and press **Enter** See “C. If You Select the Options Menu” on page 284 for more information.

D Help Menu

shows you how to display the online help and the online tutorial. Place the cursor underneath **Help** and press **Enter** See “D. If You Select the Help Menu” on page 285 for more information.

E Locking Menu

is a simple way to enter the Getlock and Unlock commands. Enter **1** or **2**.

If access is controlled by RACF®, the UNLOCK command requires only the Read authorization, but the GETLOCK command requires the Control level. See *System Automation for OS/390 Operator's Commands* for information about authorization required for I/O operations commands and for information about the GETLOCK and UNLOCK commands.

2 ISPF Command Line

On the ISPF command line, you can enter any applicable ISPF command. For more information on ISPF, see the ISPF publications listed in Table 2 on page xv.

3 I/O Operations Command Line

On the I/O operations command line, you can enter any SA OS/390 I/O operations command. See *System Automation for OS/390 Operator's Commands* for a complete list of these commands.

A. If You Select the Modify Menu

Modify

- | |
|---|
| <ol style="list-style-type: none"> 1. Work with active... 2. Work with saved.... 3. Work with a default Matrix 4. Single change to all SWCHs... |
|---|

Select A Subtask	Action (Press Enter When Needed)
1. Work with active (matrix)...	<ul style="list-style-type: none"> • a. Select a switch from the list on the <i>Select SWCH</i> panel. • b. Go to “A Sample Way to Modify a Switch Matrix” on page 280 for more information.
2. Work with saved (matrix)...	<ul style="list-style-type: none"> • a. Select a saved configuration from either: <ul style="list-style-type: none"> – Host (saved in ISPF) – Switch • b. Follow directions.
3. Work with a default Matrix	<ul style="list-style-type: none"> • Go to “A Sample Way to Modify a Switch Matrix” on page 280 for more information.
4. Single change to all SWCHs...	<ul style="list-style-type: none"> • a. Select a command on the <i>Single Change to All SWCHs</i> panel. • b. Enter the required information in the fields on the panel (for example, enter a port address or name for the Block command). • c. Press F6. • d. If the <i>Verify</i> panel is displayed, verify the information and press Enter. • e. When processing is complete, do one of the following: <ul style="list-style-type: none"> – Repeat this sequence of steps to make another change. – Press F3 to exit.

After you have created or changed a switch configuration in matrix format, you can activate it or make it operational on the designated switch, or you may save it on the host or on a selected ESCON Director. The issuing SA OS/390 I/O operations must be running and the switch must be allocated to it.

You cannot activate the IBM-supplied default matrix until you have changed its default switch device number of 0000 to a number that is valid for your configuration. (See the last entry in the table under “And Here Are Some Sample Changes You Can Make to a Port ...”.)

It is very advisable to save an active switch matrix, even if this is not mandatory.

A Sample Way to Modify a Switch Matrix

When a switch matrix is displayed, you can make the following changes on it; you do not have to enter commands on the command line.

1. If you want to assign a name to the switch, enter the name in the *SWCH Name* field.

Note: Press **Enter** if you want to see the change highlighted.

2. To make a change to a port, check whether that port’s horizontal row is displayed on the matrix. If it is not:
 - To scroll down the leftmost column of ports, use **F8** to scroll to the higher port addresses and **F7** to scroll in the other direction (backwards).
 - To scroll across the columns of ports in the matrix, use **F11** to the right across the screen and **F10** to scroll to the left.

Some sample changes are shown under “And Here Are Some Sample Changes You Can Make to a Port ...”.

3. After you have finished making changes, consider whether you want to save or to activate the switch configuration, or both.

Note: It is strongly recommended that you save a switch configuration before activating it.

4. To save a switch configuration:
 - a. Press **F5**.
 - b. On the *Select Destination of Save Configuration* panel, first choose between saving at a switch or at the host. Then, either select a name from the list that is presented, or enter a new name and description.
 - c. Press **Enter** to save the matrix of the switch configuration.

If you are replacing another switch configuration, another panel will prompt you to verify the change. In that case, press **Enter** again.
 - d. If you want to activate the switch configuration, refer to the next step.
5. To activate the switch configuration:
 - a. Press **F6** on the screen of the matrix.
 - b. Verify the information.
 - c. Press **Enter**.

And Here Are Some Sample Changes You Can Make to a Port ...

I/O operations Command	Action
Block a port	<ul style="list-style-type: none"> • Type B at the intersection point between the port row and the B column. For example, if you type B in the B column at D5’s row, D5 will be blocked.
Unblock a blocked port	<ul style="list-style-type: none"> • Type U or a space at the intersection point between the port row and the B column. For example, type U over the B in the B column at D5’s row to unblock port D5.

I/O operations Command	Action
Connect two ports statically (dedicated)	<ul style="list-style-type: none"> Type the port address of the 2nd port at the intersection point between the 1st port and the C column. For example, type C3 in the C column at port row E4 to connect C3 and E4 statically.
Disconnect a static (dedicated) connection	<ul style="list-style-type: none"> Type spaces over the port address at the intersection point between the port row and the C column. For example, type spaces over C3 in the C column at port row E4 to disconnect C3 and E4 from each other.
Prohibit a dynamic connection	<ul style="list-style-type: none"> Using F10 and F11 to scroll right and left, display the port column of the 2nd affected port. Type P at the intersection point between the 1st port's row and the 2nd port's column. For example, type P at the intersection of port row D7 and port column E1 to prohibit these ports from connecting dynamically to each other.
Allow a dynamic connection	<ul style="list-style-type: none"> Using F10 and F11 to scroll right and left, display the port column of the 2nd affected port. Type A at the intersection point between the 1st port's row and the 2nd port's column. For example, type A at the intersection of port row D7 and port column E1 to allow these ports to connect dynamically to each other.
Copy Allows and Prohibits from one port row to another port row	<ul style="list-style-type: none"> Type C on the blank line to the left of the port row you plan to use as a source. Type T on the blank line to the left of the port row you plan to use as a target.
Name or rename a port	<ul style="list-style-type: none"> Type a port name at the intersection point between the port row and the Name column. For example, type PRINTER1 in the Name column of port row C5 to name C5 PRINTER1. It is recommended that the name be in upper-case letters. (Refer to <i>System Automation for OS/390 Planning and Installation</i> for suggestions for naming ESCON Director ports.) You can remove a name by typing blanks over it.
Change the switch device number	<ul style="list-style-type: none"> Type a switch device number in the <i>Target SWCH Number</i> field. (This is a required action if you start with the IBM-supplied default matrix of 0000.)

B. If You Select the View Menu

View

- | |
|---|
| <ol style="list-style-type: none"> 1. Hosts... 2. CHPIDs... 3. Ports or Names... 4. Devices... 5. Command Results 6. Varys... 7. SWCH... |
|---|

If you select the *View* menu, the subtasks shown at the left are displayed. When the selected view is displayed:

- Use **F7** to scroll backward and **F8** to scroll forward to view the information.
- Press **F3** to return to the display selection screen.

Selection	Option	Action
1. Hosts...	The SA OS/390 I/O operations base programs that are known to the issuing SA OS/390 I/O operations.	Type * on the 1st blank line. See the DISPLAY HOST command in <i>System Automation for OS/390 Operator's Commands</i> .
	Detailed information about the SA OS/390 I/O operations base program specified.	Type the VTAM name of an SA OS/390 I/O operations on the 1st blank line. See the DISPLAY HOST command in <i>System Automation for OS/390 Operator's Commands</i> .
	A list of all SA OS/390 I/O operations base programs that have the specified switch allocated to them.	Type a switch device number on the 2nd blank line. See the DISPLAY HOST command in <i>System Automation for OS/390 Operator's Commands</i> .
2. CHPIDs...	A list of all CHPIDs with their associated information	Type * on the blank line. See the DISPLAY CHP command in <i>System Automation for OS/390 Operator's Commands</i> .
	Detailed information about a specified CHPID	Type a CHPID number on the blank line. See the DISPLAY CHP command in <i>System Automation for OS/390 Operator's Commands</i> .
3. Ports...	A list of all ports with the same name	Type the name of a named port on the 1st blank line. A generic port name may be used. See the DISPLAY NAME command in <i>System Automation for OS/390 Operator's Commands</i> .
	Details about a port name or port address on a specified switch	Type either a port address on the 2nd blank line or a port name on the 3rd blank line. Then, type a switch device number on the 4th blank line. See the DISPLAY PORT command in <i>System Automation for OS/390 Operator's Commands</i> .
	Information about all ports, only blocked ports, or only statically connected ports on a specified switch	Type A , B , or C on the 5th blank line. Then, type a switch device number on the 6th blank line. See the DISPLAY PORT command in <i>System Automation for OS/390 Operator's Commands</i> .

4. Devices...	A list of all devices attached to a specified switch	Type * on the 1st blank line. Then, type a switch device number on the 2nd blank line. See the DISPLAY DEVICE command in <i>System Automation for OS/390 Operator's Commands</i> .
	Detailed information about a specific device with relation to all switches	Type a device number on the 1st blank line. Then, type * on the 2nd blank line. See the DISPLAY DEVICE command in <i>System Automation for OS/390 Operator's Commands</i> .
	Detailed information about a specified device relative to a specified switch	Type a device number on the 1st blank line. Then, type a switch device number on the 2nd blank line. See the DISPLAY DEVICE command in <i>System Automation for OS/390 Operator's Commands</i> .
	Multiple devices on a specified switch	Type a range of device numbers on the 1st blank line. Then, type a switch device number on the 2nd blank line. See the DISPLAY DEVICE command in <i>System Automation for OS/390 Operator's Commands</i> .
5. Command Results	A list of command results with relation to each SA OS/390 I/O operations	See the DISPLAY RESULTS command in <i>System Automation for OS/390 Operator's Commands</i> .
6. Varys...	A list of failed vary path requests with relation to a specific SA OS/390 I/O operations host	Type the SA OS/390 I/O operations VTAM name on the blank line. See the DISPLAY VARY command in <i>System Automation for OS/390 Operator's Commands</i> .
7. SWCH...	A list of all switches allocated, or attached, to the issuing instance of I/O operations.	Type * on the blank line. See the DISPLAY SWITCH command in <i>System Automation for OS/390 Operator's Commands</i> .
	Details about a specific switch	Type a switch device number on the blank line. See the DISPLAY SWITCH command in <i>System Automation for OS/390 Operator's Commands</i> .

C. If You Select the Options Menu

Options

- | |
|---------------|
| 1. Assist... |
| 2. Command... |
| 3. Getlock... |
| 4. Matrix... |
| 5. Unlock... |
| 6. Verify... |

In the I/O operations ISPF dialog, a number of options are shipped with IBM-supplied defaults. You can customize these defaults to your ISPF user ID. Except for the *Verify* option, your customized options remain in effect for your user ID across SA OS/390 I/O operations sessions.

1. Do either of the following:
 - On the dialog's main menu, select the *Options*, and select one of the entries.
 - Enter **OPTIONS** in the command area of a dialog panel
2. Make a selection (1—6).
3. If you want to save your change, press **F3** or enter **END**

1. Assist

Describes the return codes and reason codes in the messages. Selections are:

1. To receive explanatory text and specific messages (IBM-supplied default)
2. Not to receive explanatory text on the return codes and reason codes.

2. Command

Specifies a set of default connectivity options. Selections are:

1. NOForce, Vary, BACkout (IBM-supplied defaults)
2. NOForce, Vary, NOBackout
3. NOCheck, Vary, BACkout
4. NOCheck, Vary, NOBackout
5. Force, Vary, NOBackout
6. Force NOVary, NOBackout

3. Getlock

Obtains processing control. (See the GETLOCK command in *System Automation for OS/390 Operator's Commands* for more information.)

Selections are:

1. Never take control from another user.
2. Be prompted with the *Getlock* panel so you can decide whether you want to take control (IBM-supplied default).
3. Always take control. If a command is being processed by another user, however, processing can be interrupted and the command can fail.

4. Matrix

Specifies which changes on the switch configuration will be activated by SA OS/390 I/O operations. (Select them with any character.) Selections are:

___ ALL commands (overrides other options; IBM-supplied default) ___
Allow and Prohibit ___ Connect and Disconnect ___ Block and Unblock
___ Port names ___ Switch name

5. Unlock

Relinquishes control of SA OS/390 I/O operations command processing. (See the UNLOCK command in *System Automation for OS/390 Operator's Commands* for further information.) Selections are:

1. No automatic unlock. You must enter the Unlock command.
2. Automatic unlock when you press **F3** or **END** from the I/O operations ISPF main menu (IBM-supplied default).
3. Automatic unlock after every command.

6. Verify

Requires you to verify a command before the dialog activates it. Contrary to the other options, you can tailor the *Verify* option for the remainder of the session only. The default for this option resets to the IBM-supplied default at the beginning of each session. Selections are:

1. Verify before activating (IBM-supplied default).
 - If you press **Enter** after entering a connectivity command, the dialog will continue.
 - If you press **F3** or **END**, command processing is halted, and the preceding screen will be displayed.
2. Do not verify.

D. If You Select the Help Menu

Help

- | |
|--|
| <ol style="list-style-type: none">1. How to get help...2. Help on keys...3. Navigation Help...4. Help Index...5. Tutorial... |
|--|

1. How to get help...
 - To get the entries shown above, select the *Help* menu from the I/O operations ISPF main menu.
 - To get field-oriented help, press **F1** on any input field on a screen.
 - To get screen-oriented help, press **F1** on any full screen. If you press **F1** twice in a row, an ISPF help panel, not an I/O operations ISPF help panel, is displayed.
2. Help on keys... explains the I/O operations ISPF dialog settings of the following function keys: **F1** (Help); **F3** (End); **F5** (Save); **F6** (Activate).
3. Navigation Help... helps you navigate through the panel, or screen, flow of the I/O operations ISPF dialog.
4. Help Index... lets you choose among a selected number of topics that are listed alphabetically.
5. Tutorial ... Do one of the following:
 - Select the *Help* menu on the main menu. Then:
 - a. Select *Tutorial*
 - b. Select one of the topics shown in on the screen below.

- Enter **TUTORIAL** on a panel of the dialog. Then:
 - a. Press **Enter**
 - b. Select one of the topics on the tutorial main menu shown below.

SA OS/390 - IO-Ops ISPF Tutorial Main Menu

Select a specific topic by typing the topic number on the command line and pressing Enter.

```
1      Overview of IO-Ops and SWCHs
2      Displaying and Changing SWCH Configuration Data
3      Displaying Other Types of Information
4      Setting Options
5      Guidelines and Precautions
6      Understanding and Using the Matrix Screen
7      Making a Single Change to All SWCHs
8      Connectivity Command Options
```

COMMAND ==>

```
F1= Help      F2=          F3= END      F4= RETURN  F5=          F6=
F7= Help      F8=          F9=          F10=         F11= Index   F12=
```

Appendix D. Coexistence between SA OS/390 2.1 Commands and Commands from Earlier Releases

Suppose, in your enterprise, you have sysplexes installed with a mixture of systems with SA OS/390 1.3 and SA OS/390 2.1, as shown in Figure 129. This section discusses what to observe when manipulating systems within such a sysplex.

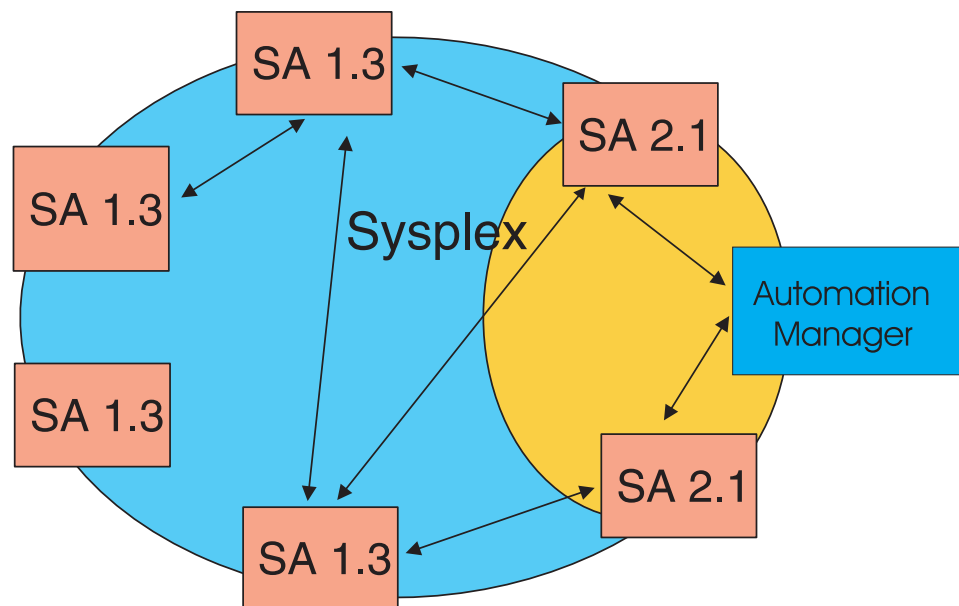


Figure 129. Coexistence of New and Old Commands

- When you are working with a SA OS/390 1.3 system, you can issue all commands available in this release to any other system in the sysplex, including the SA OS/390 2.1 systems. However:
 - you cannot issue any of the deleted commands listed in chapter *What is New in SA OS/390 2.1* of *System Automation for OS/390 Planning and Installation* to a SA OS/390 2.1 system.
 - a DISPSVPL command is not supported if sent to a SA OS/390 2.1 system.
- When you are working with a SA OS/390 2.1 system, and you:
 - issue an INGSCHED command for a down-level SA OS/390 system, this is converted to DISPSVP.
 - issue INGREQ resource REQ=STOP/DOWN to SA OS/390 1.3, then this command is converted to SHUTSYS with the following restrictions:
 - INGREQ has a timeout function, with the effect that after the timeout, the request is either purged or a message is sent to the operator; this functionality is not supported when converted to SHUTSYS.
 - INGREQ has an EXPIRE option, in a way that after the command is expired, it is automatically purged (withdrawn) from the sysplex. this option is not supported when converted to SHUTSYS.

- The options ALL/NO/TRG/FLG/DPY/STS/UOW/INIT of the *Override* parameter are not supported when converted to SHUTSYS (see Figure 15 on page 86).
- issue INGREQ resource REQ=START/UP to SA OS/390 1.3, then this command is converted to SETSTATE with the following limitations:
 - INGREQ has an EXPIRE option, in a way that after the command is expired, it is automatically purged (withdrawn) from the sysplex. this option is not supported when converted to SETSTATE.
 - the start types available for INGREQ are not supported when converted to SETSTATE.
 - The options ALL/NO/TRG/FLG/DPY/STS/UOW/INIT of the *Override* parameter are not supported when converted to SETSTATE (see Figure 15 on page 86).
 - The parameters *AutoRemove*, *Timeout* and *Priority* are not supported when converted to SETSTATE.
- For other new automation manager commands, there is no support on SA OS/390 1.3 systems.

Appendix E. Problem Determination

This appendix contains various subtopics that deal with methods of avoiding or detecting problems during SA OS/390 automation. The following topics are discussed:

- “Concurrent User Access within the Customization Dialog”
- “Maintaining System Status During a Status Forwarding Path Failure”
- “Debugging and Tracing” on page 290

Concurrent User Access within the Customization Dialog

The customization dialog allows you the editing of certain entry types by multiple users at the same time. To prevent simultaneous usage of the same resource, a serialization is implemented using the ENQ and DEQ macros with global resources. If an installation runs several systems in a global resource serialization (GRS) complex, but GRS is not installed, it should be ensured that the following major names (qname of ENQ resp. DEQ macro) are propagated:

INGPDB

This name is used by SA OS/390 to serialize access within the customization dialog. It is mandatory to have this major name distributed among all systems where the customization dialog may run. Otherwise different users may overwrite their changes and data may get lost.

SYSDSN

This name is used by SA OS/390 to obtain the user ID of a resource holder in case a policy database cannot be accessed. If this major name is not distributed, messages indicating that a resource cannot be accessed would not show a user ID.

SPFEDIT

This name is used by SA OS/390 to obtain the user ID of a resource holder in case an ISPF table, which holds the data within a policy database, cannot be accessed. If this major name is not distributed, messages indicating that a resource cannot be accessed would not show a user ID.

Maintaining System Status During a Status Forwarding Path Failure

SA OS/390 uses processor operations functions and XCF to attempt to maintain the current status of a system, even if there is a failure in the status forwarding path. SA OS/390 system operations uses XCF for both passive and active monitoring of system status. As long as there is one SA OS/390 in a sysplex with an active status forwarding path, SA OS/390 is able to use XCF to maintain system status for all systems in the sysplex.

SA OS/390 system operations receives alerts generated by processor operations for target systems monitored by processor operations. If, for example, a target system enters a wait state or a DCCF condition, SA OS/390 will use the resulting alert from the processor operations functions to update the system status, even if the status forwarding path between SA OS/390 and the target system is down.

Debugging and Tracing

This chapter describes the tracing and debugging facilities that are available with SA OS/390. The following topics are discussed:

- “Using Trace Services for the Automation Manager”
- “Using AOCTRACE” on page 293
- “How to Use a Log with INGHIST” on page 294
- “How to Use the Diagnostic Option of INGAMS” on page 294

Using Trace Services for the Automation Manager

For tracing the control flow of a process, SA OS/390 uses the **MVS Component Trace Facility** with all its capabilities.

This requires an External Writer as soon as the trace is started. The writer is internally started if it is not already active.

Before the trace can be activated the trace data set must be allocated. The recommended data set name is *'SYS1.HSA.sysname.CTRACE01'*. Appropriate JCL is provided in the SINGSAMP SA OS/390 sample library as member HSACTWR. In addition, the JCL of the component trace's external writer must be cataloged into SYS1.PROCLIB. For more information on customizing the component trace refer to *System Automation for OS/390 Planning and Installation*.

To activate the trace, on an OS/390 console, enter the command:

```
TRACE CT,ON,COMP=HSAAM
```

When the system responds with a WTOR expecting the trace options you reply:

```
xx,WTR=HSACTWR,OPTIONS=(ALL|set_of_options),END
```

where *set_of_options* means one of the following:

Table 24.

Option	Activates the trace in...
ALL	all of the options following
B[ase]	SA OS/390 service routines using OS/390 system services.
COM[munication]	the communications framework
CON[trol]	the base framework
E[vent]	the Sysplex Event Handler
F[ramework]	the service sustaining the LE environment
I[nstruction]	the services encoding or decoding the instruction streams
L[ock]	the service creating and deleting locks
MQ	MQSeries services
R[equest]	the beginning and ending of a workitem (request) processing
S[chedule]	the service overriding service period definitions
W[orkitem]	all components working on work items

You deactivate the trace through the command:

```
TRACE CT,OFF,COMP=HSAAM
```

This command is automatically issued when the last automation manager in a single image terminates while the trace is active.

Before the trace records can be analyzed by IPCS the trace data set(s) must be made available to IPCS. This is done by the operator command:

```
TRACE CT,WTRSTOP=HSACTWR
```

If the related message indicates that more than one data set contains trace data, the IPCS **COPYTRC** command must be used to combine the data sets into a new one.

For analyzing the trace data the IPCS **CTRACE** command has to be used. JCL is provided for the IPCS batch interface. The command supports lots of parameters. At least the following must be adapted:

- COMP(HSAAM)
- USEREXIT(HSAPSTUE)
- DSNAME(trace_data_set_name)
- OPTIONS((filter_options))

where **filter_options** are a combination the following items, separated by comma:

- BASE
- COMMUNICATION
- CONTROL
- EVENT
- FRAMEWORK
- INSTRUCTION
- LOCK
- MQ
- REQUEST
- SCHEDULE
- WORKITEM
- AM=xcf_member_name
- CALLID=(callid[,callid])
- KEY=(key[,key])
- METHOD=(method[,method])
- MODULE=(module[,module])
- TASKID=(taskid[,taskid])
- TOKEN=(token[,token])

The keyword options are connected by a logical *AND* while the values of a keyword and the remaining options are connected by a logical *OR*. Except AM, each keyword option supports up to 5 different values separated by comma or space. Imbedded spaces or commas of a value require delimiters '..' or "..".

JCL Sample for Printing the Trace Records

The following JCL sample member HSAJPTRC is stored in the SA OS/390 library SHSASAMP. The data set names of the DDnames STEPLIB, IPCSDDIR, and TRACEDS must be changed to their actual values before the job is submitted. This is also true for the OPTIONS parameters completely listed because the values of the keywords are sample values only.

```

//HSAAMTRC JOB ( ),CLASS=A,REGION=4M
/* Change the data set names of the following DD names to their
/* actual values:
/* STEPLIB - SA OS/390 load library
/* IPCSDDIR - VSAM data set representing the IPCS Dump Directory
/* TRACEDS - trace data set to be analyzed
//IPCS EXEC PGM=IKJEFT01,DYNAMNBR=20
//STEPLIB DD DISP=SHR,DSN=SYS1.SHSAMOD4
//IPCSDDIR DD DISP=SHR,DSN=SYS1.DDIR
//TRACEDS DD DISP=SHR,DSN=SYS1.HSAAMTRC
//SYSTSPRT DD SYSOUT=*
/* Change and/or remove the OPTIONS parameter according to your
/* requirements.
/* Each keyword except AM supports up to 5 different values separated
/* by comma or space.
/* Don't forget the concatenation character at the end of each line
/* separated by an intervening space from the data.
//SYSTSIN DD *
  IPCS NOPARM
  SETDEF DDNAME(TRACEDS) NOCONFIRM
  CTRACE -
    FULL -
    COMP(HSAAM) -
    USEREXIT(HSAPSTUE) -
    OPTIONS(( -
BASE -
COMMUNICATION -
CONTROL -
EVENT -
FRAMWORK -
INSTRUCTION -
LOCK -
MQ -
REQUEST -
SCHEDULE -
WORKITEM -
AM='xcf_member_name' -
CALLID=('callid 1' -
'callid N' -
'callid 5')-
KEY=('key 1' -
'key N' -
'key 5') -
METHOD=('method 1' -
'method N' -
'method 5') -
MODULE=('module 1' -
'module N' -
'module 5') -
TASKID=('taskid 1' -
'taskid N' -
'taskid 5') -
TOKEN=(token1 -
tokenN -
token5) -
))
  END
/*

```

Figure 130. Print the trace records

Using AOCTRACE

Use the AOCTRACE command to enable and disable the automation debugging facility. It writes information to the NetView log or to the screen.

```
AOFKAAND          SA OS/390 - Command Dialogs
Domain ID   = IPUFM   ----- AOCTRACE -----   Date = 05/25/00
Operator ID = HUT                               Time = 17:42:55

Current global mode is ON                       Trace Settings

Current clist is _____                     A All
debug is _____                             R Results
trace is _                                     I Intermediates
                                                C Commands
Select option:                                  E Errors
1 Turn global execution trace OFF              F Failures
2 Turn specific clist debug                    L Labels
3 Show current clist debug settings            O Off
4 Display clists being traced                  N Normal
                                                _ Default

Specify Subroutines to be traced: (* for all)
_____
_____

Command ==> __
PF1=Help   PF2=End   PF3=Return   PF6=Roll   PF12=Retrieve
```

Figure 131. AOCTRACE Command Dialog

Use **Select option 1** to turn ON or OFF the Current global mode. When the Current global mode is ON, each system operations automation CLIST writes a record to the NetView log containing the name of the CLIST, the issuing operator ID, and any parameters sent to the CLIST.

Use **Select option 2** to turn ON or OFF the CLIST debug feature. When turned ON, the CLIST will write debug information to the NetView log or to the screen. Not all CLISTs make use of this debug feature.

Use **Select option 3** to show the current debug settings for the specified CLIST. These are CLIST debug, CLIST trace and the subroutines being traced.

Use **Select option 4** to get a list of all CLISTs which are in trace/debugging mode. Additionally the trace and debug mode can be switched OFF for all displayed CLISTs (PF10 on panel AOFKAANL).

You specify the select option on the command line.

To set/revise the CLIST trace setting, overtype the trace field with the wanted REXX trace setting (chosen from the list on the panel) and press ENTER. Optionally, specify the list of subroutines that should be traced.

By default, only the CLIST mainroutine will be traced. Specify '*' for tracing of all subroutines.

Note: The CLIST debug setting need not be ON to use CLIST trace.

You can also enable more detailed levels of debugging for one or more CLISTs. The global mode must be ON to use CLIST debug and CLIST trace. You can set tracing ON for several CLISTs, then disable all tracing by simply turning the global mode OFF.

The syntax of the AOFTRACE and some additional information can be found in *System Automation for OS/390 Operator's Commands*.

Information about using AOCTRACE to trace user written automation procedures is provided in *System Automation for OS/390 Customizing and Programming*.

For more information about trace settings, see TRACE in *TSO/E REXX/MVS Reference*.

How to Use a Log with INGHIST

With the INGHIST command you can specify the request to display a log with automation manager messages. For this purpose, type: INGHIST REQ=LOG on the command line to reach a panel similar to the one shown in Figure 132.

```

INGKYHI1          SA OS/390 - Command Dialogs          Line
Domain ID   = IPUFM   ----- INGHIST -----         Date = 05/26/00
Operator ID = HUT     Sysplex = AOC7PLEX              Time = 11:41:12

Start time ==> 2000-05-26 10:41:00   format: yyyy-mm-dd hh:mm:ss
End time   ==>

Date          Time          Logger Messages          Group   XCF-Member
-----
2000-05-29 11:06:36          HSAM1308I SA OS/390 PRIMARY AUTOMATION MANAGER INITIALIZATION
                                     COMPLETE, TYPE=COLD.          INGXS   AOC7$$$1
2000-05-29 11:06:36          HSAM1311I Processing config part,
                                     'SATEST.PROD.ACF.G0042V00(Z995CSCH)'.SCHEDULE.2000052314260
                                     INGXS   AOC7$$$1
2000-05-29 11:06:36          HSAM1310I RC=2 REAS=4384 OPCODE=08020001 (MAIN.2)
                                     ApplyConfiguration.
Command ==>
PF1=Help    PF2=End          PF3=Return          PF6=Ro11
PF9=Refresh          PF12=Retrieve

```

Figure 132. INGHIST Logger Messages

This panel displays automation manager messages that are written to the system logger. Two or more lines are displayed for each message depending on the size of the message text. The first line contains the date and time when the message was issued. It also shows the XCF member name of the automation manager and the XCF group name the automation manager belongs to. The second and following line(s) contain the message.

How to Use the Diagnostic Option of INGAMS

From the INGAMS command dialog, you can select option *D Diagnostic*. This leads you to the panel shown in Figure 133 on page 295 where you can initiate the following diagnostic functions:

- Write snapshot of state image queue

- Start/stop recording

```

INGKYAM4          SA OS/390 - Command Dialogs
Domain ID  = IPUFM  ----- INGAMS -----   Date = 05/26/00
Operator ID = MIK   Sysplex = AOCPLEX         Time = 11:09:32

Specify or revise the following data:

Action ==>  ___    1. Write Snapshot
                2. Start recording
                3. Stop recording

Data set name ==> _____

System      ==> _____ System name, domain id or sysplex name

Command ==>
PF1=Help   PF2=End   PF3=Return
                                           PF6=Roll
                                           PF12=Retrieve

```

Figure 133. Diagnostic

In this panel's fields, enter the following information:

Data set name

specify the name of the data set that will hold the snapshot data. This data set must already be allocated. The data set can be a sequential file or a member of a partitioned data set. However, it is strongly recommended that you use a partitioned data set extended (PDSE) or to make your allocation of the snapshot data set according to the snapshot size information that you will receive when selecting option **B Show Details** for an automation manager from the INGAMS command dialog. This leads you to the following panel showing the snapshot size (highlighted in our example).

```

NGKYAM3          SA OS/390 - Command Dialogs      Line 1    of 24
Domain ID  = IPUFM  ----- INGAMS -----      Date = 05/30/00
Operator ID = HUT          Sysplex = AOCPLEX          Time = 14:52:24

Automation Manager : AOCA$$$1          running on system : AOCA
Operation mode     : PAM
Status            : READY
XCF-Groupname     : INGXSG

Logic Deck ...
Release           : V2R1M0
Date built        : 3 Mar 2000
Time built        : 18:13:40
Last APAR         : NONE

Config dataset name : SATEST.PROD.ACF.G0045V00
Config member      : HSAZ999
                  Z999CLGC  STRUCTURE  20000512062423
                  Z999CRES  STRUCTURE  20000530111537
                  Z999CSCH  SCHEDULE   20000530111537

Config token       : 200005301115378B0213749672
Config version     : 01

Diagnostic Info
  Snapshot size    : 1857172
  Number of resources : 1451
  Number of requests : 105

```

Figure 134. INGAMS Command Dialog, Show Details

Note: A data set name is required when writing a snapshot or when starting recording.

System

is the name of the system where the automation manager resides. This is only necessary when the automation manager is not within the local sysplex. You can specify either the system name, the domain ID or the sysplex name.

Glossary

This glossary includes terms and definitions from:

- The *IBM Dictionary of Computing* New York: McGraw-Hill, 1994.
- The *American National Standard Dictionary for Information Systems*, ANSI X3.172-1990, copyright 1990 by the American National Standards Institute (ANSI). Copies can be purchased from the American National Standards Institute, 1430 Broadway, New York, New York 10018. Definitions are identified by the symbol (A) after the definition.
- The *Information Technology Vocabulary* developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC1/SC1). Definitions of published parts of this vocabulary are identified by the symbol (I) after the definition; definitions taken from draft international standards, committee drafts, and working papers being developed by ISO/IEC JTC1/SC1 are identified by the symbol (T) after the definition, indicating that final agreement has not yet been reached among the participating National Bodies of SC1.

The following cross-references are used in this glossary:

Contrast with. This refers to a term that has an opposed or substantively different meaning.

Deprecated term for. This indicates that the term should not be used. It refers to a preferred term, which is defined in its proper place in the glossary.

See. This refers the reader to multiple-word terms in which this term appears.

See also. This refers the reader to terms that have a related, but not synonymous, meaning.

Synonym for. This indicates that the term has the same meaning as a preferred term, which is defined in the glossary.

Synonymous with. This is a backward reference from a defined term to all other terms that have the same meaning.

A

ACF. Automation control file.

ACF/NCP. Advanced Communications Function for the Network Control Program. See *Advanced Communications Function* and *Network Control Program*.

ACF/VTAM*. Advanced Communications Function for the Virtual Telecommunications Access Method. Synonym for *VTAM*. See *Advanced Communications Function* and *Virtual Telecommunications Access Method*.

ACO. Automated console operations.

active monitoring. In SA OS/390, the acquiring of resource status information by soliciting such information at regular, user-defined intervals. See also *passive monitoring*

adapter. Hardware card that enables a device, such as a workstation, to communicate with another device, such as a monitor, a printer, or some other I/O device.

adjacent hosts. Systems connected in a peer relationship using adjacent NetView sessions for purposes of monitoring and control.

adjacent NetView. In SA OS/390, the system defined as the communication path between two SA OS/390 systems that do not have a direct link. An adjacent NetView is used for message forwarding and as a communication link between two SA OS/390 systems. For example, the adjacent NetView is used when sending responses from a focal point system to a remote system.

Advanced Communications Function (ACF). A group of IBM licensed programs (principally VTAM, TCAM, NCP, and SSP) that use the concepts of Systems Network Architecture (SNA), including distribution of function and resource sharing.

advanced program-to-program communication (APPC). A set of inter-program communication services that support cooperative transaction processing in a Systems Network Architecture (SNA) network. APPC is the implementation, on a given system, of SNA's logical unit type 6.2.

alert. (1) In SNA, a record sent to a system problem management focal point or to a collection point to communicate the existence of an alert condition. (2) In the NetView program, a high-priority event that warrants immediate attention. A database record is generated for certain event types that are defined by user-constructed filters.

alert condition. A problem or impending problem for which some or all of the process of problem determination, diagnosis, and resolution is expected to require action at a control point.

alert focal point system. See entry for NPDA focal point system under *focal point system*

alert threshold. An application service value that determines the level at which SA OS/390 changes the associated icon on the NMC workstation to the alert color. SA OS/390 may also issue an alert. See *warning threshold*

AMC. (1) Automation Manager Configuration (2) The Auto Msg Classes entry type

APF. Authorized program facility.

APPC. Advanced program-to-program communications.

application. An OS/390 subsystem or job monitored by SA OS/390.

Application entry. A construct, created with the customization dialog, used to represent and contain policy for an application.

application group. A named set of applications. An application group is used to represent and contain common policy for the contained applications. Applications in an application group can be automated as an entity. Application groups can behave differently according to their defined nature (BASIC, MOVE, SERVER). An application group can also be used for monitoring purposes.

ApplicationGroup entry type. A construct, created with the customization dialog, used to represent and contain policy for an application group.

application program. (1) A program written for or by a user that applies to the user's work, such as a program that does inventory or payroll. (2) A program used to connect and communicate with stations in a network, enabling users to perform application-oriented activities.

ARM. Automatic restart management.

ASCB. Address space control block.

ASCB status. An application status derived by SA OS/390 running a routine (the ASCB checker) which searches the OS/390 address space control blocks (ASCBs) for address spaces with a particular job name. The job name used by the ASCB checker is the job name defined in the customization dialog for the application.

ASCII (American National Standard Code for Information Interchange). The standard code, using a coded character set consisting of 7-bit coded characters (8-bits including parity check), for information interchange among data processing systems, data

communication systems, and associated equipment. The ASCII set consists of control characters and graphic characters. (A)

ASF. automation status file.

assist mode facility. An SA OS/390 facility that uses SDF and enables interaction with automation before SA OS/390 takes an automation action. SDF prompts the operator with a suggested action, then provides options for using that action, modifying and using the action, or canceling the action. Also called assist mode, it is enabled using the customization dialog, or dynamically.

authorized program facility (APF). A facility that permits identification of programs that are authorized to use restricted functions.

automated function. SA OS/390 automated functions are NetView automation operators, that are assigned to perform specific automation functions. However, SA OS/390 defines its own synonyms, or *automated function names*, for the NetView automation operators, and these function names are referred to in the sample policy databases provided by SA OS/390. For example, the automation operator AUTBASE corresponds to the SA OS/390 automated function BASEOPER.

automated console operations (ACO). The concept (versus a product) of using computers to perform a large subset of tasks ordinarily performed by operators, or assisting operators in performing these tasks.

automatic restart management. An OS/390 recovery function that improves the availability of specified subsystems and applications by automatically restarting them under certain circumstances. Automatic restart management is a function of the Cross-System Coupling Facility (XCF) component of OS/390.

automatic restart management element name. In MVS 5.2 or later, OS/390 automatic restart management requires the specification of a unique sixteen character name for each address space which registers with it. All automatic restart management policy is defined in terms of the element name, including SA OS/390's interface with it.

automation. The automatic initiation of actions in response to detected conditions or events. SA OS/390 provides automation for OS/390 applications, OS/390 components, and remote systems that run OS/390. SA OS/390 also provides tools that can be used to develop additional automation.

automation agent. In SA OS/390, the automation function is split up between the automation manager and the automation agents. The observing, reacting and doing parts are located within the NetView address space, and are known as the *automation agents*. The automation agents are responsible for:

- recovery processing
- message processing
- active monitoring: they propagate status changes to the automation manager

automation control file (ACF). In SA OS/390, a file that contains system-level automation policy information. There is one master automation control file for each NetView system on which SA OS/390 is installed. The SA OS/390 customization dialog must be used to build the automation control files. They must not be edited manually.

automation flags. In SA OS/390, the automation policy settings that determine the operator functions that are automated for a resource and the times during which automation is active. When SA OS/390 is running, automation is controlled by automation flag policy settings and override settings (if any) entered by the operator. Automation flags are set using the customization dialog.

automation manager. In SA OS/390, the automation function is split up between the automation manager and the automation agents. The coordination, decision making and controlling functions are processed by each sysplex's *automation manager*.

The automation manager contains a model of all of the automated resources within the sysplex. The automation agents feed the automation manager with status information and perform the actions that the automation manager tells them to.

The automation manager provides *sysplex-wide* automation.

Automation Manager Configuration. The Automation Manager Configuration file (AMC) contains an image of the automated systems in a sysplex or of a stand-alone system.

Automation NetView. In SA OS/390 the NetView that performs routine operator tasks with command procedures or uses other ways of automating system and network management, issuing automatic responses to messages and management services units.

automation operator. NetView automation operators are NetView autotasks that are assigned to perform specific automation functions. See also *automated function*. NetView automation operators may receive messages and process automation procedures. There are no logged-on users associated with automation operators. Each automation operator is an operating system task and runs concurrently with other NetView tasks. An automation operator could be set up to handle JES2 messages that schedule automation procedures, and an automation statement could route such messages to the automation operator. Similar to *operator station task*. SA OS/390 message monitor tasks and target control tasks are automation operators.

automation policy. The policy information governing automation for individual systems. This includes automation for applications, OS/390 subsystems, OS/390 data sets, and OS/390 components.

automation policy settings. The automation policy information contained in the automation control file. This information is entered using the customization dialog. You can display or modify these settings using the customization dialog.

automation procedure. A sequence of commands, packaged as a NetView command list or a command processor written in a high-level language. An automation procedure performs automation functions and runs under the NetView program.

automation status file. In SA OS/390, a file containing status information for each automated subsystem, component or data set. This information is used by SA OS/390 automation when taking action or when determining what action to take.

automation table. Also called NetView message automation table. See *NetView message automation table*

autotask. See *automation operator*.

available. In VTAM programs, pertaining to a logical unit that is active, connected, enabled, and not at its session limit.

B

basic mode. A central processor mode that does not use logical partitioning. Contrast with *logically partitioned (LPAR) mode*.

beaconing. The repeated transmission of a frame or messages (beacon) by a console or workstation upon detection of a line break or outage.

C

central processor (CP). The part of the computer that contains the sequencing and processing facilities for instruction execution, initial program load (IPL), and other machine operations.

central processor complex (CPC). A physical collection of hardware that consists of central storage, one or more central processors, timers, and channels.

central site. In a distributed data processing network, the central site is usually defined as the focal point for alerts, application design, and remote system management tasks such as problem management.

CFR/CFS and ISC/ISR. I/O operations can display and return data about integrated system channels (ISC)

connected to a coupling facility and coupling facility receiver (CFR) channels and coupling facility sender (CFS) channels.

channel. A path along which signals can be sent; for example, data channel, output channel. See also *link*.

channel path identifier. A system-unique value assigned to each channel path

CHPID. In SA OS/390, channel path ID; the address of a channel.

CHPID port. A label that describes the system name, logical partitions, and channel paths.

channel-attached. (1) Attached directly by I/O channels to a host processor (for example, a channel-attached device). (2) Attached to a controlling unit by cables, rather than by telecommunication lines. Contrast with *link-attached*. Synonymous with *local*.

CI. Console integration.

CICS/VS. Customer Information Control System for Virtual Storage.

CLIST. Command list.

clone. A set of definitions for application instances which are derived from a basic application definition by substituting a number of different system-specific values into the basic definition.

clone ID. A generic means of handling system-specific values such as the MVS SYSCLONE or the VTAM subarea number. Clone IDs can be substituted into application definitions and commands to customize a basic application definition for the system that it is to be instantiated on.

CNC. A channel path that transfers data between a host system image and an ESCON control unit. It can be point-to-point or switchable.

command. A request for the performance of an operation or the execution of a particular program.

command facility. The component of the NetView program that is a base for command processors that can monitor, control, automate, and improve the operation of a network. The successor to NCCF.

command list (CLIST). (1) A list of commands and statements, written in the NetView command list language or the REXX language, designed to perform a specific function for the user. In its simplest form, a command list is a list of commands. More complex command lists incorporate variable substitution and conditional logic, making the command list more like a conventional program. Command lists are typically interpreted rather than being compiled. (2) In SA OS/390, REXX command lists that can be used for automation procedures.

command procedure. In the NetView program, either a command list or a command processor.

command processor. A module designed to perform a specific function. Command processors, which can be written in assembler or a high-level language (HLL), are issued as commands.

Command Tree/2. An OS/2-based program that helps you build commands on an OS/2 window, then routes the commands to the destination you specify (such as a 3270 session, a file, a command line, or an application program). It provides the capability for operators to build commands and route them to a specified destination.

common commands. The SA OS/390 subset of the CPC operations management commands.

common routine. One of several SA OS/390 programs that perform frequently used automation functions. Common routines can be used to create new automation procedures.

communication controller. A type of communication control unit whose operations are controlled by one or more programs stored and executed in the unit or by a program executed in a processor to which the controller is connected. It manages the details of line control and the routing of data through a network.

communication line. Deprecated term for *telecommunication line*.

communications path. A set of communications facilities that SA OS/390 uses to connect a focal point system to a target system. There are two types: a NetView connection and a workstation.

communications task. An SA OS/390 task responsible for all communications with a number of workstations. Communications tasks receive commands from target control tasks and send inbound messages to the message monitoring task. There can be many communications tasks. Communications tasks are defined using the configuration dialogs.

configuration dialogs. A user interface for entering the information that defines the SA OS/390 configuration. In SA OS/390 the configuration dialogs are an ISPF application.

connectivity view. In SA OS/390, a display that uses graphic images for I/O devices and lines to show how they are connected.

console automation. The process of having NetView facilities provide the console input usually handled by the operator.

console connection. In SA OS/390, the 3270 or ASCII (serial) connection between a PS/2 computer and a

target system. Through this connection, the workstation appears (to the target system) to be a console.

console integration (CI). A hardware facility which if supported by an operating system, allows operating system messages to be transferred through an internal hardware interface for display on a system console. Conversely, it allows operating system commands entered at a system console to be transferred through an internal hardware interface to the operating system for processing.

consoles. Workstations and 3270-type devices that manage your enterprise.

Control units. Hardware units that control I/O operations for one or more devices. You can view information about control units through I/O operations, and can start or stop data going to them by blocking and unblocking ports.

controller. A unit that controls I/O operations for one or more devices.

couple data set. A data set that is created through the XCF couple data set format utility and, depending on its designated type, is shared by some or all of the OS/390 systems in a sysplex. See also *sysplex couple data set* and *XCF couple data set*

coupling facility. The hardware element that provides high-speed caching, list processing, and locking functions in a sysplex.

CP. Central processor.

CPC. Central processor complex.

CPC operations management commands. A set of commands and responses for controlling the operation of System/390 CPCs.

CPC subset. All or part of a CPC. It contains the minimum *resource* to support a single control program.

CPCB. Command processor control block; an I/O operations internal control block that contains information about the command being processed.

CPU. Central processing unit. Deprecated term for *processor*.

cross-system coupling facility (XCF). XCF is a component of OS/390 that provides functions to support cooperation between authorized programs running within a sysplex.

CTC. The channel-to-channel (CTC) channel can communicate with a CTC on another host for intersystem communication.

Customer Information Control System (CICS). A general-purpose transactional program that controls

online communication between terminal users and a database for a large number of end users on a real-time basis.

customization dialog. The customization dialog is an ISPF application. They are used to customize the enterprise policy, like for example the automated enterprise resources and the relationships between resources, or the automation policy for systems in the enterprise.

CVC. A channel operating in converted (CVC) mode transfers data in blocks and a CBY channel path transfers data in bytes. Converted CVC or CBY channel paths can communicate with a parallel control unit. This resembles a point-to-point parallel path and dedicated connection, regardless whether it passes through a switch.

D

DASD. Direct access storage device.

data services task (DST). The NetView subtask that gathers, records, and manages data in a VSAM file or a network device that contains network management information.

data set. The major unit of data storage and retrieval, consisting of a collection of data in one of several prescribed arrangements and described by control information to which the system has access.

data set members. Members of partitioned data sets that are individually named elements of a larger file that can be retrieved by name.

DBCS. Double-byte character set.

DCCF. Disabled console communication facility.

DCF. Document composition facility.

Devices. You can see information about all devices (such as printers, tape or disk drives, displays, or communications controllers) attached to a particular switch, and control paths and jobs to devices.

direct access storage device (DASD). A device in which the access time is effectively independent of the location of the data; for example, a disk.

disabled console communication facility (DCCF). An OS/390 component that provides limited-function console communication during system recovery situations.

disk operating system (DOS). (1) An operating system for computer systems that use disks and diskettes for auxiliary storage of programs and data. (2) Software for a personal computer that controls the processing of programs. For the IBM Personal

Computer, the full name is Personal Computer Disk Operating System (PCDOS).

distribution manager. The component of the NetView program that enables the host system to use, send, and delete files and programs in a network of computers.

domain. (1) An access method and its application programs, communication controllers, connecting lines, modems, and attached workstations. (2) In SNA, a system services control point (SSCP) and the physical units (PUs), logical units (LUs), links, link stations, and associated resources that the SSCP can control by means of activation requests and deactivation requests.

double-byte character set (DBCS). A character set, such as Kanji, in which each character is represented by a 2-byte code.

DSIPARM. This file is a collection of members of NetView's DSIPARM data set. It determines how automation is applied to resources.

DST. Data Services Task.

E

EBCDIC. Extended binary-coded decimal interchange code. A coded character set consisting of 8-bit coded characters.

ECB. Event control block. A control block used to represent the status of an event.

EMCS. Extended multiple console support.

enterprise. An organization, such as a business or a school, that uses data processing.

entry type. Resources, such as processors or applications, used for automation and monitoring.

environment. Data processing enterprise.

error threshold. An automation policy setting that specifies when SA OS/390 should stop trying to restart or recover an application, subsystem or component, or off-load a data set.

ESA. Enterprise Systems Architecture.

event. (1) In the NetView program, a record indicating irregularities of operation in physical elements of a network. (2) An occurrence of significance to a task; for example, the completion of an asynchronous operation, such as an input/output operation. (3) Events are part of a trigger condition, in a way that if all events of a trigger condition have occurred, a *STARTUP* or *SHUTDOWN* of an application is performed.

exception condition. An occurrence on a system that is a deviation from normal operation. SA OS/390

monitoring highlights exception conditions and allows an SA OS/390 enterprise to be managed by exception.

extended recovery facility (XRF). A facility that minimizes the effect of failures in OS/390, VTAM, the host processor, or high availability applications during sessions between high availability applications and designated terminals. This facility provides an alternate subsystem to take over sessions from the failing subsystem.

F

fallback system. See *secondary system*

file manager commands. A set of SA OS/390 commands that read data from or write data to the automation control file. These commands are useful in the development of automation that uses SA OS/390 facilities.

focal point. In the NetView program, the focal point domain is the central host domain. It is the central control point for any management services element containing control of the network management data.

focal point system. (1) A system that can administer, manage, or control one or more target systems. There are a number of different focal point systems associated with IBM automation products. (2) **SA OS/390 automation focal point system.** The SA OS/390 automation focal point system is an SA OS/390 NetView system that collects status information from other SA OS/390 NetViews within your enterprise. It is supported by SA OS/390, which uses NetView NNT/OST sessions to forward information to it. (3) **SA OS/390 configuration focal point system.** The SA OS/390 configuration focal point is the system on which SA OS/390 is installed. The SA OS/390 policy databases exist on this system and are built into automation control file fragments, and processor control file on this system (if this is being done using SA OS/390). (4) **SA OS/390 workstation focal-system.** The SA OS/390 workstation focal point must be the same as the NMC focal point system. SA OS/390 code is installed on both the workstation and the NMC focal point system. The SA OS/390 workstation focal point system collects status information about systems and applications within your enterprise. It is supported by SA OS/390. (5) **NMC focal point system.** The NMC focal point system is a NetView system with an attached workstation server and LAN which gathers information about the state of the network. This focal point system uses RODM to store the data it collects in the data model. The information stored in RODM can be accessed from any LAN-connected workstation with NetView Management Console installed. (6) **NPDA focal point system.** This is a NetView system which collects all the NPDA alerts that are generated within your enterprise. It is supported by NetView. If you have SA OS/390 installed the NPDA focal point system

must be the same as your NMC focal point system. The NPDA focal point system is also known as the *alert focal point system*. (7) **Status focal point system.** In NetView, the system to which STATMON, VTAM and NLDM send status information on network resources. If you have a NMC focal point, it must be on the same system as the Status focal point. (8) **SA OS/390 focal point system.** This is a NetView system that has SA OS/390 host code installed, and network connections to a number of SA OS/390 workstations. The SA OS/390 focal point system receives messages from the systems and operator consoles of the machines it controls. It provides full systems and operations console function for its target systems. It can be used to IPL these systems. Note that some restrictions apply to the Hardware Management Console for an S/390 microprocessor cluster. (9)

Hardware Management Console. Although not listed as a focal point, the Hardware Management Console acts as a focal point for the console functions of an S/390 microprocessor cluster. Unlike all the other focal points in this definition, the Hardware Management Console runs on a LAN-connected workstation,

frame. For a System/390 microprocessor cluster, a frame contains one or two central processor complexes (CPCs), support elements, and AC power distribution.

full-screen mode. In the NetView program, a form of panel presentation that makes it possible to display the contents of an entire workstation screen at once. Full-screen mode can be used for fill-in-the-blanks prompting. Contrast with *line mode*.

G

gateway session. An NetView-NetView task session with another system in which the SA OS/390 outbound gateway operator logs onto the other NetView session without human operator intervention. Each end of a gateway session has both an inbound and outbound gateway operator.

generic alert. Encoded alert information that uses code points (defined by IBM and possibly customized by users or application programs) stored at an alert receiver, such as NetView.

generic routines. In SA OS/390, a set of self-contained automation routines that can be called from the NetView message automation table, or from user-written automation procedures.

Group entry type. A collection of target systems defined through the customization dialog. An installation might set up a group to refer to a physical site or an organizational entity. Groups can be of type STANDARD or SYSPLEX.

H

Hardware Management Console. A console used by the operator to monitor and control a System/390 microprocessor cluster.

Hardware Management Console Application (HWMCA). A direct-manipulation object-oriented graphical user interface that provides single point of control and single system image for hardware elements. HWMCA provides customer grouping support, aggregated and real-time system status using colors, consolidated hardware messages support, consolidated operating system messages support, consolidated service support, and hardware commands targeted at a single system, multiple systems, or a customer group of systems.

heartbeat. In SA OS/390, a function which monitors the validity of the status forwarding path between remote systems and the NMC focal point system, and monitors the availability of remote OS/390 systems, to ensure that status information displayed on the SA OS/390 workstation is current.

help panel. An online panel that tells you how to use a command or another aspect of a product.

hierarchy. In the NetView program, the resource types, display types, and data types that make up the organization, or levels, in a network.

high-level language (HLL). A programming language that does not reflect the structure of any particular computer or operating system. For the NetView program, the high-level languages are PL/I and C.

HLL. High-level language.

host system. In a coupled system or distributed system environment, the system on which the facilities for centralized automation run. SA OS/390 publications refer to target systems or focal-point systems instead of hosts.

host (primary processor). The processor at which you enter a command (also known as the *issuing processor*)

HWMCA. Hardware Management Console Application. Application for the graphic hardware management console that monitors and controls a central processor complex. It is attached to a target processor (a system 390 microprocessor cluster) as a dedicated system console. This microprocessor uses OCF to process commands.

I

images. A grouping of processors and I/O devices that you define. You can define a single-image mode which allows a multiprocessor system to function as one central processor image.

IMS/VS. Information Management System/Virtual Storage.

inbound. In SA OS/390, messages sent to the focal-point system from the PS/2 computer or target system.

inbound gateway operator. The automation operator that receives incoming messages, commands, and responses from the outbound gateway operator at the sending system. The inbound gateway operator handles communications with other systems using a gateway session.

Information Management System/Virtual Storage (IMS/VS). A database/data communication (DB/DC) system that can manage complex databases and networks. Synonymous with IMS.

INGEIO PROC. The I/O operations default procedure name; part of the SYS1.PROCLIB

initial program load (IPL). (1) The initialization procedure that causes an operating system to commence operation. (2) The process by which a configuration image is loaded into storage at the beginning of a workday or after a system malfunction. (3) The process of loading system programs and preparing a system to run jobs.

initialize automation. SA OS/390-provided automation that issues the correct OS/390 start command for each subsystem when SA OS/390 is initialized. The automation ensures that subsystems are started in the order specified in the automation control file and that prerequisite applications are functional.

input/output support processor (IOSP). The hardware unit that provides I/O support functions for the primary support processor and maintenance support functions for the processor controller.

Interactive System Productivity Facility (ISPF). An IBM licensed program that serves as a full-screen editor and dialog manager. Used for writing application programs, it provides a means of generating standard screen panels and interactive dialogs between the application programmer and the terminal user.

interested operator list. The list of operators who are to receive messages from a specific target system.

internal token. A *logical token* (LTOK); name by which the I/O resource or object is known; stored in IODF.

Inter-System Control Facility (ISCF). A program offering that provides remote operations support for 3090, 4381, and 308x processors. ISCF is a predecessor to SA OS/390. It runs as a command processor on the NetView program and works in conjunction with the ISCF/PC program.

Inter-System Control Facility/PC (ISCF/PC). A program offering that runs as an application on an IBM personal computer and works in conjunction with ISCF.

IOCDs. I/O configuration data set. The data set that describes the I/O configuration.

I/O Ops. See *I/O operations*

IOSP. Input/Output Support Processor.

I/O operations. The part of SA OS/390 that provides you with a single point of logical control for managing connectivity in your active I/O configurations. I/O operations takes an active role in detecting unusual conditions and lets you view and change paths between a processor and an I/O device, using dynamic switching (the ESCON director).

I/O resource number. Combination of channel path identifier (CHPID), device number, etc. See internal token.

IPL. Initial program load.

ISA. Industry Standard Architecture.

ISCF. Inter-System Control Facility.

ISCF/PC. Inter-System Control Facility/Personal Computer.

ISPF. Interactive System Productivity Facility.

ISPF console. From this 3270-type console you are logged onto ISPF to use the runtime panels for I/O operations and SA OS/390 customization panels.

issuing host. See *primary host*; the base program at which you enter a command for processing.

J

JCL. Job control language.

JES. Job entry subsystem.

job. (1) A set of data that completely defines a unit of work for a computer. A job usually includes all necessary computer programs, linkages, files, and instructions to the operating system. (2) An address space.

job control language (JCL). A problem-oriented language designed to express statements in a job that are used to identify the job or describe its requirements to an operating system.

job entry subsystem (JES). A facility for spooling, job queuing, and managing I/O. In SA OS/390 publications, JES refers to JES2 or JES3, unless distinguished as being either one or the other.

K

Kanji. An ideographic character set used in Japanese. See also *double-byte character set*

L

LAN. Local area network.

line mode. A form of screen presentation in which the information is presented a line at a time in the message area of the terminal screen. Contrast with *full-screen mode*.

link. (1) In SNA, the combination of the link connection and the link stations joining network nodes; for example, a System/370 channel and its associated protocols, a serial-by-bit connection under the control of synchronous data link control (SDLC). (2) In SA OS/390, link connection is the physical medium of transmission.

link-attached. Describes devices that are physically connected by a telecommunication line. Contrast with *channel-attached*.

local. Pertaining to a device accessed directly without use of a telecommunication line. Synonymous with *channel-attached*.

local area network (LAN). (1) A network in which a set of devices is connected for communication. They can be connected to a larger network. See also *token ring*. (2) A network in which communications are limited to a moderately sized geographic area such as a single office building, warehouse, or campus, and which do not generally extend across public rights-of-way.

logical partition (LP). A subset of the processor hardware that is defined to support an operating system. See also *logically partitioned () mode*.

logical switch number (LSN). Assigned with the switch parameter of the CHPID macro of the IOCP

logical token (LTOK). Resource number of an object in the IODF

logical unit (LU). In SNA, a port through which an end user accesses the SNA network and the functions provided by system services control points (SSCPs). An LU can support at least two sessions — one with an SSCP and one with another LU — and may be capable of supporting many sessions with other LUs. See also *physical unit (PU)* and *system services control point (SSCP)*.

logical unit (LU) 6.2. A type of logical unit that supports general communications between programs in a distributed processing environment. LU 6.2 is characterized by (a) a peer relationship between session

partners, (b) efficient use of a session for multiple transactions, (c) comprehensive end-to-end error processing, and (d) a generic application program interface (API) consisting of structured verbs that are mapped into a product implementation. Synonym for advanced program-to-program communications (APPC).

logically partitioned (LPAR) mode. A central processor mode that enables an operator to allocate system processor hardware resources among several logical partitions. Contrast with *basic mode*.

LOGR. The sysplex logger.

LP. Logical partition.

LPAR. Logically partitioned (mode).

LU. Logical unit.

LU-LU session. In SNA, a session between two logical units (LUs) in an SNA network. It provides communication between two end users, or between an end user and an LU services component.

LU 6.2. Logical unit 6.2.

LU 6.2 session. A session initiated by VTAM on behalf of an LU 6.2 application program, or a session initiated by a remote LU in which the application program specifies that VTAM is to control the session by using the APPCCMD macro.

M

MCA. Micro Channel* architecture.

MCS. Multiple console support.

member. A specific function (one or more modules/routines) of a multisystem application that is defined to XCF and assigned to a group by the multisystem application. A member resides on one system in the sysplex and can use XCF services to communicate (send and receive data) with other members of the same group.

NetView message automation table. A table against which the NetView program compares incoming messages. A match with an entry triggers the specified response. SA OS/390 entries in the NetView automation table trigger an SA OS/390 response to target system conditions.

message class. A number that SA OS/390 associates with a message to control routing of the message. During automated operations, the classes associated with each message issued by SA OS/390 are compared to the classes assigned to each notification operator. Any operator with a class matching one of the message's classes receives the message.

message forwarding. The SA OS/390 process of sending messages generated at an SA OS/390 target system to the SA OS/390 focal point system.

message group. Several messages that are displayed together as a unit.

message monitor task. A task that starts and is associated with a number of communications tasks. Message monitor tasks receive inbound messages from a communications task, determine the originating target system, and route the messages to the appropriate target control tasks.

message processing facility (MPF). An OS/390 table that screens all messages sent to the OS/390 console. The MPF compares these messages with a customer-defined list of messages on which to automate, suppress from the OS/390 console display, or both, and marks messages to automate or suppress. Messages are then broadcast on the subsystem interface (SSI).

message suppression. The ability to restrict the amount of message traffic displayed on the OS/390 console.

Micro Channel architecture. The rules that define how subsystems and adapters use the Micro Channel bus in a computer. The architecture defines the services that each subsystem can or must provide.

microprocessor. A processor implemented on one or a small number of chips.

migration. Installation of a new version or release of a program to replace an earlier version or release.

MP. Multiprocessor.

MPF. Message processing facility.

Multiple Virtual Storage (MVS). An IBM licensed program. MVS, which is the predecessor of OS/390, is an operating system that controls the running of programs on a System/390 or System/370 processor. MVS includes an appropriate level of the Data Facility Product (DFP) and Multiple Virtual Storage/Enterprise Systems Architecture System Product Version 5 (MVS/ESA SP5)

multiprocessor (MP). A CPC that can be physically partitioned to form two operating processor complexes.

multisystem application. An application program that has various functions distributed across OS/390 images in a multisystem environment.

multisystem environment. An environment in which two or more OS/390 images reside in one or more processors, and programs on one image can communicate with programs on the other images.

MVS. Multiple Virtual Storage, predecessor of OS/390.

MVS image. A single occurrence of the MVS/ESA operating system that has the ability to process work.

MVS/JES2. Multiple Virtual Storage/Job Entry System 2. An OS/390 subsystem that receives jobs into the system, converts them to internal format, selects them for execution, processes their output, and purges them from the system. In an installation with more than one processor, each JES2 processor independently controls its job input, scheduling, and output processing.

MVS/ESA. Multiple Virtual Storage/Enterprise Systems Architecture.

MVS/ESA SP. Multiple Virtual Storage/Enterprise Systems Architecture System Product.

MVS/XA. Multiple Virtual Storage for Extended Architecture.

N

NAU. (1) Network accessible unit. (2) Network addressable unit.

NCCF. Network Communications Control Facility.

NCP. (1) Network Control Program (IBM licensed program). Its full name is Advanced Communications Function for the Network Control Program. Synonymous with *ACF/NCP*. (2) Network control program (general term).

NetView. An IBM licensed program used to monitor a network, manage it, and diagnose network problems. NetView consists of a command facility that includes a presentation service, command processors, automation based on command lists, and a transaction processing structure on which the session monitor, hardware monitor, and terminal access facility (TAF) network management applications are built.

network accessible unit (NAU). A logical unit (LU), physical unit (PU), control point (CP), or system services control point (SSCP). It is the origin or the destination of information transmitted by the path control network. Synonymous with *network addressable unit*.

network addressable unit (NAU). Synonym for *network accessible unit*.

NetView automation procedures. A sequence of commands, packaged as a NetView command list or a command processor written in a high-level language. An automation procedure performs automation functions and runs under the NetView program.

NetView Command list language. An interpretive language unique to NetView that is used to write command lists.

NetView (NCCF) console. A 3270-type console for NetView commands and runtime panels for system operations and processor operations

NetView hardware monitor. The component of NetView that helps identify network problems, such as hardware, software, and microcode, from a central control point using interactive display techniques. Formerly called *network problem determination application*

NetView log. The log in which NetView records events pertaining to NetView and SA OS/390 activities.

NetView-NetView task (NNT). The task under which a cross-domain NetView operator session runs. Each NetView program must have a NetView-NetView task to establish one NNT session. See *operator station task*

NetView paths via logical unit (LU 6.2). A type of network-accessible port (VTAM connection) that enables end users to gain access to SNA network resources and communicate with each other. LU 6.2 permits communication between processor operations and the workstation.

NetView-NetView task session. A session between two NetView programs that runs under an NetView-NetView task. In SA OS/390, NetView-NetView task sessions are used for communication between focal point and remote systems.

network. (1) An interconnected group of nodes. (2) In data processing, a user application network. See *SNA network*.

Network Communications Control Facility (NCCF). The operations control facility for the network. NCCF consists of a presentation service, command processors, automation based on command lists, and a transaction processing structure on which the network management applications NLDM and NPDA are built. NCCF is a precursor to the NetView command facility.

Network Control Program (NCP). An IBM licensed program that provides communication controller support for single-domain, multiple-domain, and interconnected network capability. Its full name is Advanced Communications Function for the Network Control Program.

Networking NetView. In SA OS/390 the NetView that performs network management functions, such as managing the configuration of a network. In SA OS/390 it is common to also route alerts to the Networking NetView.

Network Problem Determination Application (NPDA). An NCCF application that helps you identify network problems, such as hardware, software, and microcode, from a central control point using interactive display methods. The alert manager for the network. The precursor of the NetView hardware monitor.

NMC focal point system. See *focal point system*

NMC workstation. The NMC workstation is the primary way to dynamically monitor SA OS/390 systems. From the windows, you see messages, monitor status, view trends, and react to changes before they cause problems for end users. You can use multiple windows to monitor multiple views of the system.

NIP. Nucleus initialization program.

NNT. NetView-NetView task.

notification message. An SA OS/390 message sent to a human notification operator to provide information about significant automation actions. Notification messages are defined using the customization dialog.

notification operator. A NetView console operator who is authorized to receive SA OS/390 notification messages. Authorization is made through the customization dialog.

NPDA. Network Problem Determination Application.

NPDA focal point system. See *focal point system*

NTRI. NCP/token-ring interconnection.

nucleus initialization program (NIP). The program that initializes the resident control program; it allows the operator to request last-minute changes to certain options specified during system generation.

O

OCA. In SA OS/390, operator console A, the active operator console for a target system. Contrast with *OCB*.

OCB. In SA OS/390, operator console B, the backup operator console for a target system. Contrast with *OCA*.

OCF. Operations command facility.

OCF-based processor. A central processor complex that uses an operations command facility for interacting with human operators or external programs to perform operations management functions on the CPC. Contrast with *screen-oriented processor*.

OPC/A. Operations Planning and Control/Advanced.

OPC/ESA. Operations Planning and Control/Enterprise Systems Architecture.

operating system (OS). Software that controls the execution of programs and that may provide services such as resource allocation, scheduling, input/output control, and data management. Although operating systems are predominantly software, partial hardware implementations are possible. (T)

OS/2. A software operating system for personal computers (workstations). OS/2 supports sophisticated business applications and gives you multiple simultaneous host sessions, DOS sessions, Windows sessions, and OS/2 sessions with a graphic interface that lets you select resources by clicking on an icon with a mouse.

operations. The real-time control of a hardware device or software function.

operations command facility (OCF). A facility of the central processor complex that accepts and processes operations management commands.

Operations Planning and Control/Advanced (OPC/A). A set of IBM licensed programs that automate, plan, and control batch workload. OPC/A analyzes system and workload status and submits jobs accordingly.

Operations Planning and Control/ESA (OPC/ESA). A set of IBM licensed programs that automate, plan, and control batch workload. OPC/ESA analyzes system and workload status and submits jobs accordingly. The successor to OPC/A.

operator. (1) A person who keeps a system running. (2) A person or program responsible for managing activities controlled by a given piece of software such as OS/390, the NetView program, or IMS. (3) A person who operates a device. (4) In a language statement, the lexical entity that indicates the action to be performed on operands.

operator console. (1) A functional unit containing devices that are used for communications between a computer operator and a computer. (T) (2) A display console used for communication between the operator and the system, used primarily to specify information concerning application programs and I/O operations and to monitor system operation. (3) In SA OS/390, a console that displays output from and sends input to the operating system (OS/390, VM, VSE, or TPF). Also called *operating system console*. In the SA OS/390 operator commands and configuration dialogs, OC is used to designate a target system operator console.

operator station task (OST). The NetView task that establishes and maintains the online session with the network operator. There is one operator station task for each network operator who logs on to the NetView program.

OS/390 component. A part of OS/390 that performs a specific OS/390 function. In SA OS/390, component refers to entities that are managed by SA OS/390 automation.

OS/390 subsystem. Software products that augment the OS/390 operating system. JES and TSO/E are examples of OS/390 subsystems. SA OS/390 includes automation for some OS/390 subsystems.

OS/390 system. An OS/390 image together with its associated hardware, which collectively are often referred to simply as a system, or OS/390 system.

OSA. I/O operations can display the open system adapter (OSA) channel logical definition, physical attachment, and status. You can configure an OSA channel on or off.

OST. Operator station task.

OS/2. The IBM Operating System/2 program.

OS/2 program. The IBM Operating System/2* program. SA OS/390 uses the intersystem communication and emulation services of the Communication Manager.

outbound. In SA OS/390, messages or commands from the focal-point system to the PS/2 computer or target system.

outbound gateway operator. The automation operator that establishes connections to other systems. The outbound gateway operator handles communications with other systems through a gateway session. The automation operator sends messages, commands, and responses to the inbound gateway operator at the receiving system.

P

page. (1) The portion of a panel that is shown on a display surface at one time. (2) To transfer instructions, data, or both between real storage and external page or auxiliary storage.

panel. (1) A formatted display of information that appears on a terminal screen. Panels are full-screen 3270-type displays with a monospaced font, limited color and graphics. (2) By using SA OS/390 panels you can see status, type commands on a command line using a keyboard, configure your system, and passthru to other consoles. See also *help panel*. (3) In computer graphics, a display image that defines the locations and characteristics of display fields on a display surface. Contrast with *screen*.

parallel channels. Parallel channels operate in either byte (BY) or block (BL) mode. You can change connectivity to a parallel channel operating in block mode.

parameter. (1) A variable that is given a constant value for a specified application and that may denote the application. (2) An item in a menu for which the user specifies a value or for which the system provides a value when the menu is interpreted. (3) Data passed to a program or procedure by a user or another program, namely as an operand in a language statement, as an item in a menu, or as a shared data structure.

partition. (1) A fixed-size division of storage. (2) In VSE, a division of the virtual address area that is available for program processing. (3) On an IBM Personal Computer fixed disk, one of four possible storage areas of variable size; one can be accessed by DOS, and each of the others may be assigned to another operating system.

partitionable CPC. A CPC that can be divided into 2 independent CPCs. See also *physical partition*, *single-image mode*, *MP*, *side*.

partitioned data set (PDS). A data set in direct access storage that is divided into partitions, called *members*, each of which can contain a program, part of a program, or data.

passive monitoring. In SA OS/390, the receiving of unsolicited messages from OS/390 systems and their resources. These messages can prompt updates to resource status displays. See also *active monitoring*

path. Communication link (either NetView or PS/2) between a processor and console

PCE. Processor controller. Also known as the "support processor" or "service processor" in some processor families.

PDS. Partitioned data set.

Personal System/2* (PS/2) computer. A family of microcomputers manufactured by IBM Corporation.

physical partition. Part of a CPC that operates as a CPC in its own right, with its own copy of the operating system.

physical unit (PU). In SNA, the component that manages and monitors the resources (such as attached links and adjacent link stations) of a node, as requested by a system services control point (SSCP) through an SSCP-PU session. An SSCP activates a session with the physical unit to indirectly manage, through the PU, resources of the node such as attached links.

physically partitioned (PP) configuration. A mode of operation that allows a multiprocessor (MP) system to function as two or more independent CPCs having separate power, water, and maintenance boundaries. Contrast with *single-image (SI) configuration*.

POI. Program operator interface.

policy. The automation and monitoring specifications for an SA OS/390 enterprise. See *SA OS/390 policy*

policy database. The database where the automation policy is recorded.

POR. Power-on reset.

port. (1) System hardware to which the I/O devices are attached. (2) On an ESCON switch, a port is an addressable connection. The switch routes data through the ports to the channel or control unit. Each port has a name that can be entered into a switch matrix, and you can use commands to change the switch configuration. (3) An access point (for example, a logical unit) for data entry or exit. (4) A functional unit of a node through which data can enter or leave a data network. (5) In data communication, that part of a data processor that is dedicated to a single data channel for the purpose of receiving data from or transmitting data to one or more external, remote devices. (6) power-on reset (POR) (7) A function that re-initializes all the hardware in a CPC and loads the internal code that enables the CPC to load and run an operating system.

PP. Physically partitioned (configuration).

PPT. Primary POI task.

primary host. The base program at which you enter a command for processing.

primary POI task (PPT). The NetView subtask that processes all unsolicited messages received from the VTAM program operator interface (POI) and delivers them to the controlling operator or to the command processor. The PPT also processes the initial command specified to execute when NetView is initialized and timer request commands scheduled to execute under the PPT.

primary system. A system is a primary system for an application if the application is normally meant to be running there. SA OS/390 starts the application on all the primary systems defined for it.

problem determination. The process of determining the source of a problem; for example, a program component, machine failure, telecommunication facilities, user or contractor-installed programs or equipment, environment failure such as a power loss, or user error.

processor controller. Hardware that provides support and diagnostic functions for the central processors.

processor operations. The part of SA OS/390 that monitors and controls processor (hardware) operations. Processor operations provides a connection from a focal point system to a target system. Through NetView on the focal point system, processor operations automates operator and system consoles for monitoring and recovering target systems.

processor operations control file. Named by your system programmer, this file contains configuration and customization information. The programmer records the name of this control file in the processor operations file generation panel ISQDPG01.

processor operations workstation. This 3270-type display echoes commands run by automation and relays commands from the focal point system to the target processor, and messages from the target processor to the focal point system. The display can also be used as operator consoles. The workstation attaches to a processor through the processor controller.

Processor Resource/Systems Manager* (PR/SM*). The feature that allows the processor to use several operating system images simultaneously and provides logical partitioning capability. See also (.

ProcOps. See *Processor Operations*

product automation. Automation integrated into the base of SA OS/390 for the products DB2, CICS, IMS, OPC (formerly called *features*).

program to program interface (PPI). A NetView function that allows user programs to send or receive data buffers from other user programs and to send alerts to the NetView hardware monitor from system and application programs.

protocol. In SNA, the meanings of, and the sequencing rules for, requests and responses used for managing the network, transferring data, and synchronizing the states of network components.

proxy resource. A resource defined like an entry type *Application* representing a processor operations target system.

PR/SM. Processor Resource/Systems Manager.

PS/2 computer. In SA OS/390, an IBM PS/2 computer that runs the OS/2 program and that contains a communication adapter. The PS/2 computer, which is connected to one or more target systems, contains the distributed feature code of SA OS/390. An SA OS/390 workstation may be either an IBM PS/2 computer or an IBM PS/55 computer, unless otherwise stated.

PS/2 LU name. In SA OS/390, the focal-point SNA logical unit name of the workstation.

PS/2 name. In SA OS/390, the logical name of the workstation.

PS/2 ports. On a PS/2 workstation, a port is a cable connector on a 3270 or ASCII logic card that attaches it to a target system. The port is associated with the screen handler for the PS/2 and identified by a port letter.

PU. Physical unit.

R

remote system. A system that receives resource status information from an SA OS/390 focal point system. An SA OS/390 remote system is defined as part of the same SA OS/390 enterprise as the SA OS/390 focal point system to which it is related.

requester. A requester is a workstation software, which enables users to log on to a domain, that is, to the server(s) belonging to this domain, and use the resources in this domain. After the log on to a domain, users can access the shared resources and use the processing capability of the server(s). Because the bigger part of shared resources is on the server(s), users can reduce hardware investment.

resource. (1) Any facility of the computing system or operating system required by a job or task, and including main storage, input/output devices, the processing unit, data sets, and control or processing programs. (2) In NetView, any hardware or software that provides function to the network. (3) In SA OS/390, any OS/390 application, OS/390 component, job, device, or target system capable of being monitored or automated through SA OS/390.

Resource Access Control Facility (RACF). A program that can provide data security for all your resources. RACF protects data from accidental or deliberate unauthorized disclosure, modification, or destruction.

resource group. A physically partitionable portion of a processor. Also known as a *side*.

Resource Monitoring Facility (RMF). A program that measures and reports on the availability and activity of system hardware and software resources, such as processors, devices, storage, and address spaces. RMF can issue reports about system performance problems as they occur.

Resource Object Data Manager (RODM). A data cache manager designed to support process control and automation applications. RODM provides an in-memory data cache for maintaining real-time data in an address space that is accessible by multiple applications. RODM also allows an application to query an object and receive a rapid response and act on it.

resource token. A unique internal identifier of an ESCON resource or resource number of the object in the IODF

restart automation. SA OS/390-provided automation that monitors subsystems to ensure that they are running. If a subsystem fails, SA OS/390 attempts to restart it according to the policy in the automation control file.

Restructured Extended Executor (REXX). An interpretive language used to write command lists.

return code. A code returned from a program used to influence the issuing of subsequent instructions.

REXX. Restructured Extended Executor.

REXX procedure. A command list written with the Restructured Extended Executor (REXX) which is an interpretive language.

RMF. Resource Measurement Facility.

RODM. Resource Object Data Manager.

S

SAF. Security Authorization Facility.

SA OS/390 automation focal point system. See *focal point system*

SA OS/390 customization dialog. An ISPF application through which the SA OS/390 policy administrator defines policy for individual OS/390 systems and builds automation control data.

SA OS/390 customization focal point system. See *focal point system*

SA OS/390 enterprise. The group of systems and resources defined in the customization dialog under one enterprise name. An SA OS/390 enterprise consists of connected OS/390 systems running SA OS/390.

SA OS/390 focal point system. See *focal point system*.

SA OS/390 policy. The description of the systems and resources that make up an SA OS/390 enterprise, together with their monitoring and automation definitions.

SA OS/390 policy administrator. The member of the operations staff who is responsible for defining SA OS/390 policy.

SA OS/390 satellite. If you are running two NetViews on an OS/390 system to split the automation and networking functions of NetView, it is common to route alerts to the Networking NetView. For SA OS/390 to process alerts properly on the Networking NetView, you must install a subset of SA OS/390 code, called an *SA OS/390 satellite* on the Networking NetView.

SCA. In SA OS/390, system console A, the active system console for a target hardware. Contrast with *SCB*.

SCB. In SA OS/390, system console B, the backup system console for a target hardware. Contrast with *SCA*.

screen. Deprecated term for display panel.

screen-based processor. See *screen-oriented processor*.

screen handler. In SA OS/390, software that interprets all data to and from a full-screen image of a target system. The interpretation depends on the format of the data on the full-screen image. Every processor and operating system has its own format for the full-screen image. A screen handler controls one PS/2 connection to a target system.

screen-oriented processor. A central processor complex that interacts with human operators through line-mode display consoles. For System/390 and System/370 processors, the display consoles use either an IBM 3270 data stream or an ASCII data stream. Contrast with *OCF-based processor*.

SDF. Status display facility.

SDLCL. Synchronous data link control.

SDFS. System Display and Search Facility.

secondary system. A system is a secondary system for an application if it is defined to automation on that system, but the application is not normally meant to be running there. Secondary systems are systems to which an application can be moved in the event that one or more of its primary systems are unavailable. SA OS/390 does not start the application on its secondary systems.

server. A server is a workstation, that shares resources, which include directories, printers, serial devices, and computing powers.

service period. Service periods allow the users to schedule the availability of applications. A service period is a set of time intervals (service windows), during which an application should be active.

service threshold. An SA OS/390 policy setting that determines when to notify the operator of deteriorating service for a resource. See *alert threshold* and *warning threshold*

service language command (SLC). The line-oriented command language of processor controllers or service processors.

service processor (SVP). The name given to a processor controller on smaller System/370 processors.

session. In SNA, a logical connection between two network addressable units (NAUs) that can be activated, tailored to provide various protocols, and deactivated, as requested. Each session is uniquely identified in a transmission header by a pair of network addresses identifying the origin and destination NAUs of any transmissions exchanged during the session.

session monitor. The component of the NetView program that collects and correlates session-related data and provides online access to this information. The successor to NLDM.

shutdown automation. SA OS/390-provided automation that manages the shutdown process for subsystems by issuing shutdown commands and responding to prompts for additional information.

side. A part of a partitionable CPC that can run as a physical partition and is typically referred to as the A-side or the B-side.

single image. A processor system capable of being physically partitioned that has not been physically partitioned. Single-image systems can be target hardware processors.

single-image (SI) mode. A mode of operation for a multiprocessor (MP) system that allows it to function as one CPC. By definition, a uniprocessor (UP) operates in single-image mode. Contrast with *physically partitioned (PP) configuration*.

SLC. Service language command.

SMP/E. System Modification Program Extended.

SNA. Systems Network Architecture.

SNA network. In SNA, the part of a user-application network that conforms to the formats and protocols of systems network architecture. It enables reliable transfer of data among end users and provides protocols for controlling the resources of various network configurations. The SNA network consists of network addressable units (NAUs), boundary function components, and the path control network.

SNMP. Simple Network Management Protocol (a TCP/IP protocol). A protocol that allows network management by elements, such as gateways, routers, and hosts. This protocol provides a means of communication between network elements regarding network resources.

solicited message. An SA OS/390 message that directly responds to a command. Contrast with *unsolicited message*.

SRPI. Server-Requester Programming Interface.

SSCP. System services control point.

SSI. Subsystem interface.

start automation. SA OS/390-provided automation that manages and completes the startup process for subsystems. During this process, SA OS/390 replies to prompts for additional information, ensures that the startup process completes within specified time limits, notifies the operator of problems, if necessary, and brings subsystems to an UP (or ready) state.

startup. The point in time at which a subsystem or application is started.

status. The measure of the condition or availability of the resource.

status focal point system. See *focal point system*

status display facility (SDF). The system operations part of SA OS/390 that displays status of resources such as applications, gateways, and write-to-operator messages (WTOs) on dynamic color-coded panels. SDF shows spool usage problems and resource data from multiple systems.

steady state automation. The routine monitoring, both for presence and performance, of subsystems, applications and systems. Steady state automation may respond to messages, performance exceptions and discrepancies between its model of the system and reality.

structure. A construct used by OS/390 to map and manage storage on a coupling facility. See cache structure, list structure, and lock structure.

subgroup. A named set of systems. A subgroup is part of an SA OS/390 enterprise definition and is used for monitoring purposes.

SubGroup entry. A construct, created with the customization dialog, used to represent and contain policy for a subgroup.

subsystem. (1) A secondary or subordinate system, usually capable of operating independent of, or asynchronously with, a controlling system. (2) In SA OS/390, an OS/390 application or subsystem defined to SA OS/390.

subsystem interface. The OS/390 interface over which all messages sent to the OS/390 console are broadcast.

support element. A hardware unit that provides communications, monitoring, and diagnostic functions to a central processor complex (CPC).

support processor. Another name given to a processor controller on smaller System/370 processors; see *service processor*.

SVP. Service processor.

switches. ESCON directors are electronic units with ports that dynamically switch to route data to I/O devices. The switches are controlled by I/O operations commands that you enter on a workstation.

switch identifier. The switch device number (swchdevn), the logical switch number (LSN) and the switch name

symbolic destination name (SDN). Used locally at the workstation to relate the VTAM application name

synchronous data link control (SDLC). A discipline for managing synchronous, code-transparent, serial-by-bit information transfer over a link connection. Transmission exchanges may be duplex or half-duplex over switched or non-switched links. The configuration of the link connection may be point-to-point, multi-point, or loop. SDLC conforms to subsets of the Advanced Data Communication Control Procedures (ADCCP) of the American National Standards Institute and High-Level Data Link Control (HDLC) of the International Standards Organization.

SysOps. See *System Operations*

sysplex. A set of OS/390 systems communicating and cooperating with each other through certain multisystem hardware components (coupling devices and timers) and software services (couple data sets).

In a sysplex, OS/390 provides the coupling services that handle the messages, data, and status for the parts of a multisystem application that has its workload spread across two or more of the connected processors, sysplex timers, coupling facilities, and couple data sets (which contains policy and states for automation).

A parallel sysplex is a sysplex which includes a coupling facility.

sysplex application group. A sysplex application group is a grouping of applications that can run on any system in a sysplex.

sysplex couple data set. A couple data set that contains sysplex-wide data about systems, groups, and members that use XCF services. All OS/390 systems in a sysplex must have connectivity to the sysplex couple data set. See also *couple data set*

Sysplex Timer. An IBM unit that synchronizes the time-of-day (TOD) clocks in multiple processors or processor sides. External Time Reference (ETR) is the OS/390 generic name for the IBM Sysplex Timer (9037).

system. In SA OS/390, system means a focal point system (OS/390) or a target system (MVS, VM, VSE, TPF or CF).

System Automation for OS/390. The full name for SA OS/390.

system console. (1) A console, usually having a keyboard and a display screen, that is used by an operator to control and communicate with a system. (2) A logical device used for the operation and control of hardware functions (for example, IPL, alter/display, and reconfiguration). The system console can be assigned to any of the physical displays attached to a processor controller or support processor. (3) In SA OS/390, the hardware system console for processor controllers or service processors of processors connected using SA OS/390. In the SA OS/390

operator commands and configuration dialogs, SC is used to designate the system console for a target hardware processor.

System Display and Search Facility (SDSF). An IBM licensed program that provides information about jobs, queues, and printers running under JES2 on a series of panels. Under SA OS/390 you can select SDSF from a pull-down menu to see the resources' status, view the OS/390 system log, see WTOR messages, and see active jobs on the system.

System entry type. A construct, created with the customization dialog, used to represent and contain policy for a system.

System Modification Program/Extended (SMP/E). An IBM licensed program that facilitates the process of installing and servicing an OS/390 system.

system operations. The part of SA OS/390 that monitors and controls system operations applications and subsystems such as NetView, SDSF, JES, RMF, TSO, RODM, ACF/VTAM, CICS, IMS, and OPC.

system services control point (SSCP). In SNA, the focal point within an SNA network for managing the configuration, coordinating network operator and problem determination requests, and providing directory support and other session services for end users of the network. Multiple SSCPs, cooperating as peers, can divide the network into domains of control, with each SSCP having a hierarchical control relationship to the physical units and logical units within its domain.

Systems Network Architecture (SNA). The description of the logical structure, formats, protocols, and operational sequences for transmitting information units through, and controlling the configuration and operation of, networks.

System/390 microprocessor cluster. A configuration that consists of central processor complexes (CPCs) and may have one or more integrated coupling facilities.

T

TAF. Terminal access facility.

target. A processor or system monitored and controlled by a focal point system.

target control task. In SA OS/390, target control tasks process commands and send data to target systems and workstations through communications tasks. A target control task (a NetView autotask) is assigned to a target system when the target system is initialized.

target hardware. In SA OS/390, the physical hardware on which a target system runs. It can be a single-image or physically partitioned processor. Contrast with *target system*.

target system. (1) In a distributed system environment, a system that is monitored and controlled by the focal-point system. Multiple target systems can be controlled by a single focal-point system. (2) In SA OS/390, a computer system attached to the focal-point system for monitoring and control. The definition of a target system includes how remote sessions are established, what hardware is used, and what operating system is used.

task. (1) A basic unit of work to be accomplished by a computer. (2) In the NetView environment, an operator station task (logged-on operator), automation operator (autotask), application task, or user task. A NetView task performs work in the NetView environment. All SA OS/390 tasks are NetView tasks. See also *communications task*, *message monitor task*, and *target control task*.

telecommunication line. Any physical medium, such as a wire or microwave beam, that is used to transmit data.

terminal access facility (TAF). (1) A NetView function that allows you to log onto multiple applications either on your system or other systems. You can define TAF sessions in the SA OS/390 customization panels so you don't have to set them up each time you want to use them. (2) In NetView, a facility that allows a network operator to control a number of subsystems. In a full-screen or operator control session, operators can control any combination of subsystems simultaneously.

terminal emulation. The capability of a microcomputer or personal computer to operate as if it were a particular type of terminal linked to a processing unit to access data.

threshold. A value that determines the point at which SA OS/390 automation performs a predefined action. See *alert threshold*, *warning threshold*, and *error threshold*.

time of day (TOD). Typically refers to the time-of-day clock.

Time Sharing Option (TSO). An optional configuration of the operating system that provides conversational time sharing from remote stations. It is an interactive service on OS/390, MVS/ESA, and MVS/XA.

Time-Sharing Option/Extended (TSO/E). An option of OS/390 that provides conversational time-sharing from remote terminals. TSO/E allows a wide variety of users to perform many different kinds of tasks. It can handle short-running applications that use fewer sources as well as long-running applications that require large amounts of resources.

timers. A NetView command that issues a command or command processor (list of commands) at a specified time or time interval.

TOD. Time of day.

token ring. A network with a ring topology that passes tokens from one attaching device to another; for example, the IBM Token-Ring Network product.

TP. Transaction program.

TPF. Transaction processing facility.

transaction processing facility (TPF). A high-availability, high-performance system, designed to support real-time, transaction-driven applications (such as an airline reservation system). The specialized architecture of TPF is intended to optimize system efficiency, reliability, and responsiveness for data communication and database processing.

TPF provides real-time inquiry and update to a large, centralized database, where message length is relatively short in both directions, and response time is generally less than three seconds. Formerly known as the Airline Control Program/Transaction Processing Facility (ACP/TPF).

transaction program. In the VTAM program, a program that performs services related to the processing of a transaction. One or more transaction programs may operate within a VTAM application program that is using the VTAM application program interface (API). In that situation, the transaction program would request services from the applications program using protocols defined by that application program. The application program, in turn, could request services from the VTAM program by issuing the APPCCMD macro instruction.

transitional automation. the actions involved in starting and stopping subsystems and applications which have been defined to SA OS/390. This can include issuing commands and responding to messages.

translating host. Role played by a host that turns a resource number into a token during a unification process.

trigger. On top of requests, triggers, in combination with events, are used to control the starting and stopping of applications in a single system or a Parallel Sysplex. Triggers act as inhibitors for the requested action.

TSO. Time Sharing Option.

TSO console. From this 3270-type console you are logged onto TSO or ISPF to use the runtime panels for I/O operations and SA OS/390 customization panels.

TSO/E. TSO Extensions.

U

UCB. The unit control block; an MVS/ESA data area that represents a device and which is used for allocating devices and controlling I/O operations.

unsolicited message. An SA OS/390 message that is not a direct response to a command. Contrast with *solicited message*.

user task. An application of the NetView program defined in a NetView TASK definition statement.

V

Virtual Machine/System Product (VM/SP). An IBM licensed program. It is an operating system that manages the resources of a real processor to provide virtual machines to end users. As a time-sharing system control program, it consists of the virtual machine control program (CP), the conversational monitor system (CMS), the group control system (GCS), and the interactive problem control system (IPCS).

Virtual Storage Extended (VSE). An IBM licensed program whose full name is Virtual Storage Extended/Advanced Function. It is an operating system that controls the execution of programs.

Virtual Telecommunications Access Method (VTAM). An IBM licensed program that controls communication and the flow of data in an SNA network. It provides single-domain, multiple-domain, and interconnected network capability. Its full name is Advanced Communications Function for the Virtual Telecommunications Access Method. Synonymous with *ACF/VTAM*.

VM/ESA*. Virtual Machine/Enterprise Systems Architecture*

VM/SP. Virtual Machine/System Product.

VM/SP HPO. Virtual Machine/System Product High Performance Option.

VSE. Virtual Storage Extended.

VTAM. Virtual Telecommunications Access Method.

W

warning threshold. An application service value that determines the level at which SA OS/390 changes the associated icon on the NMC workstation to the warning color. See *alert threshold*

workstation. In SA OS/390 workstation means the *graphic workstation* that an operator uses for day-to-day operations.

write-to-operator (WTO). A request to send a message to an operator at the OS/390 operator console. This request is made by an application and is handled by the WTO processor, which is part of the OS/390 supervisor program.

write-to-operator-with-reply (WTOR). A request to send a message to an operator at the OS/390 operator console which requires a response from the operator. This request is made by an application and is handled by the WTO processor, which is part of the OS/390 supervisor program.

WTO. Write-to-Operator.

WTOR. Write-to-Operator-with-Reply.

WWV. The US National Institute of Standards and Technology (NIST) radio station that provides standard time information. A second station, known as WWVB, provides standard time information at a different frequency.

X

XCF. Cross-system coupling facility.

XCF couple data set. The name for the sysplex couple data set prior to MVS/ESA System Product Version 5 Release 1. See *sysplex couple data set*

XCF group. A set of related members that a multisystem application defines to XCF. A member is a specific function, or instance, of the application. A member resides on one system and can communicate with other members of the same group across the sysplex.

XRF. Extended recovery facility.

Numerics

3090/ACA/ISCF. 3090 Automated Console Application for Inter-System Control Facility.

3090/Automated Console Application/ISCF (3090/ACA/ISCF). A program offering that runs as a NetView application in conjunction with ISCF. It provides some built-in automation and an enhanced user interface. 3090/ACA/ISCF is limited to 3090 OS/390 targets.

3270 connection card. A 3270 emulator card installed in a workstation used to connect the workstation to the target system. Four 3270 connection cards can be installed in a workstation.

37x5. A 3705, 3725, or 3745 communication controller.

3x74. A 3174 or 3274 subsystem control unit. A control unit to which 3270-family display stations are attached.

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User's Guide
Version 2 Release 1

Publication No. SC33-7040-02

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System Automation for OS/390 User's Guide

Version 2 Release 1

SC33-7040-02