@server zSeries 990

Open Systems Adapter-Express Customer's Guide and Reference

SA22-7935-00

@server zSeries 990

Open Systems Adapter-Express Customer's Guide and Reference

SA22-7935-00

Note!
Before using this information and the products it supports, be sure to read the general information under “Notices” on page 265.

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This edition, SA22-7935-00, applies to the IBM z990 Open Systems Adapter-Express features, Open Systems Adapter Support Facility (as part of Program Number 5694-A01) for the following operating systems: OS/390 Version 2 Release 10 (Program Number 5647-A01), z/OS Version 1 Release 2 or higher (5694-A01), and z/OS.e Version 1 Release 3 or higher (5655–G52), Open Systems Adapter Support Facility for z/Virtual Machine/Enterprise (z/VM) Version 3 Release 1, Version 4 Release 2 or higher (Program Number 5654-A17), OSA/SF for VSE Version 2 Release 2 (part of VSE Central Functions 6.1.1, 5686-066) in VSE/ESA Version 2 Release 2.6 (5690-VSE) or higher, and to all subsequent releases and modifications until otherwise indicated in new editions or technical newsletters.

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About this Document

This document describes the Open Systems Adapter-Express feature and the Open Systems Adapter Support Facility (OSA/SF) with the goal of helping you to define, install, and use these products on a @server zSeries 990 model processor. An OSA is an integrated IBM @server zSeries hardware feature that combines the functions of an I/O channel with the functions of a network port to provide direct connectivity between zSeries applications and their clients on the attached network.

Detailed instructions are provided in Part 1 to help you set up and use the OSA-Express feature and OSA/SF. Reference information in Part 2 includes commands, sample configurations, messages, and other supporting information. The Appendixes in Part 3 contain cabling specifications and information of interest to OSA-2 users, as well as notes on how OSA-Express features were set up in test scenarios.

Who Should Use This Document

Anyone who is responsible for connecting the z990 model processor to a LAN should use this document.

This book does not discuss details of the hardware features or functions of @server zSeries 990 model processor. Before you use this book, see *zSeries 990 System Overview* to familiarize yourself with those features or functions.

Where to Find More Information

This document contains all the instructions necessary to set up the OSA-Express feature and OSA Support Facility (OSA/SF). In some instances, there are references to other publications for detailed information.

Notes:

1. The *Program Directory for IBM Open Systems Adapter Support Facility for OS/390 (5645-001)* is distributed on the OS/390 product tape.
2. The *Program Directory for IBM Open Systems Adapter Support Facility for VM (5654-030)* is distributed on the VM product tape.
3. The *Program Directory for IBM Open Systems Adapter Support Facility for VSE (part of VSE Central Functions 6.1.1, 5686-066)* is distributed on the VSE product tape.

z/OS

z/OS Communications Server

- *z/OS Communications Server: IP Administrator's Commands*, SC31-8781
- *z/OS Communications Server: IP Migration Guide*, SC31-8773
- *z/OS Communications Server: IP Configuration Guide*, SC31-8775
- *z/OS Communications Server: IP User's Guide,* SC31-8780
- *z/OS Communications Server: SNA Network Implementation Guide,* SC31-8777
- *z/OS Communications Server: SNA Resource Definition Reference,* SC31-8778
- *z/OS Communications Server: SNA Migration Guide,* SC31-8774
- *z/OS Communications Server: IPv6 Network and Application Design Guide,* SC31-8885

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HCD

- *z/OS HCD Users's Guide,* SC33-7988

MVS

- *z/OS MVS Initialization and Tuning Reference*, SA22-7592

Security Server (RACF)

- *z/OS Security Server (RACF) Server Administration and Using*, SC24-5923
- *z/OS Security Server (RACF) Command Language Reference*, SC22-7687

APPC

- *z/OS MVS Planning: APPC Management*, SA22-7598

RMF

- *z/OS RMF User's Guide*, SC33-7990
- *z/OS RMF Report Analysis*, SC33-7991

UNIX System Services

- *z/OS UNIX System Services: Planning,* GA22-7801
- *z/OS UNIX System Services: Command Reference,* SA22-7802
- *z/OS UNIX System Services: User's Guide,* SA22-7801

OS/390

OS/390 Communication Server

- *OS/390 Communications Server: IP Planning and Migration Guide*, SC31-8512
- *OS/390 Communications Server: IP Configuration Guide*, SC31-8513
- *OS/390 Communications Server: IP User's Guide,* SC31-8514
- *OS/390 Communications Server: SNA Network Implementation Guide,* SC31-8563
- *OS/390 Communications Server: SNA Resource Definition Reference,* SC31-8565
- *OS/390 Communications Server: SNA Planning and Migration Guide,* SC31-8622
- *OS/390 Communications Server TCP/IP: Guide to Enhancements,* SG24-5631

HCD

- *OS/390 HCD Users's Guide,* SC28-1848

Security Server (RACF)

- *OS/390 Security Server (RACF) Planning*, GC28-1920
- *OS/390 Security Server (RACF) Command Language Reference*, SC28-1919

APPC

- *OS/390 and MVS Planning: APPC/MVS Management*, GC28-1807

RMF

- *OS/390 RMF User's Guide*, SC28-1949
- *OS/390 RMF Report Analysis*, SC28-1950

UNIX System Services

- *OS/390 UNIX System Services: Planning,* SC28-1890
- *OS/390 UNIX System Services: Command Reference,* SC28-1892

- *OS/390 UNIX System Services: User's Guide,* SC28-1891

z/VM

- *z/VM: General Information,* GC24-5944
- *z/VM: Planning and Administration,* SC24-5948
- *z/VM: VMSES/E Introduction and Reference,* GC24-5947
- *z/VM: I/O Configuration* SC24-6044
- *z/VM: CMS Application Development Guide,* SC24-5957
- *z/VM: CMS File Pool Planning, Administration, and Operation,* SC24-5949
- *z/VM: CP Command and Utility Reference,* SC24-5773
- *z/VM: CMS Command Reference,* SC24-5969
- *z/VM: TCP/IP Level 3A0 Planning and Customization,* SC24-5981
- *z/VM: TCP/IP Level 3A0 User's Guide,* SC24-5982

VSE/ESA

- *VSE/ESA V2R7 Planning,*SC33-6703
- *VSE/ESA V2R4.0 Networking,*SC33-6708

Linux

- *Linux for zSeries: Device Drivers and Installation Commands*, LNUX-1103, available at www10.software.ibm.com/developerworks/opensource/linux390/index.shtml
- www.linux.org/docs

TCP/IP

- *TCP/IP V3R2 for MVS: Planning and Migration Guide,*SC31-7189
- *TCP/IP V3R2 for MVS: User's Guide,*SC31-7136

NetView

- *NetView Installation and Administration Guide (VM) V2R3,* SC31-6181

TPF

- *Transaction Processing Facility TCP/IP,* SH31-0120
- *Transaction Processing Facility Migration Guide (Volume 2)* GH31-0187

On the LANs and LAN Cables that OSA Supports

- *X3T9.5 ANSI FDDI Statement Management,* Revision 7.2, is the FDDI SMT standard
- *RFC 1231* is the TCP/IP protocol standard for IEEE 802.5 token ring MIB
- *RFC 1398* is the TCP/IP protocol standard for managed objects for the Ethernet-like interface types
- *RFC 1483: Multiprotocol Encapsulation over ATM Adaptation Layer 5,* Section 4.1, Routed Encapsulation, is the standard used for the ATM IP Forwarding mode
- *Maintenance Information for ATM and FDDI Links,* SY27-0331
- *IBM Local Area Network Administrator's Guide*, GA27-3748
- *IBM FDDI Network Introduction and Planning Guide,* GA27-3892
- *Token Ring Network Introduction and Planning Guide,* GA27-3677

- *IBM Multisegment LAN Design Guidelines,* GG24-3398
- *IBM 8250/8260/8285 Planning and Site Preparation,* GA33-0285
- *IBM Cabling System Optical Fiber Planning and Installation Guide,* GA27-3943
- *Token Ring Network Architecture Reference,* SC30-3374

z900

- *zSeries 900 System Overview*, SA22-1027
- *Placement Report* and *CHPID Report* produced by the IBM Configurator (CFSYSTEM) which may be available from your IBM marketing representative.

z800

- *zSeries 800 System Overview*, SA22-1028
- *Placement Report* and *CHPID Report* produced by the IBM Configurator (CFSYSTEM) which may be available from your IBM marketing representative.

zSeries

- *zSeries PR/SM Planning Guide*, SB10-7033
- *zSeries IOCP User's Guide*, SB10-7029
- *zSeries Hardware Management Console Guide* (See www.ibm.com/servers/resourcelink for current edition)
- *zSeries Support Element Operations Guide* (See www.ibm.com/servers/resourcelink for current edition)

z990 Model Processors

- *zSeries 990 System Overview*, SA22-1032
- *PCHPID Report* produced by the IBM Configurator (CFSYSTEM) which may be available from your IBM marketing representative.

OSA-2 Publications

Attention

This publication is not intended to address OSA-2 setup. See the following list of titles for more information.

Document Title	Document Hardcopy Order #	Document Softcopy File Name	In OS/390 Collection Kit # (Note 1)	Documentshelf File Name	Bookshelf Index File Name
Planning for the S/390 Open Systems Adapter-2	GC23-3870 (Note 2)	IOA1PG*xx*	SK2T-6700	IOA390*xx*	IOA390*xx*
OS/390: OSA/SF User's Guide for OSA-2	SC28-1855 (Note 2)	IOASUG*xx*	SK2T-6700	IOA390*xx*	IOA390*xx*
VM/ESA: OSA/SF User's Guide for OSA-2	SC28-1992	IOAVMS*xx*	SK2T-2067	IOAVUG*xx*	IOAVMS*xx*
VSE/ESA: OSA/SF User's Guide	SC28-1946	IOAVSE*xx*	SK2T-0060	IOAVSE*xx*	IOAVSE*xx*

Notes:

1. The OS/390 collection kit, which is distributed with OS/390, is also available on the Internet through the OS/390 home page (www.s390.ibm.com/os390).

Double-click on the Library icon. *OS/390 Information Roadmap* should help you locate the OSA Planning Guide and OSA/SF User's Guide.

2. GC23-3870 and SC28-1855 are distributed on the OSA/SF bookshelf in the OS/390 softcopy collection kit. These documents can be ordered separately in hardcopy.

Using LookAt to look up message explanations

LookAt is an online facility that lets you look up explanations for most messages you encounter, as well as for some system abends and 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/eserver/zseries/zos/bkserv/lookat/ or from anywhere in z/OS or z/OS.e where you can access a TSO/E command line (for example, TSO/E prompt, ISPF, z/OS UNIX System Services running OMVS).

The LookAt Web site also features a mobile edition of LookAt for devices such as Pocket PCs, Palm OS, or Linux-based handhelds. So, if you have a handheld device with wireless access and an Internet browser, you can now access LookAt message information from almost anywhere.

To use LookAt as a TSO/E command, you must have LookAt installed on your host system. You can obtain the LookAt code for TSO/E from a disk on your *z/OS Collection* (SK3T-4269) or from the LookAt Web site's **Download** link.

A note about IOAx messages for OSA/SF

Message numbers for OSA/SF messages in LookAt contain an x that can represent different characters for use by IBM in problem determination. When you use LookAt to search for an OSA/SF message, be sure to specify the prefix `IOAx`. For example, to search for message `IOAC022E`, specify:

```
IOAx022E
```

Not all OSA/SF messages are available to LookAt. For details, see Chapter 14, "OSA/SF Messages and Codes", on page 163.

A Note on Terminology

Throughout this publication, certain equipment terms and short versions of product names are used to make the information more easily understood. These are:

FENET
: Fast Ethernet feature

1000Base-T
: 1000Base-T Ethernet feature capable of 10, 100, or 1000Mbps

GbE
: Gigabit Ethernet feature

Hub
: A common connection point for devices in a network, typically connecting segments of a LAN. A hub contains multiple ports into which each segment is plugged. When a packet arrives at one port, it is copied to the other ports so that all ports see all packets.

MAU
: Multistation Access Unit, allows multiple network nodes to access a LAN through a single device as opposed to a single network tap.

OSA Abbreviation for Open Systems Adapter (OSA-Express and OSA-2) feature. Although this publication primarily addresses the OSA-Express features, Chapter 13, “OSA/SF Commands for REXX”, on page 141 and Chapter 14, “OSA/SF Messages and Codes”, on page 163 include information on OSA-2.

OSA-Express
Abbreviation for Open Systems Adapter-Express features.

OSD The channel type name for OSA-Express features that run under Queued Direct Input/Output architecture (QDIO).

OSE The channel type name for OSA-Express features that do not use QDIO architecture (typically SNA/APPN/HPR applications).

Queued Direct Input/Output (QDIO)
An architecture that allows an OSA-Express feature to communicate directly with system memory through the use of queues and a never-ending channel program.

QoS Quality of Service; tools to manage network congestion, shape network traffic, and set traffic policies end-to-end from the application across the network to the client.

Router
A device that moves packets between networks that use a common network layer protocol.

Switch
An intelligent hub that reads the destination address of a packet and propagates it only on the port through which that address can be reached.

TR Token Ring

Part 1. OSA-Express Guide

Part 1 of the document

describes the OSA-Express features, functions, and modes of operation. It provides instructions for defining the OSA hardware in the host I/O configuration, installing and setting up the OSA/SF application and interfaces, setting up the host program to handle OSA traffic, and ways to configure the mode of operation for the OSA using OSA/SF.

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Chapter 1. Introducing OSA-Express

The IBM® Open Systems Adapter-Express is a family of integrated hardware features that provides direct connection to clients on local area networks (LANs). The OSA-Express feature plugs into an I/O slot just like a channel card. Up to 24 OSA-Express features can be installed in an IBM @server zSeries 990 environment.

Each z990 OSA-Express feature has two separate channels for direct LAN attachment. If you install the maximum of 24 OSA-Express features, you will have 48 CHPIDs to use.

zSeries OSA-Express features for IBM @server zSeries 990 are available for Fast Ethernet (FENET), the 1000Base-T Ethernet, Gigabit Ethernet (GbE), and Token Ring (TR) LAN connection. All can use IBM's new Queued Direct I/O (QDIO) architecture to eliminate the need for channel control words (CCWs) and interrupts, resulting in accelerated TCP/IP data packet transmission.

What's new for OSA in this publication?

This publication describes the OSA-Express features and OSA/SF for the IBM @server zSeries 990. The following list summarizes some of the new and changed information that you can find in this book:

- The IBM @server zSeries 990 has more than one channel subsystem or logical channel subsystem (LCSS). For information about the LCSS and other hardware features and functions of the z990, see *zSeries 990 System Overview*, SA22–1032.
- This publication refers to systems on the z990 as images (not logical partitions or LPs).
- This publication includes the OSA-Express 1000Base-T Ethernet feature.
- The OSA/SF graphical user interface (GUI) has changed. It now runs on any platform that supports Java-based applications including Microsoft® Windows® and Linux.
- IBM @server zSeries 990 does not support the OSA-Express ATM feature.

Start Here

Bringing your OSA-Express feature online is a four-step process.

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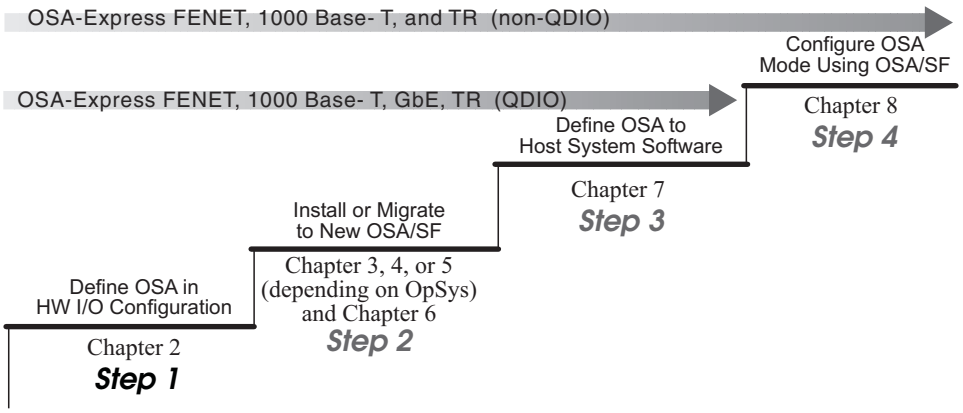

Figure 1. Four Steps to Bringing OSA-Express Online

If you are setting up the Gigabit Ethernet, FENET, the 1000Base-T, or TR feature to use QDIO, configuration is done automatically, and step 4 is optional.

When you set up the FENET, the 1000Base-T, or TR features for non-QDIO operation, step 4 is required to configure the OSA-Express for the right type of traffic.

If you have already installed or updated OSA/SF, skip step 2.

If you are familiar with OSA/SF and the OSA-Express features and functions, see Chapter 2, “OSA-Express Hardware Configuration”, on page 25 and begin step 1. Otherwise, continue with this chapter to learn about the OSA-Express features.

The OSA-Express Gigabit Ethernet Feature

The OSA-Express Gigabit Ethernet feature supports direct attachment through two separate channels to **Gigabit Ethernet** (GbE) LANs where clients communicate using Transmission Control Protocol/Internet Protocol (TCP/IP). The OSA-Express Gigabit Ethernet feature

- Is available as short and long wavelength features
- Provides 1000 mbps/full duplex operation via point-to-point link.
- Supports two types of frames:
  - IEEE 802.3 (ISO/IEC 802.3)
  - Ethernet V2.0, including jumbo frames (those larger than 1,518 bytes). Larger frame sizes increase efficiency for data-intensive applications by reducing frame transmission processing.

    Note: The MTU size can vary and can be set manually in the TCP/IP profile to a maximum of 1492 bytes for 802.3 (1500 for DIX II), and to a maximum of 8992 bytes for jumbo frames.
- Supports multicast traffic but will only send Ethernet V2.0 (DIX) formatted frames
- Uses Queued Direct I/O architecture (QDIO)
- Can be upgraded and repaired while server is powered on

SNA traffic is also supported by the OSA-Express Gigabit Ethernet when Enterprise Extender is enabled (page 17).

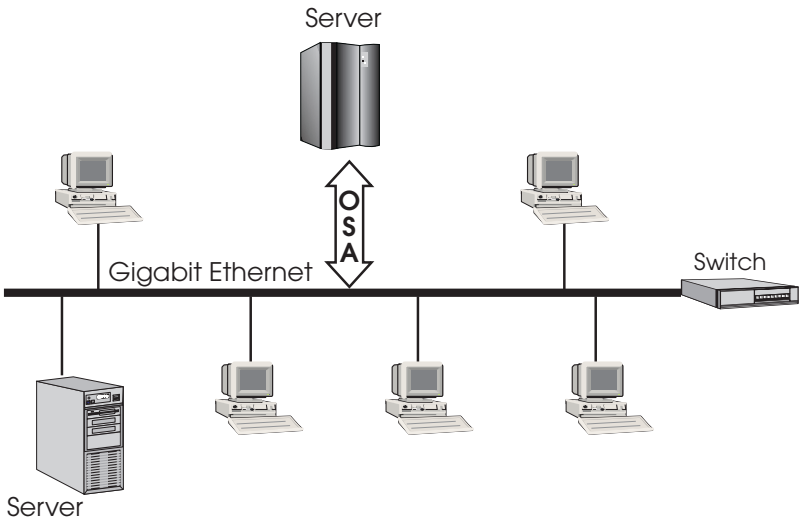

Figure 2. The OSA-Express Gigabit Ethernet Feature Connects Directly to a LAN

"Physical Ports and LEDs" on page 233 includes a figure showing OSA-Express port and LED locations, as well as explanations of LED values.

The OSA-Express FENET and 1000Base-T Ethernet Features

The OSA-Express Fast Ethernet (FENET) feature and the OSA-Express 1000Base-T Ethernet (1000Base-T) feature provide direct attachment through two separate channels as follows:

- 1000 Mbps Ethernet LANs running in full-duplex mode for the 1000Base–T
- 100 Mbps or 10 Mbps Ethernet LANs running in either half- or full-duplex mode for FENET or 1000Base-T

(FENET is available only as an upgrade from z900.)

FENET and 1000Base-T Ethernet features both support auto-negotiation with the attached Ethernet networking equipment. (Auto-negotiation is a process that takes control of the cable when a connection to a network device is established. It detects the various modes that exist in the device on the other end of the wire and advertises its own abilities in order to automatically configure the highest common performance mode of interoperation.)

"Physical Ports and LEDs" on page 233 includes a figure showing OSA-Express port and LED locations, as well as explanations of LED values.

Image–to–image communication is supported when the destination IP address is the same as the IP address for the target image and the port is enabled. Otherwise the packet is sent out on the network.

Operating Modes

Both the OSA-Express FENET and 1000Base-T features handle IP traffic in QDIO mode when defined as an OSD CHPID (see page 7). When set up for non-QDIO operation as an OSE CHPID, the feature can run TCP/IP Passthru or SNA, or both concurrently.

For TCP/IP Passthru mode, the default OSA address table (OAT) can be used without any configuration or setup required. For information about the OSA OAT,

see Chapter 12, “About the OSA Address Table (OAT)”, on page 135. When running SNA, the OSA-Express FENET supports SNA management services provided by OSA/SF.

Ethernet LAN Speeds and Duplex Modes

You can choose any one of the following settings for the OSA-Express FENET and 1000Base-T features:

- Auto negotiate
- 10 Mbps half-duplex
- 10 Mbps full-duplex
- 100 Mbps half-duplex
- 100 Mbps full-duplex

You can choose the following setting for the OSA-Express 1000Base-T feature::

- 1000 Mbps full-duplex

To select these settings, you can use OSA/SF, the standalone support element, or single object operations through the hardware management console. .

The LAN must conform either to the IEEE 802.3 (ISO/IEC 8802.3) standard or to the Ethernet V2.0 specifications. It is important that the speed and mode settings on both the Ethernet-type OSA and Ethernet networking equipment match each other.

The OSA-Express Token Ring Feature

The OSA-Express Token Ring (TR) feature provides direct attachment through two separate channels to 100, 16, or 4 Mbps LANs running in either half- or full-duplex mode. The OSA-Express TR also supports autosensing.

“Physical Ports and LEDs” on page 233 includes a figure showing OSA-Express port and LED locations, as well as explanations of LED values.

Image-to-image communication is supported when the destination IP address is the same as the IP address for the target image and the port is enabled. Otherwise the packet is sent out on the network.

Token Ring Operating Modes

The OSA-Express TR feature handles IP traffic in QDIO mode when defined as an OSD CHPID (page 7). When set up for non-QDIO operation as an OSE CHPID, it can run TCP/IP Passthru or System Network Architecture (SNA), or both concurrently.

For TCP/IP Passthru mode, the default OAT may be used with no configuration or setup required. When running SNA, the OSA-Express TR supports SNA management services provided by OSA/SF. For information about OSA/SF, see “Open Systems Adapter/Support Facility (OSA/SF)” on page 18

Token Ring LAN Speeds and Duplex Modes

You can choose any one of the following settings for the OSA-Express TR feature:

- Auto-negotiate
- 4 Mbps half-duplex
- 4 Mbps full-duplex
- 16 Mbps half-duplex

- 16 Mbps full-duplex
- 100 Mbps full-duplex

You can use OSA/SF, the standalone support element, or single object operations via the hardware management console to select these settings.

If you allow the LAN speed to default to autosense, the OSA-Express Token Ring feature will sense the speed of the attached hub, router, or switch and insert into the LAN at the appropriate speed. If the OSA-Express is the first station on the LAN and the user specifies autosense, it will default to a speed of 16 Mbps and will attempt to open in full duplex mode. If unsuccessful, it will default to half duplex mode.

The LAN must conform to the IEEE 802.5 (ISO/IEC 8802.5) standard.

If you are not using auto-negotiate, the OSA will attempt to join the ring at the specified speed/mode, however, the speed/mode settings are only used when the OSA is first in the LAN or ring. If this fails, the OSA will attempt to join the ring as if auto negotiate were specified.

Supported Operating Systems

OSA-Express features are supported by the following operating systems on z990.

- OS/390
- z/OS or z/OS.e
- z/VM
- VSE/ESA
- Linux

  For information on Linux, see the following website:

  www10.software.ibm.com/developerworks/opensource/linux390/index.shtml

  www.linux.org/docs
- Transaction Processing Facility (TPF) Version 4.1 at PUT 13 (or higher) supports the OSA-Express Gigabit Ethernet feature running QDIO. OSA/SF does not run on TPF. For more information about TPF, see the www.s390.ibm.com/products/tpf/ web site.

The exact version and release required depends on the OSA-Express feature and operating mode. See “Supported Operating Modes” and “Software Requirements” on page 21 for more information.

The Open Systems Adapter/Support Facility (OSA/SF) runs on z/OS, z/OS.e, OS/390, z/VM, and VSE/ESA.

Supported Operating Modes

One of the first tasks you perform is to define the OSA-Express feature to the hardware I/O configuration as a channel that uses QDIO or one that does not use QDIO:

- Define QDIO channels as channel type OSD (OSA-Express Direct).
- Define non-QDIO channels as channel type OSE (OSA-Express).

QDIO Mode

All OSA-Express features can handle IP traffic in QDIO mode but the software requirements differ by feature type on z990:

Any OSA-Express on z/OS, z/OS.e, or OS/390
Requires Release 10 of Communications Server for OS/390 or z/OS Version 1 Release 2 or higher.

Gigabit Ethernet on TPF
The Gigabit Ethernet feature runs on images operating in a TPF 4.1 environment.

Any OSA-Express on VM
Requires z/VM Version 3 Release 1, z/VM Version 4 Release 2, or z/VM Version 4 Release 3 for QDIO operation on a VM guest or on a native VM operating system.

Any OSA-Express on VSE
Requires Version 2 Release 6 or higher.

FENET or Gigabit Ethernet on Linux
Requires Linux kernel V2.4 or higher.

Token Ring on Linux
Requires Linux kernel V2.4 or higher.

These software releases support the OSD channel type and signalling protocol that minimize I/O interruptions. Once the QDIO data queues are activated, continuous, direct data exchange between the OSA-Express and CS for OS/390 or z/OS is initiated and remains active without the need for additional instructions to start the subchannel.

OSA-Express features running in QDIO mode support IP broadcast traffic beginning with Z/OS V1R4, z/VM V4R3, and Linux kernel 2.4.14.

QDIO includes an IP assist function, which gathers Address Resolution Protocol (ARP) data during the mapping of IP addresses to media access (MAC) addresses. For OS/390, z/OS, or z/OS.e, you can use the TSO NETSTAT ARP command to query the OSA-Express feature for this data for problem determination. z/OS V1R4 introduces an additional method for querying the ARP cache using the DISPLAY TCPIP NETSTAT ARP command.

IPv6 on z/OS and Linux

OSA-Express Gigabit Ethernet, FENET, and 1000Base-T features running QDIO in a z/OS (V1R4 or higher), Linux (kernel 2.4.14 or higher), or z/VM (V4R4 or higher) environment can use the IPv6 protocol. IPv6 provides improved traffic management in the following areas:

128–bit addressing
Eliminates all practical limitations on global addressability. This means that private address space—and the network address translators (NATs) used between private intranet and public internet—are no longer needed.

Simplified header formats
Allow for more efficient packet handling and reduced bandwidth cost.

Hierarchical addressing and routing
Keep routing tables small and backbone routing efficient by using address prefixes rather than address classes.

Improved support for options
Changes the way IP header options are encoded, allowing more efficient forwarding and greater flexibility.

Address autoconfiguration
Allows stateless IP address configuration without a configuration server.

In addition, IPv6 brings greater authentication and privacy capabilities through the definition of new extensions, and integrated Quality of Service (QoS) through a new traffic class byte in the header.

Certain commands that specify IP addresses, such those dealing with VIPA addresses and IP address takeover, use syntax specific to a particular IP version. “Sample TCP/IP Profile (IPv4 and IPv6)” on page 261 shows IPv6 definitions. See the following for more information:

z/OS Communications Server: IPv6 Network and Application Design Guide

z/OS Communications Server: IP Configuration Guide

z/OS Communications Server: IP Configuration Reference

Linux for zSeries: Device Drivers and Installation Commands, LNUX-1103

Virtual LAN Support for Linux

OSA-Express GbE, FENET, and 1000Base-T features running QDIO in a Linux kernel 2.4.14 (or higher) environment support Virtual Local Area Networks (VLANs) as described in IEEE standard 802.1Q.

VLANs increase traffic flow and reduce overhead by allowing you to organize your network by traffic patterns rather than by physical location. In a conventional network topology, such as that shown in Figure 3, devices communicate across LAN segments to different broadcast domains using routers. Although routers add latency by delaying transmission of data while using more of the data packet to determine destinations, they are preferable to building a single broadcast domain, which could more easily be flooded with traffic.

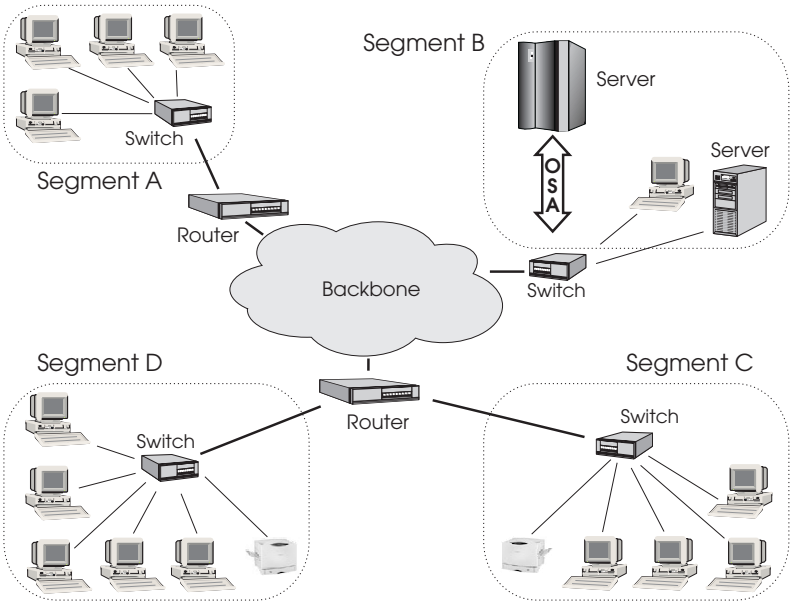

Figure 3. Conventional routed network

By organizing the network into VLANs through the use of Ethernet switches, distinct broadcast domains can be maintained without the latency introduced by multiple routers. As Figure 4 shows, a single router can provide the interfaces for all VLANs that appeared as separate LAN segments in Figure 3 on page 9.

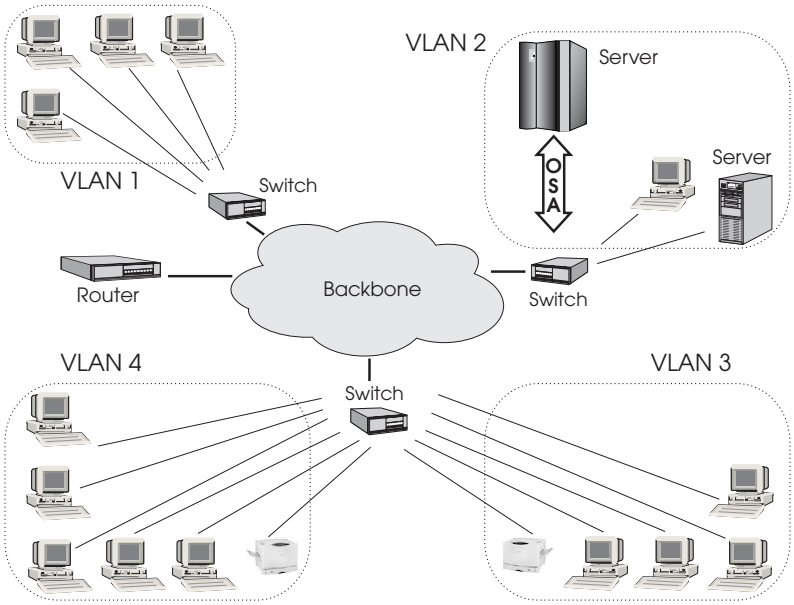

Figure 4. Switched VLAN network

Figure 5 shows how VLANs can be organized logically, according to traffic flow, rather than being restricted by physical location. If workstations 1–3 communicate mainly with the small server, VLANs can be used to organize only these devices in a single broadcast domain that keeps broadcast traffic within the group. This reduces traffic both inside the domain and outside, on the rest of the network.

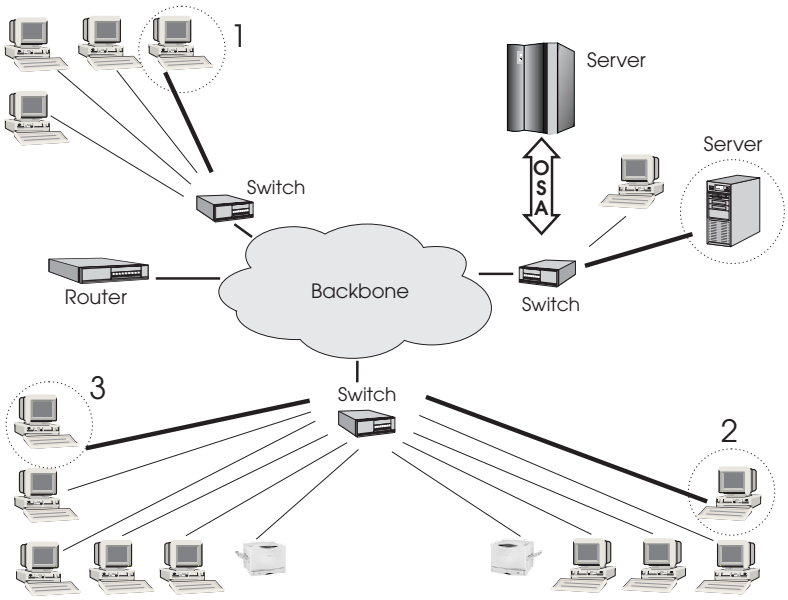

Figure 5. VLAN network organized for traffic flow

See*Linux for zSeries: Device Drivers and Installation Commands*, LNUX-1103, for configuration information.

VLAN Priority Tagging

VLAN priority tagging extends the capabilities of priority queuing beyond the server to include LAN bridges and switches. This function provides a way to manage consistent QoS traffic prioritization and service differentiation end-to-end, across switched LAN and WAN networks. VLAN priority tagging is supported by z/OS Communications Server.

By using standard based 802.1Q priority tagged frames and setting appropriate priorities based on policy, you can ensure that mission-critical traffic is not affected by non-critical traffic. The standard 802.1Q VLAN header enables interoperability with switch vendors, more flexibility in setting traffic priorities, and increased efficiency in switching and routing frames. “VLAN Priority Tagging” on page 261 contains test configuration information. See*z/OS Communications Server: IP Configuration Guide* for more information.

Non-QDIO Modes

You can configure OSA-Express FENET, 1000Base-T, and TR features to run as channel type OSE (non-QDIO) in TCP/IP Passthru and SNA modes. You can run these OSA-Express features concurrently in the TCP/IP Passthru and SNA mode.

TCP/IP Passthru Mode

TCP/IP Passthru for z990 requires one of the following:

- OS/390 V2R10
- z/OS Version 1 Release 2 or higher
- z/VM Version 3 Release 1.0, z/VM Version 4 Release 2 or higher
- VSE/ESA V2R6 or higher
- Linux kernel V2.4 or higher (FENET and 1000Base-T only)

In TCP/IP Passthru mode, an OSA transfers data between a host IP program to which it is defined and clients on the following networks:

- An Ethernet LAN that is attached to the port on an FENET and 1000Base-T OSA-Express and supports one of the following frame protocols:
  - Ethernet II using the DEC Ethernet V 2.0 envelope
  - Ethernet 802.3 using the 802.2 envelope with SNAP
- A token ring LAN that is attached to the port on a TR OSA-Express and supports the following frame protocol:
  - Token Ring 802.5 using the 802.2 envelope with SNAP

SNA Mode

If an OSA is run in SNA mode, VTAM and the SNA function of OS/390 or z/OS treat the OSA as an external communications adapter (XCA) that can have either switched or non-switched lines of communication. In this mode, an OSA acts as a SNA passthru agent to the clients that use the SNA protocol on the LAN that is directly attached to the OSA.

SNA mode on the z990 requires one of the following:

- OS/390 V2R10
- z/OS V1 R3 or higher
- z/VM/ V3R1, z/VM V4R2 or higher

OSA-Express Characteristics

Each zSeries OSA-Express feature has two channels. Each channel has one physical ***OSA port*** for direct LAN attachment. See Appendix A, “Physical Connection Information”, on page 233 for more information on cabling.

The OSA-Express is identified in the hardware I/O configuration by its channel path identifier (CHPID). The CHPID is assigned when the OSA is installed and is based on the number of features already installed in the server. For each OSA-Express CHPID installed, you must specify device numbers and unit addresses using Hardware Configuration Definition (HCD) or System Element (SE) panels. During this hardware configuration process, you will also define the type of OSA-Express channel as either **OSD** (QDIO) or **OSE** (non-QDIO). Chapter 2, “OSA-Express Hardware Configuration”, on page 25, shows you how this is done.

The OSA-Express channel can be shared among all images of the server. In some OSA documentation this is referred to as ***port sharing*** (page 13). A significant difference between OSA-Express features defined as OSD channels and those defined as OSE, is that the OSA Support Facility (OSA/SF) is not required to set up port sharing for OSD GbE, TR, or FENET features (QDIO mode).

Each OSA is shipped with the set of IBM-supplied default port parameters that are shown in Chapter 9. Some of these port parameters can be set through OSA/SF or at the standalone support element or single object operations via the hardware management console, or at only one of these input devices. Some port parameters, however, cannot be set through user input.

- The IBM-supplied default settings for port traffic and those parameters that can be altered, or changed by user input appear in Chapter 9.
- A number of port parameters can be set only if an OSA is being run in the SNA mode. These parameters, which can only be set with OSA/SF, can be used to enhance SNA session availability, to change the link level control timer values, and so on. A discussion on these SNA mode port parameters starts on page 103.
- Each OSA-Express is shipped with a world-wide unique, or universal, media access control (MAC) address. This MAC address permits the OSA to be uniquely identifiable on the attached LAN. If you prefer, you can use the OSA Support Facility (OSA/SF), the Hardware Management Console, or the Support Element to create and activate a local or group Media Access Control (MAC) address for a physical OSA port. Local MAC addresses can also be set for OSA-Express physical ports using the Support Element or single object operations via the hardware management console.

Support for Simple Network Management Protocol

You can use Simple Network Management Protocol (SNMP) to monitor and control your OSA-Express ports in real time, just as you would other network devices. OSA-Express features provide data for use by an SNMP management application such as Tivoli® or NetView®. This data is organized in two different management information base (MIB) tables:

- OSA-Express MIB
- Communications Server IBM MVS™ TCP/IP Enterprise Specific MIB

If you are running z/OS V1R4 or Linux kernel 2.4.14 or higher with an OSA-Express feature in QDIO mode, the OSA-Express MIB is directly accessible through an OSA-Express SNMP subagent.

The Communications Server subagent for the IBM TCP/IP Enterprise Specific MIB requires OSA/SF for access and can be used by OS/390 and z/OS.

The Communications Server SNMP TCP/IP Subagent

Communications Server for OS/390 and z/OS provides SNMP support for the following OSA-Express features and modes:

FENET or 1000Base-T	QDIO only (OSD channel)
Gigabit Ethernet	QDIO only (OSD channel)

See “Set up the Communications Server SNMP TCP/IP subagent” on page 46 and *z/OS Communications Server: IP Configuration Guide*. For a complete description of the SNMP TCP/IP subagent support for OSA-Express management data, see the SNMP chapter of *IP System Administrator’s Commands* in your Communications Server library.

The OSA-Express Direct SNMP Subagent

Communications Server for z/OS V1R4 and Linux kernel 2.4.14 support the OSA-Express subagent for accessing OSA MIBs. This subagent communicates directly with the OSA and does not require OSA/SF to access OSA MIBs as the CS SNMP TCP/IP subagent does. Although the OSA subagent supports all OSA-Express features. See “OSA-Express Direct SNMP Support” on page 117 for more information.

Port Sharing Among Images

If a system is running in logically-partitioned (LPAR) mode, an OSA channel path can be defined to be shared among those images to which it is defined in the system hardware I/O configuration (IOCDS). This allows access to a network port on the OSA to be shared by as many as 15 images, the maximum allowed.

The principle of *port sharing* is shown in Figure 6, where two IP programs share access to the OSA-Express physical port.

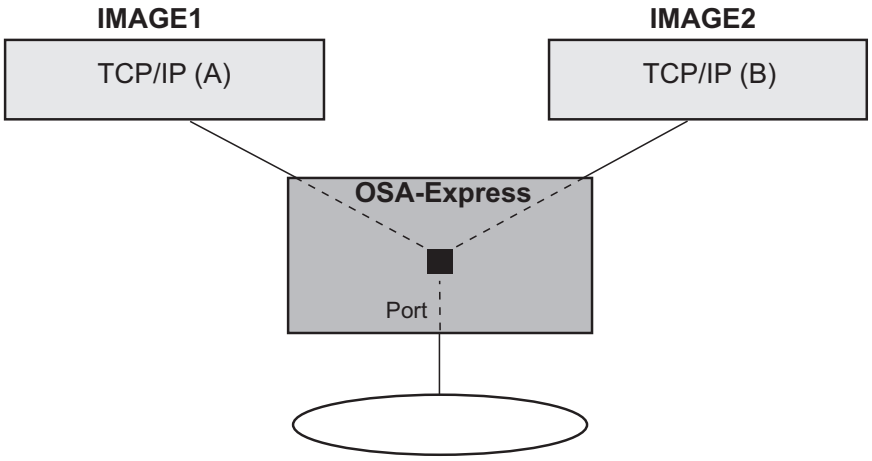

Figure 6. Port Sharing that Allows Multiple Images Access to OSA-Express Channels

IP Multicast Support

IP Multicast improves scalability by increasing data traffic recipients without a corresponding increase in bandwidth. Any application connecting to a multicast socket can pass traffic through any OSA-Express feature. OSA-Express features accept LAN packets based on multicast addresses, which are displayed through the Open Systems Adapter/Support Facility (OSA/SF).

Enhanced Network Availability

There are several ways to ensure network availability should failure occur at either the image or the CHPID/network connection level. Port sharing, redundant paths, and the use of primary and secondary ports all provide some measure of recovery. A combination of these can guarantee network availability regardless of the failing component.

Single-point-of-failure consideration

Because 2 channels share the same physical OSA feature on the z990, it is not recommended to configure both CHPIDS to a network (one as primary and one as backup) through the same physical OSA-Express feature. If the OSA fails, you lose both CHPID connections to the network. For availability, use different OSA-Express features as backup to ensure network availability in the event of an OSA failure.

ARP Takeover

When TCP/IP is started in QDIO mode, it downloads all the home IP addresses in the stack and stores them in each OSA-Express feature. This service of QDIO architecture occurs automatically for OSD channels.

For OSA-Express features set up as OSE channels (non-QDIO), you must define multiple IP addresses in the OSA Address Table using OSA/SF. The OSA-Express then responds to ARP requests for its own IP address, as well as for virtual IP addresses (VIPAs).

If an OSA-Express feature fails while there is a backup OSA-Express available on the same network or subnetwork, TCP/IP informs the backup OSA which IP addresses (real and VIPA) to take over, and the network connection is maintained.

Figure 7 on page 15 shows two OSA-Express features, each storing the same four IP addresses that were either downloaded by TCP/IP for OSD channels, or defined in the OAT for OSE channels. shows how this scenario works:

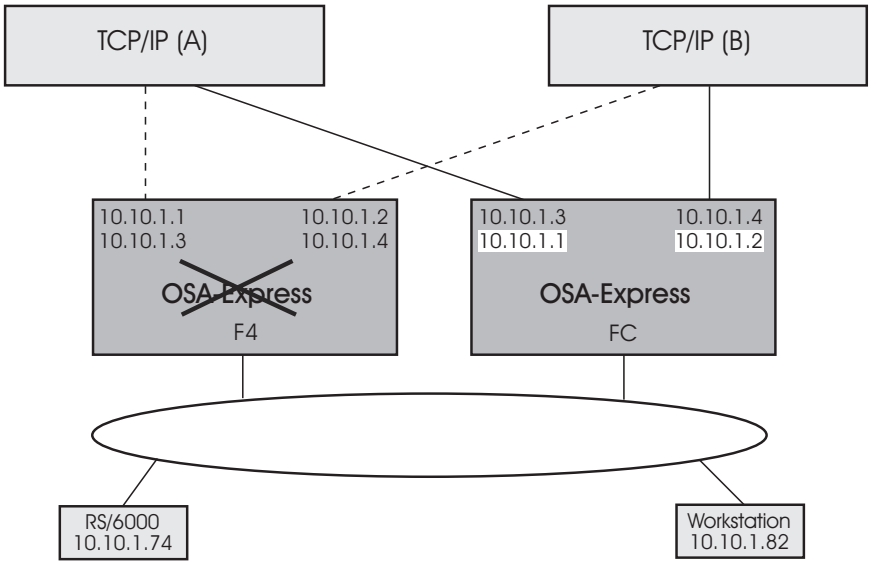

Figure 7. IP Address Control that is Automatically Taken Over from Failing OSA-Express

In Figure 7, under normal conditions, OSA-Express CHPID F4 controls the network connection to IP addresses 10.10.1.1 and 10.10.1.2, while CHPID FC controls the connection to 10.10.1.3 and 10.10.1.4. If CHPID F4 fails, OSA-Express CHPID FC automatically takes control of IP addresses 10.10.1.1 and 10.10.1.2, while maintaining control of 10.10.1.3 and 10.10.1.4. These changes are made dynamically in the CHPID's OSA Address Table and communicated to the clients, alerting them to the new path.

The ARP cache for a targeted TCP/IP stack can be queried and purged from the z/OS console. "Querying and Purging the ARP Cache" on page 116 shows command examples.

The qetharp utility is available on Linux to query and purge the ARP cache for a targeted TCP/IP stack. See "Querying and Purging the ARP Cache" on page 116 for usage information.

Primary and Secondary Default Routing

When multiple TCP/IP instances are using the same OSA-Express feature, you can designate a TCP/IP instance as the primary default or secondary default for handling unknown IP address destinations. (CS for OS/390 or z/OS uses the terms *primary router* and *secondary router*.) For the OSA-Express feature, you must designate a primary or secondary instance of TCP/IP in order to access an IP address on another LAN. Only one TCP/IP instance can be registered as the primary default on any OSA-Express.

For OSA-Express GbE, FENET, and 1000Base-T features running QDIO, multiple TCP/IP instances can be registered as secondary defaults, but for all other OSA-Express CHPIDs, only one TCP/IP instance can be registered as the secondary default. (See the description of the PRIROUTER and SECROUTER parameters on the DEVICE statement for MPCIPA in *z/OS Communications Server: IP Configuration Guide* for details on how to designate a primary or secondary router. For Linux, see *Linux for zSeries: Device Drivers and Installation Commands*, LNUX-1103.)

When running the OSA-Express feature dedicated to one image, the primary router flag must be specified if the dedicated LPAR is to be used as a router. When the primary router flag is set, the OSA-Express feature will forward all IP packets received that do not contain a destination IP address registered with the feature. The HOME IP statements in each TCP/IP stack are the addresses registered to the OSA Express feature. If the primary router flag is NOT specified, then all packets received by the OSA-Express feature without a registered IP address are dropped. This includes all packets to be routed through the dedicated LPAR that is serving as a router to other networks.

Figure 8 shows two TCP/IP instances, one of which is designated *Primary TCP/IP Router*, the other, *Secondary TCP/IP Router*

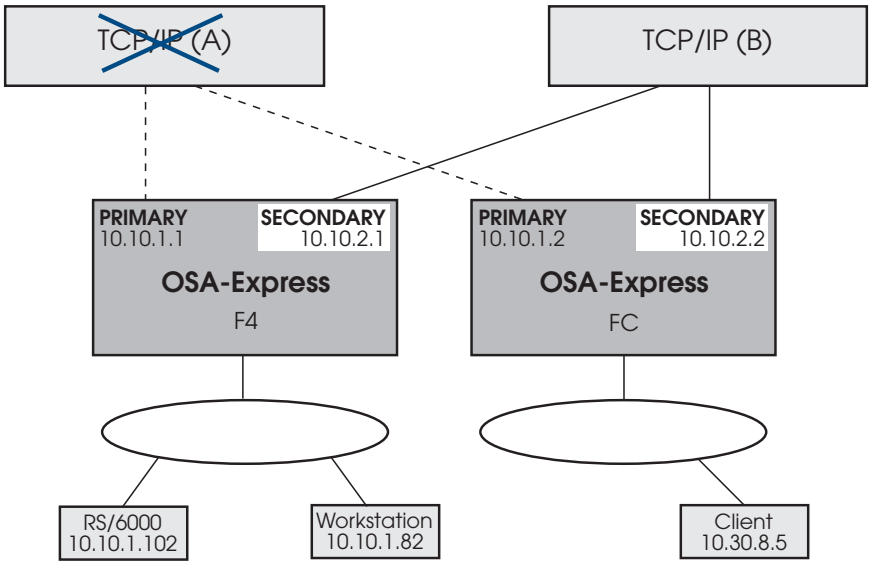

Figure 8. Secondary Router that Provides Path to Unknown IP Addresses When Primary Router Fails

In Figure 8, two OSA-Express features provide redundant paths to both TCP/IP instances, ensuring that both the RS/6000® and the workstation can access the client at IP address 10.30.8.5 on another LAN. TCP/IP instance A has failed, removing the primary path between the 10.10 LAN and the 10.30 LAN, but TCP/IP instance B provides a secondary path for recovery.

"Primary and Secondary Routing" on page 241 and "Multiple Secondary Routes with Dynamic Routing" on page 247 describe how to set up the environment to test this function.

Virtual IP Addressing

The Virtual IP Address (VIPA) adds another layer of protection against network connection failure. A Virtual IP Address (VIPA) is configured on a TCP/IP stack rather than a physical adapter, and is therefore not associated with any particular endpoint device. By configuring multiple paths to a stack using VIPA in combination with conventional IP addresses, you can eliminate hardware and transmission media as a single point of failure for many connections. A server can still become unavailable, however, if a TCP/IP stack or operating system fails. Such a problem can be fixed by moving the VIPA to another stack. Dynamic VIPA (DVIPA) automates this movement.

Automatic VIPA takeover allows a VIPA address to automatically move to a stack where an existing suitable application instance is already active and allows the application to serve the client formerly going to the failed stack. DVIPA for an application server allows an application to create and activate VIPA so that the VIPA moves when the application moves. This means that application instances on a failing node may be distributed among all surviving nodes.

In Figure 9, TCP/IP stack A has failed, but DVIPA 10.10.4.1 is automatically started on another node with the same application environment, which now handles all the failing node's clients.

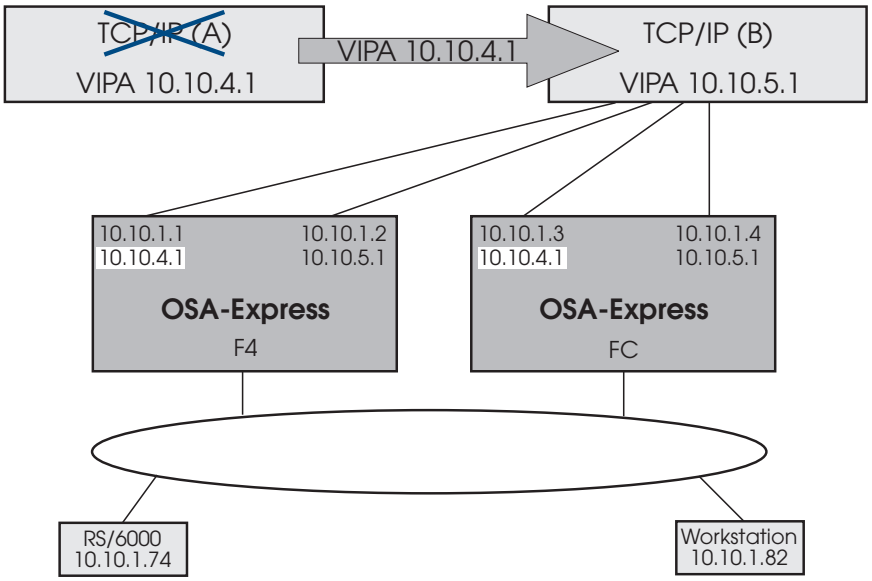

Figure 9. DVIPA that Automatically Relocates When TCP/IP Stack Fails

z/OS Communications Server: IP Configuration Guide contains a complete description and detailed examples of DVIPA configuration.

Enterprise Extender

The Enterprise Extender (EE) function of CS for OS/390 or z/OS allows you to run SNA applications and data on IP networks and IP-attached clients. It can be used with any OSA-Express feature running IP traffic. EE is a simple set of extensions to the open High Performance Routing technology that integrates HPR frames into User Datagram Protocol/Internet Protocol (UDP/IP) packets, providing:

- SNA application connectivity using an IP backbone support for
  - SNA-style priority
  - SNA parallel sysplex exploitation
- Improved throughput and response times
- Compatible support for TCP and UDP traffic on the IP portion of the application traffic path (SNA/HPR and UDP/IP traffic can coexist on an EE connection)

In order to enable EE, you must configure the TCP/IP stack with a virtual IP address (VIPA) and define an XCA major node. The XCA major node is used to define the PORT, GROUP, and LINE statements for the EE connections.

In addition, a switched major node is required when an APPN connection network is **not** used. The switched major node is used to define the PU statements for the EE connections. When an APPN connection network **is** used, the switched major node is not used on the dial-out side and is optional on the dial-in side. If a switched major node is not defined on the dial-in side, a PU is dynamically created.

Starting with Release 10 of CS for OS/390, if you want to activate EE connections when starting VTAM, you must use either the TCPNAME start option or the IPADDR start option. No default values are applied. See *z/OS Communications Server: SNA Network Implementation Guide* for detailed instructions.

Open Systems Adapter/Support Facility (OSA/SF)

OSA/SF is a base element of OS/390, z/OS, z/OS.e, z/VM, and VSE/ESA. OSA/SF provides a user-friendly interface for monitoring and managing the installed OSAs. OSA/SF includes software that runs on a personal computer communicating with the server.

OSA/SF GUI: OSA/SF includes a graphical user interface (GUI) that runs on the following software platforms:

- Microsoft Windows 2000, and Microsoft XP. (This publication refers to these workstation operating systems collectively as Windows.)
- Linux
- Any other platform that supports graphics and Java 1.4

REXX command interface (IOACMD EXEC): Instead of the GUI, you can use a REXX command interface (IOACMD EXEC) with OSA/SF.

For details on the OSA/SF interfaces, see Chapter 6, “Setting up and Using the OSA/SF Interfaces”, on page 67.

Deciding Whether OSA/SF is Required

OSA/SF ***is required*** for the following OSA-Express features in non-QDIO mode (channel type OSE):

- TR
- FENET
- 1000Base-T Ethernet

If any of these non-QDIO mode features uses the default OAT without port sharing, OSA/SF is not required.

OSA/SF ***is required*** for SNMP support using the Communications Server SNMP TCP/IP SNMP subagent.

OSA/SF is ***not required*** for the OSA-Express Direct SNMP subagent. See “Support for Simple Network Management Protocol” on page 12 for more information.

OSA/SF is ***not required*** to set up any OSA-Express feature in QDIO mode (channel type OSD). For these features, all data required to configure an OSD CHPID is automatically taken from the HCD hardware definition and software definition input to Communication Server for OS/390 or z/OS. The only configuration information that you might need to define is the local or group MAC addresses and port speeds. If you choose to change the MAC address that is shipped with the

OSA-Express, you can use the Hardware Management Console, the Support Element, or OSA/SF to define the information. If your installation requires setting group addresses, you must use OSA/SF.

OSA/SF **is recommended** for monitoring network information and assisting with problem determination for ***all OSA-Express features***. If you already have a previous OSA/SF installed, it is recommended that you migrate to the latest OSA/SF. If you have other OSAs installed or plan to install other OSAs in the future, you should install the latest OSA/SF. If this is your first and only OSA and setup time is critical, you can postpone installation of OSA/SF until later.

Install the Latest OSA/SF if any of the following conditions apply:

- A previous release of OSA/SF is already installed.
- Other OSA features that require OSA/SF are installed or planned.

  The latest OSA/SF supports all OSA-Express features. If you install OSA/SF on the z990, you can set up and manage OSA-Express features from one OSA/SF image.
- You do not have access to the Hardware Management Console (HMC) or the Support Element (SE) and you want to set a local MAC address in place of the MAC address that shipped with the OSA.

  If you have access to either of these consoles, some of the tasks you can do are:
  - Enable or disable the port
  - Query port status
  - View port parameters
  - Set a local MAC address
  - Collect trace information for service

  Note: To review the instructions for accessing the OSA information from the HMC or SE, see “Using the Hardware Consoles (HMC or SE)” on page 116.

OSA/SF Management Span

In the OS/390, z/OS, VM, and VSE environments, OSA/SF supports all OSAs and all OSA modes. Generally, therefore, one of these OSA/SFs will be managing the OSAs that are defined to the images in which these operating systems are running. (With LCSS on the z990 processor, OSA/SF management is restricted to the channel subsystem on which both the instance of OSA/SF and the OSAs run. See “Managing Multiple Images of OSA/SF on the z990” on page 21.)

You can use the OSA/SF REXX command interface or the OSA/SF GUI interface to access OSAs that are defined to an image. Only one instance, or copy, of OSA/SF can run on an OS/390, z/OS, z/OS.e, VM, or VSE system image. However, that instance of OSA/SF can be used to customize, or configure, the modes of operation on all the OSAs defined in the system hardware I/O configuration data set (IOCDS) or I/O definition file that the copy of OSA/SF can view.

For a managing instance of OSA/SF to recognize an OSA, you must associate one device number with the OSA channel path that is defined in the same image as the system image on which OSA/SF is running. Furthermore, this device number must be specified as device type = OSAD with unit address = X'FE'. Because of these requirements, this device number is called either the OSAD device or FE device.

From the OSA/SF GUI on one workstation, you can attach to multiple hosts, but you must start a separate OSA/SF GUI logon session to each host through the GUI host window.

Figure 10 shows three different OSA/SF GUI host sessions set up on a single workstation. You can access each image by opening a different Host Open window and specifying the name of the image:

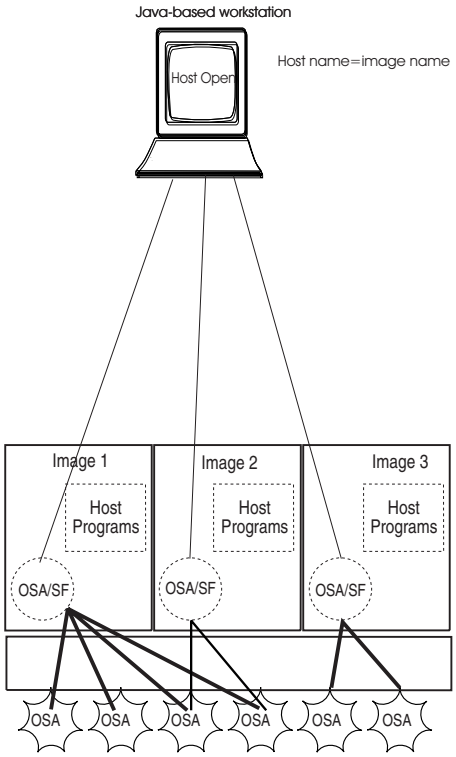

Figure 10. Multiple OSA/SF GUI sessions to access images on the z990

OSA/SF Management of an OSA

The following information summarizes how OSA/SF manages an OSA:

- If an OSA is online and operational before OSA/SF is running, the OSA is managed by the first instance of OSA/SF that is started and that can recognize the OSA.
- If one or more OSA/SFs are running, but a particular OSA is not online, the OSA is managed by the first OSA/SF that can recognize the OSA CHPID and that receives an OSA/SF command to start managing the OSA.
- Conversely, if an OSA/SF that manages the OSA is terminated, another instance of OSA/SF does not automatically start managing the OSA.

For example, If another instance of OSA/SF is already active, it waits until it is instructed to start managing an unmanaged OSA through the OSA/SF **Start Managing** command. The OSA channel, however, continues to transfer data in the OSA mode that is active at the time.

If another instance of OSA/SF is started, it automatically starts managing all the unmanaged OSAs that have been assigned to its image.

Managing Multiple Images of OSA/SF on the z990

OSAs are managed by an instance of OSA/SF running in a host image. If a copy of OSA/SF is running in more than one image, you can choose which OSA/SF manages the OSAs.

Any OSA/SF within the same central processing complex (CPC) can manage the OSAs. This function provides backup if there is a problem in the current OSA/SF image, and you need to quickly manage the OSAs from a different image. However, for the z990 processor that has a more than one channel subsystem (LCSS), a copy of OSA/SF running on one channel subsystem cannot manage an OSA attached to a different channel subsystem. For information about the LCSS on a z990 processor, see *zSeries 990 System Overview*.

Hardware Requirements

Hardware requirements are for the OSA-Express features and OSA/SF.

OSA-Express Features

- IBM @server zSeries 990

with one or more of the following OSA-Express features:

- OSA-Express Gigabit Ethernet feature (FC 2364, FC2365)
- OSA-Express FENET and 1000Base-T Ethernet features (FC 2366)
- OSA-Express TR feature (FC 2367)

OSA/SF

OSA/SF is available as a web deliverable from the IBM z/OS Download page:

`http://www.ibm.com/servers/eserver/zseries/zos/downloads/`

The package is first downloaded to your workstation, then uploaded to the host system. The OSA/SF function is packaged with the SMP/E GIMZIP utility, and sample installation JCL is provided to perform the SMP/E installation processes through SMP/E RECEIVE.

OSA/SF and the OSA/SF GUI are optional for any OSA-Express feature that runs in QDIO mode (OSD channels). See “Deciding Whether OSA/SF is Required” on page 18.

Cabling Requirements

See Appendix A for cabling requirements.

Software Requirements

Software requirements are for the z990 processor and depend on the OSA-Express feature and operating mode.

Certain functions require the latest operating system releases. See the functional descriptions earlier in this section for specific version releases, and the IBM Preventive Service Planning (PSP) bucket for OSA with news on the latest service levels.

The latest release of z/OS (and z/OS.e) can be considered the latest version release of OS/390 for the following software requirements.

The latest release of z/VM can be considered the latest version release of VM for the following software requirements.

The latest release of VSE/ESA can be considered the latest version release of ESA for the following software requirements.

For the OSA-Express Gigabit Ethernet Feature

The OSA-Express Gigabit Ethernet feature uses QDIO architecture, which handles IP traffic and requires the following on z990:

- OS/390 Version 2 Release10 , z/OS V1 R2 or higher, which includes:
  - Communication Server (CS element of OS/390 or z/OS) supporting the MPCIPA TCP/IP device type and the IPAQGNET link type. (Starting with R10, the IPAQENET link type can be used instead of IPAQGNET.)

or

- z/VM Version 3 Release 1, z/VM Version 4 Release 2 or higher for QDIO operation on a native VM system
  - with TCP/IP feature 330

or

- Communication Server (CS element of OS/390 or z/OS) supporting the MPCIPA TCP/IP device type and the IPAQGNET link type. (Starting with R10, the IPAQENET link type can be used instead of IPAQGNET.)

or

- VSE/ESA Version 2 Release 6

or

- Linux Kernel Version 2.4 or higher.
- TPF 4.1 at PUT 13 supports the OSA-Express Gigabit Ethernet feature.

For the OSA-Express FENET and 1000Base-T Ethernet Features

The FENET and 1000Base-T features handle TCP/IP Passthru and SNA traffic. QDIO mode can be used for IP traffic when the CHPID is set up as an OSD channel.

To Run IP Traffic in QDIO Mode

One of the following operating systems is required:

- OS/390 Version 2 Release10, z/OS V1 R2 or higher, which includes:
  - Communication Server (CS element of OS/390 or z/OS) supporting the MPCIPA TCP/IP device type and the IPAQGNET link type. (Starting with R10, the IPAQENET link type can be used instead of IPAQGNET.)

or

- z/VM Version 3 Release 1, z/VM Version 4 Release 2 or higher for QDIO operation on a native VM system
  - with TCP/IP feature 330

or

- z/VM Version 3 Release 1, z/VM Version 4 Release 2 or higher for QDIO operation on a VM guest.

or

- VSE/ESA Version 2 Release 6

or

- Linux Kernel Version 2.4 or higher.

To Run TCP/IP Passthru

One of the following operating systems is required:

- OS/390 Version 2 Release 10, z/OS V1 R2 or higher, which includes:
  - Communications Server (CS element of OS/390) supporting the LCS TCP/IP device type.

or

- z/VM Version 3 Release 1, z/VM Version 4 Release 2 or higher, and
  - TCP/IP for VM Version 2 Release 4 or higher.

or

- VSE/ESA Version 2 Release 6

or

- Linux Kernel Version 2.4 or higher.

To Run SNA

One of the following operating systems is required:

- OS/390 Version 2 Release 10, z/OS V1 R2 or higher, which includes:
  - Communications Server (SNA function of CS element of OS/390 or z/OS)

or

- z/VM Version 3 Release 1, z/VM Version 4 Release 2 or higher, and
  - VTAM for VM Version 4 Release 2 or higher.
- VSE/ESA Version 2 Release 6

or

For the OSA-Express Token Ring Feature

The TR feature handles TCP/IP Passthru and SNA traffic. QDIO mode can be used for IP traffic when the CHPID is set up as an OSD channel.

To Run IP Traffic in QDIO Mode

One of the following operating systems is required:

- OS/390 Version 2 Release 10, z/OS V1 R2 or higher, which includes:
  - Communication Server (CS element of OS/390 or z/OS) supporting the MPCIPA TCP/IP device type and the IPAQTR link type.

or

- z/VM Version 3 Release 1, z/VM Version 4 Release 2, or z/VM Version 4 Release 3 or higher for QDIO operation on a native VM system
  - with TCP/IP feature 330
- VSE/ESA Version 2 Release 6

or

- Linux Kernel Version 2.4.0.

To Run TCP/IP Passthru

One of the following operating systems is required:

- OS/390 Version 2 Release 10, z/OS V1 R2 or higher, which includes:
  - Communications Server (CS element of OS/390) supporting the LCS TCP/IP device type

or

- z/VM Version 3 Release 1, z/VM Version 4 Release 2, or z/VM Version 4 Release 3, and

  - TCP/IP for VM Version 2 Release 4 or higher.

or

- VSE/ESA Version 2 Release 6.

To Run SNA

One of the following operating systems is required:

- OS/390 Version 2 Release 10, z/OS V1 R2 or higher, which includes:
  - Communications Server (SNA function of CS element of OS/390 or z/OS)

or

- z/VM Version 3 Release 1, z/VM Version 4 Release 2, or z/VM Version 4 Release 3, and
  - VTAM for VM Version 4 Release 4 or higher.

or

- VSE/ESA Version 2 Release 6.

For OSA/SF

To use a GUI on all system platforms (OS/390, z/OS, z/OS.e, z/VM, and VSE/ESA):

- Microsoft Windows NT 4.0 with Service Pack 6a or higher, or Microsoft Windows 2000 or XP or higher.

or

  Linux Kernel Version 2.4 or higher.

- TCP/IP connection on the workstation
- Java 1.4 or higher
- JavaHelp™ 1.1.2 or higher.

Running on z/OS, z/OS.e, or OS/390

OSA/SF Version 2 Release 1 with PTFs for OS/390 Version 2 Release 10, z/OS Version 1 Release 2 or higher.

For GUI-to-server communications (TCP/IP):

- Communications Server (CS for OS/390 or z/OS) Version 2 Release 10 or higher on the host.

Running on z/VM

OSA/SF for z/VM Version 3 Release 1, z/VM Version 4 Release 2, or z/VM Version 4 Release 3.

For GUI-to-server communications (TCP/IP):

- TCP/IP Version 3 Release 1, Version 4 Release 2, Version 4 Release 3, or higher on the host.

Running on VSE/ESA

OSA/SF for VSE/ESA Version 2 Release 6 or higher.

For GUI-to-server communications (TCP/IP):

- TCP/IP Version 2 Release 6 or higher on the host.

Chapter 2. OSA-Express Hardware Configuration

In order to bring your OSA-Express features, online, you must enure that they are defined to the I/O configuration:

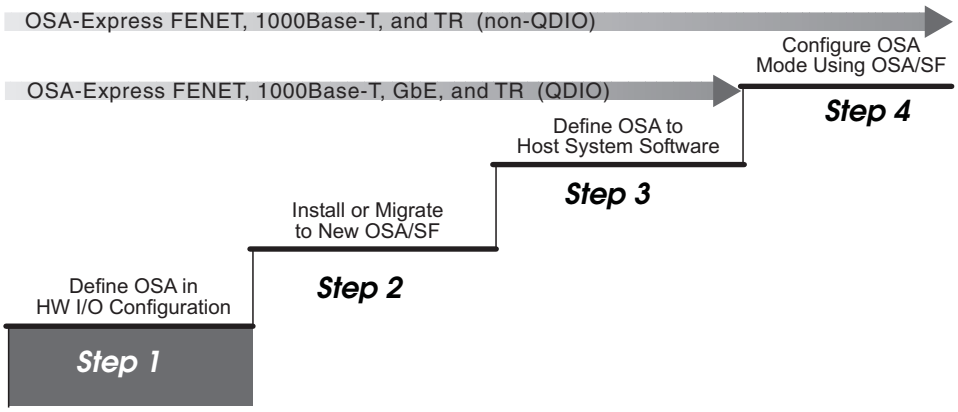

Figure 11. Step One in a Four-Step Process

The procedure in this chapter is for OS/390, z/OS, and z/OS.e.

To configure the hardware I/O for z/VM see “VM Hardware I/O Configuration” on page 34.

To configure the hardware I/O for VSE/ESA, go to “VSE/ESA Hardware Configuration” on page 34.

You can also use the hardware console to configure OSAs for any environment. See“Using the Hardware Consoles (HMC or SE)” on page 116.

Using HCD for Hardware I/O Configuration

This procedure shows you how to define an OSA-Express channel, *or port*, to the channel subsystem. The HCD data provides the basis for the TCP/IP or SNA definitions and OSA address table data that complete the port definition in Chapter 7, “Host Program Setup”, on page 81 and Chapter 8, “Configuring OSA-Express Modes”, on page 97.

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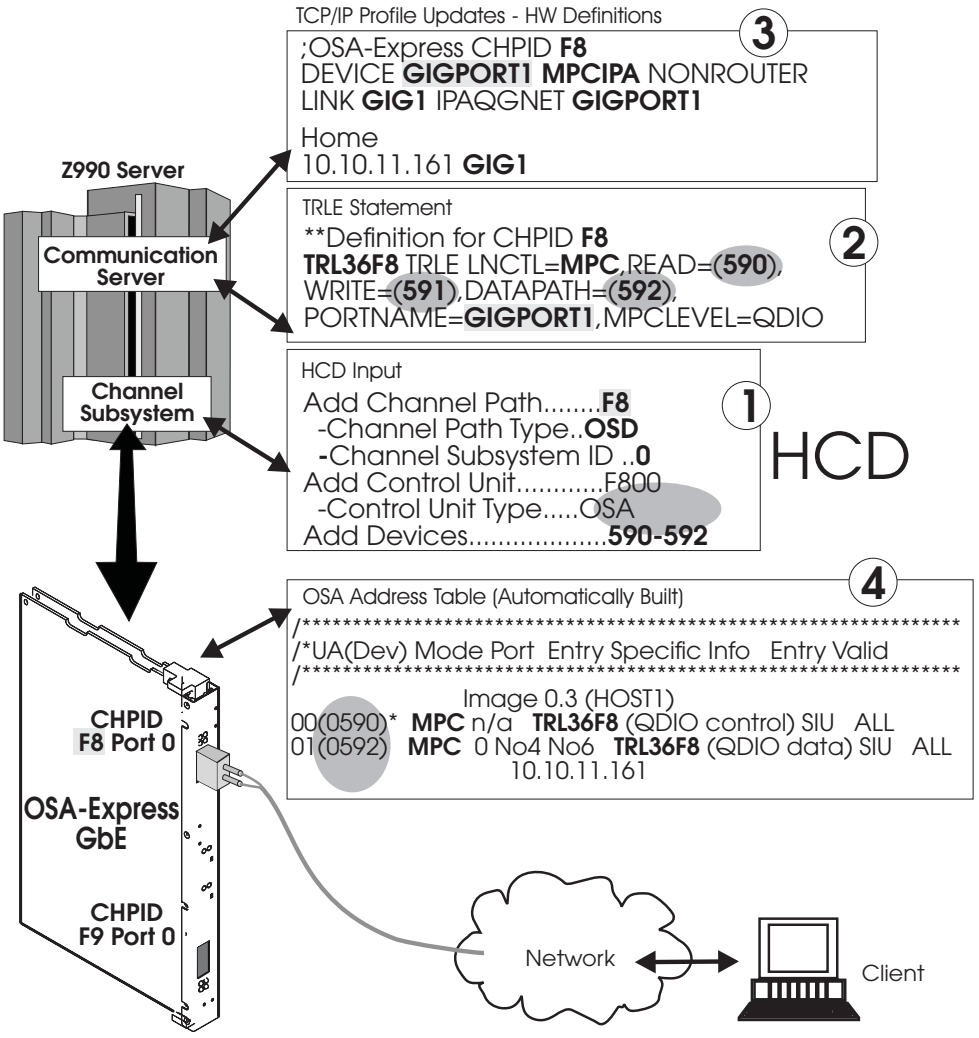

Figure 12. Defining an OSA-Express Port Connection

Figure 12 shows a high-level diagram for defining device addresses for a QDIO CHPID (OSD channel) in HCD, including how HCD input relates to definitions for TCP/IP and the OSA Address Table (OAT). For information about OSE channels and HCD, see the references cited at the end of this topic:

1. HCD identifies CHPID F8 and assigns device addresses 590 through 592. A minimum of three device addresses are required for QDIO (OSD channel), one each for READ and WRITE, and one DATAPATH per TCP/IP stack. In addition to the OSAD device, a minimum of two device addresses are required for non-QDIO (OSE channel), one each for READ and WRITE.
2. For a QDIO CHPID (OSD channel), the TRLE statement associates portname GIGPORT1 with device addresses 590–592 and enables the connection for TCP/IP and VTAM. For a non-QDIO CHPID (OSE channel), the portname is used for communication with the SNMP subagent. A port name is required for QDIO reqardless of the operating system. This port name must match the device name specified for all TCP/IP stacks using this CHPID.
3. For a QDIO CHPID (OSD channel), the TCP/IP profile defines GIGPORT1 as device type MPCIPA with link type IPAQGNET.

4. For a QDIO CHPID (OSD channel), the OSA Address (OAT) is automatically generated from HCD and TCP/IP definitions. For a non-QDIO CHPID (OSE channel), data must be entered as described in Chapter 8, “Configuring OSA-Express Modes”, on page 97.

Although the following HCD samples show data entered for an OSA-Express Gigabit Ethernet feature, the panels are the same for TR, FENET, or 1000Base-T. Required parameter values that differ are noted. If you need more information for HCD or the hardware configuration definitions, refer to the one of these publications:

- *zSeries 900 IOCP User's Guide*, SB10-7029
- *z/OS Hardware Management Console Guide*, SC28-6805
- *OS/390 HCD User's Guide*, SC28-1848

Configuring an OSA for HCD

Information that You Need: When an OSA-Express feature is installed, either in a new server or as an MES for an existing server, the ordering system that your IBM representative uses automatically specifies where the OSA-Express is to be plugged. This number is the physical channel id (PCHID) number, which appears in a ***PCHID Report*** that your IBM representative provides. The CHPID number is any available CHPID number that you specify for an OSA and is used in the OSA-Express configuration and setup tasks.

You can specify control unit addresses explicitly, or you can specify the addresses implicitly as the last two digits of the corresponding device numbers. HCD allows you to choose any device number to assign to the control unit address.

When you define an OSA device, specify a unit address from X'00' through X'FD' for any device except the OSAD device for communications between the OSA and the host.

For the OSAD device for OSA/SF communications, specify X'FE' as the unit address. See “Define the OSAD Device for OSA/SF” on page 34.

For an OSA-Express FENET, 1000Base-T, or TR using the default OAT, you must associate X'00' and X'01' as the unit addresses for the device pair for data transfer across port 0.

QDIO Stack and Device Limitations

When defining devices for QDIO it is important to remember these limiting factors.

- The maximum number of total unit addresses/devices per OSD CHPID is 480. These devices can be spread out among 15 separate images.
- The maximum number of total unit addresses/devices per OSE CHPID is 240. These devices can be spread out among 15 separate images.
- The maximum number of images that share an OSA-Express port is 15.
- The maximum number of TCP/IP stacks that can be defined on each OS/390 or z/OS image is 8.
- The maximum number of TCP/IP stacks and Linux images per OSD CHPID is 160.

Defining Devices for z/OS: For an OSD CHPID (QDIO), three device numbers are required for the first TCP/IP stack defined on a z/OS image

- 1 for READ control device

- 1 for WRITE control device
- 1 for DATAPATH control device

Each subsequent stack defined on the z/OS image shares control devices but requires its own DATAPATH device. For example, if 8 stacks are defined on a single z/OS image for a QDIO CHPID, 10 devices are used, 8 DATAPATH, 1 READ, and 1 WRITE device.

For an OSE CHPID (non-QDIO), two device numbers (1 for READ and 1 for WRITE) as well as the OSAD device are required.

Defining Devices for Linux: For an OSD CHPID (QDIO), three device numbers are required for each Linux interface that is defined for the CHPID

- 1 for READ control device
- 1 for WRITE control device
- 1 for DATAPATH control device

Therefore, the maximum number of Linux interfaces that can be defined for a single OSA-Express QDIO CHPID is 80: 240 devices ÷ 3 devices per interface = 80 interfaces. For example, you could have 80 Linux images each with one interface defined for the QDIO CHPID, or you could have 40 Linux images each with 2 interfaces defined for the QDIO CHPID. Either way, you reach the maximum of 80 Linux interfaces for the QDIO CHPID.

For an OSE CHPID (non-QDIO), two device numbers are required (1 for READ and 1 for WRITE) plus the OSAD device.

Defining Devices for both z/OS and Linux: Since z/OS and Linux allocate devices differently, the maximum number of TCP/IP stacks that can be defined depends on the distribution of z/OS and Linux images where the CHPID will be defined. The following example illustrates how stacks might be distributed in a mixed environment.

Example: CHPID 1 is used to define three TCP/IP stacks on each of five z/OS images. This requires [(3 TCP/IP stacks) x (5 z/OS images) = 15 DATAPATH devices] + [(2 control devices) x (5 first TCP/IP stacks on each z/OS image) = 10 control devices] resulting in 15 stacks using 25 devices. This leaves 455 devices available for other TCP/IP stacks.

Define the Channel Path

Using HCD, do the following to define the **Channel Path**.

__ 1. From the ***Define, Modify, or View Configuration Data*** (main panel), select ***3. Processors***.

__ 2. Select the required processor from the ***Processor List*** panel, then, to display the ***Channel Subsystem List***, select ***Work with channel subsystems . . . (XMP)***.

__ 3. From ***Channel Subsystem List***, select the appropriate channel subsystem, then from the context menu, select the ***Work with attached channel path*** action. HCD displays the ***Channel Path List*** showing all channel paths defined for the selected processor/channel subsystem.

__ 4. Press F11 on the keyboard to add a new channel path. The ***Add Channel Path*** panel is displayed.

```
Goto  Filter  Backup  Query  Help

                                 Add Channel Path

   Specify or revise the following values.

   Processor ID . . . . : ZOS1
   Configuration mode . : LPAR
   Channel Subsystem ID : 0            CSS 0 for ZOS01

   Channel path ID  . . . . F8    +            PCHID . . . 37D_
   Number of CHPIDs . . . . 1
   Channel path type  . . . OSD    +
   Operation mode . . . . . SHR    +
   Managed  . . . . . . . . No   (Yes or No)   I/O Cluster ________  +
   Description  . . . . . . ____________________________________

   Specify the following values only if connected to a switch:
   Dynamic entry switch ID  __  + (00 - FF)
   Entry switch ID  . . . . __  +
   Entry port . . . . . . . __  +

    F1=Help     F2=Split    F3=Exit     F4=Prompt   F5=Reset    F9=Swap     F12=Cancel
```

Figure 13. Add Channel Path

__ 5. Enter the required information using the following guidelines:
   - Channel path ID is the OSA-Express (CHPID) number.
   - **PCHID** is the physical channel identifier (PCHID) to the channel path identifier (CHPID) and is required for defining configurations on the z990 processor. The CHPID Mapping Tool (CMT) can be used to make the mapping between CHPIDs and PCHIDs easier. For complete information on HCD and defining channel paths, see *z/OS HCD User's Guide*.
   - Channel path type must be either **OSD** for QDIO, or **OSE** for non-QDIO. The OSA-Express Gigabit Ethernet feature is only defined as channel path type **OSD** and runs in QDIO mode. The FENET, 1000Base-T Ethernet, and TR features can be defined as **OSD** to run in QDIO mode or as **OSE** to run IP Passthru and SNA modes. The TR feature can be defined as **OSD** or **OSE** for IP traffic but only as **OSE** for SNA.
   - Operation mode is either **DED** (dedicated), **SHR** (shared), or **REC** (reconfigurable).
   - Enter a description of **OSA-Express (*feature type*)** for future reference.
   - The other fields for switches are not applicable.

__ 6. When complete, press Enter and the ***Define Access List panel*** is displayed. For the z990 processor, the ***Define Access List*** shows the partitions defined for all channel subsystems (identified as `CSS x` in the description field, where x is the channel subsystem identifier):

```
                      Define Access List           Row 1 of 4

Select one or more partitions for inclusion in the access list.

Channel subsystem ID: 0           CS 0
Channel path ID ....: F8          Channel path type .: OSD
Operation mode .....: SHR         Number of CHPIDs ..: 1

/CSS ID Partition Name Number Usage Description
/ 0     PROD1           1     OS    Used for Gigabit Ethernet of CSS 0
/ 0     PROD2           2     OS    Second production partition of CSS 0
/ 0     TEST1           3     OS    First test system of CSS 0
/ 0     TEST2           4     OS    Second test system of CSS 1
F1=Help F2=Split F3=Exit F4=Prompt F5=Reset F9=Swap
```

Figure 14. Define Access List

__ 7. Specify those images that access this OSA-Express (CHPID) and press Enter. You receive the ***Define Candidate List***. From this list you can select images that can be brought online after IPL. If you use OSA/SF, include all the images that run OSA/SF. If you want a logical partition to access a dedicated, reconfigurable, or shared OSA-Express channel path when you initially activate the logical partition, place that logical partition in the channel path access list. For shared channel paths, you can place more than one partition in the access list.

```
                      Define Candidate List          Row 1 of 4

Select one or more partitions for inclusion in the candidate list.

Channel subsystem ID: 0           CS 0
Channel path ID ....: F8          Channel path type .: OSD
Operation mode .....: SHR         Number of CHPIDs ..: 1

/CSS ID Partition Name Number Usage Description
/ 0     PROD3           5     OS    Third production image of CSS 0
/ 0     PROD4           6     OS    Fourth production image of CSS 0
/ 0     PROD5           7     OS    Fifth production image of CSS 0
F1=Help F2=Split F3=Exit F4=Prompt F5=Reset F9=Swap
```

Figure 15. Define Candidate List

__ 8. Press Enter to return to the ***Channel Path List panel***.

Define a Control Unit

__ 1. From the ***Channel Path List*** panel, enter **s** next to the CHPID (OSD or OSE) you previously defined.

__ 2. From the Control Unit List panel, press F11 to add a control unit for the channel path.

```
             Add Control Unit


Specify or revise the following values.

Control unit number           ....F800 +
Control unit type            .....OSA _____+

Serial number .......__________
Description ........ OSA connection to zOS1

Connected to switches ...__ __ __ __ __ __ __ __ __+
Ports ...........          __ __ __ __ __ __ __ __ __+

If connected to a switch:

Define more than eight ports ..2 1.Yes
                                 2.No

Propose CHPID/link addresses and
unit addresses .........2 1.Yes
                          2.No
```

Figure 16. Add Control Unit (1 of 2 panels)

__ 3. Specify the control unit number and a ***Control unit type*** of **OSA**. Space is provided for a description. The other fields are not applicable.

__ 4. Press the Enter key and the ***Select Processor / Control Unit*** panel will be displayed. Select the channel subsystem (CSS ID).

__ 5. Type **s** to choose the processor in which this OSA feature is installed. (If you have a large number of processors defined, scroll forward to show the required processor entry, depending on how you came to this panel). The OSA control unit can be shared between the images within the same processor, so do not assign this OSA CU number to more than one processor in this HCD IODF unless the device number is the same.

__ 6. Press Enter and the next ***ADD Control Unit (second panel)*** panel will be displayed.

```
                 Add Control Unit

Specify or revise the following values.

Control unit number  .: F800      Type ......: OSA
Processor ID .....    : ZOS1      Raised floor producion
Channel Subsystem ID .: 0

Channel path IDs ....  F8   ___   *    *    *    ___  ___  ___+
Link address ......    ___  ___  ___  ___  ___  ___  ___  ___+

Unit address ......    00   __   __   __   __   __   __   __ +
Number of units ....   255  ___  ___  ___  ___  ___  ___  ___

Logical address ....   __ + (same as CUADD)

Protocol ...... ..     __ + (D,SorS4)
I/O concurrency level. 2  + (1,2 or 3)
```

Figure 17. Add Control Unit (2 of 2 panels)

__ 7. Enter the remaining control unit definitions using the following guidelines.

- The CHPID number entry is provided if you are using the HCD hierarchical definition method to define this OSA CU (Processor to CHPID to CU to I/O device).

- The OSA control unit requires 00 as the starting unit address and 255 as the number of units (although only 240 devices can be used).
- Define an OSA control unit I/O concurrency level of 2. I/O concurrency level 2 specifies that multiple I/O operations may be sent between the channel subsystem and the OSA control unit and will be managed by the OSA-Express feature.

Define OSA Devices

__ 1. From the ***Control Unit List panel*** enter **s** next to the control unit that you just defined. The ***I/O Device List***. panel is displayed.

__ 2. Press F11 to add devices. The ***Add Device*** panel is displayed.

```
                  Add Device

Specify or revise the following values.

Device number .........    590
Number of devices ......3
Device type .........     OSA     +

Serial number .........____________
Description ...........________________________

Volume serial number...________(for DASD)

Connected to CUs.......F800

F1=Help F2=Split F3=Exit F4=Prompt F5=Reset F9=Swap
```

Figure 18. Define Device

__ 3. Enter the OSA-Express device definitions and use the following guidelines:

- For ***Number of devices***:

  Any OSD channel (FENET, 1000Base-T, TR, or Gigabit Ethernet)
  Requires three devices (READ, WRITE, and DATAPATH).

  TR (OSE) IP Traffic
  Requires two devices for each READ/WRITE, even/odd device pair for the physical port to run in TCP/IP Passthru mode.

  TR (OSE) SNA Traffic
  Requires one device number for each physical port to run in SNA mode.

  FENET and the 1000Base-T (OSE) IP Traffic
  Requires two devices for each READ/WRITE, even/odd device pair for the physical port to run in TCP/IP Passthru mode.

  FENET and the 1000Base-T (OSE) SNA Traffic
  Requires one device number for each physical port to run in SNA mode.

- Enter **OSA** as the ***Device type*** and any appropriate description.
- When complete, press Enter: either the ***Update Serial Number and Description*** panel or the ***Device/Processor Definition*** panel is displayed. Make any changes to the device description in the ***Update Serial Number and Description*** panel. The following is an example of the ***Device/Processor Definition*** panel:

```
                  Device / Processor Definition

Select processors to change device/processor definitions.

Device number .........    590    Number of devices ......3
Device type ..........     OSA     +

                                        Preferred         Explicit Device
/Proc.CSSID           UA  + Time-Out    STADET   CHPID +  Candidate List
 PROC.0               __    No          No       ____     No

F1=Help F2=Split F3=Exit F4=Prompt F5=Reset F9=Swap
```

Figure 19. Device / Processor Definition

- On the ***Device/Processor Definition*** panel, select the processor to change the device/processor definitions and press Enter. On the next panel, you need to specify the starting unit address. It is recommended that you specify **00** as the starting unit address. **You must specify 00 for the OSA-Express FENET, the 1000Base-T, or TR feature to run TCP/IP Passthru using the default OAT.** For ***Explicit Device candidate list***, enter **YES** to define the list. You can use the explicit device candidate list to distribute up to 480 OSD CHPID unit devices (or up to 240 OSE CHPID unit devices) that are associated with the device addresses among the processor images. If you want each image that you select to have access to the addresses of all devices in the list, enter **NO** for the option.
- Accept the default values for the other panel fields.
- When defining devices for OSD CHPIDs, it is important to remember that there is a maximum of 480 device unit addresses per OSD CHPID, and a maximum of 160 TCP/IP stacks per OSD CHPID, since 3 devices (2 control + 1 data) are required for each TCP/IP stack (480 ÷ 3 = 160). See “QDIO Stack and Device Limitations” on page 27 for more information.

```
                Device  / Processor Definition
                  Define Device / Processor

Specify or revise the following values.

Device number .........    590    Number of devices ......3
Device type ..........     OSA     +
Processor id
Channel subsystem id: 0

Unit Address .....................00 + (Only necessary when different from
                                      the last 2 digits of device number)

Time-Out.........................No   (Yes or No)
Stadet...........................No   (Yes or No)

Preferred CHPID..................__   +
Explicit device candidate list . No (Yes or No)+


F1=Help F2=Split F3=Exit F4=Prompt F5=Reset F9=Swap
```

Figure 20. Device / Processor Definition — Define Device / Processor

- If you specified **Yes** for the ***Explicit device candidate list*** option and press Enter, the ***Define Device Candidate List*** panel is displayed.
- If you defined the CHPID as dedicated (DED), there is no device candidate list. Continue with the next step. Otherwise, complete the ***Define Device Candidate List*** panel by selecting the image that needs access to these OSA devices.

- Define the devices to the Operation System Configurations.

  Use HCD action code **s** to select the relevant software configurations, and the press Enter.
- Enter the following in the ***Define Device Parameters/Features*** panel.
  - OFFLINE=NO (default), for these devices to be available online upon IPL.
  - Specify DYNAMIC=YES (default).

Define the OSAD Device for OSA/SF

Follow these guidelines only if you are using OSA/SF.

There is only one OSAD device. This device is used to communicate the adapter status to OS/390 or z/OS and OSA/SF. Do the same steps listed in "Define OSA Devices" on page 32, but use these guidelines.

- The OSA control unit number that was associated with the OSAD device is the same control unit number associated with the OSA devices.
- Specify **OSAD** for the ***Device type***.
- For OSAD, define one device number with the unit address of **FE**. It is recommended that the last digit of the device number be X'F' (nnnF). Also, use an address number within the first 16 device addresses for convenience when you want to use the Display Units command. Any available device number is acceptable.
- Accept the default **No** for the device explicit candidate list to allow the OSAD device to be shared among multiple images.
- Define this device with the following Operating System Configuration parameter values:
  - OFFLINE=NO (default), for these devices to be available online upon IPL.
  - DYNAMIC=YES (default), for the device to be dynamic

VM Hardware I/O Configuration

For z/VM, define an OSA channel path with its connected, or attached, control unit plus the devices that are required by the OSA mode or modes in which the OSA is being run.

If you define an OSA to z/VM dynamically, you can use the dynamic I/O configuration commands, but the data is put in the HSA and will not be kept after the system is shut down. To keep data across IPLs, you must also define the OSA in the system hardware I/O configuration using IOCP statements. Shown below are the VM dynamic I/O configuration statements for an OSA-Express OSE CHPID identified as X'20'.

```
CP DEFINE CHPID 20 TYPE OSE SHARED ACC LPLEFT1 LPRIGHT1 INIT LPLEFT1 INIT LPRIGHT1
CP DEFINE CU F00 TYPE OSA CHPID 20
CP DEFINE DEVICE F00-F03 UNIT_A 00 CU F00 PAR LPLEFT1 LPRIGHT1
CP DEFINE DEVICE 1FE UNIT_A FE CU F00 PAR LPLEFT1 LPRIGHT1
```

For more information on the user input required, see the descriptions that start on page 25. For information on the VM statements, see *Planning and Administration* and *z/VM I/O Configuration* in the z/VM library, listed in the bibliography.

VSE/ESA Hardware Configuration

There are two ways to add device numbers to a VSE/ESA system image.

- Select ***Fastpath 241*** to get to the *Configure Hardware* dialog and add the device numbers to VSE/ESA that way.

  You must have the highest authority level, which is usually reserved for the system programmer under user ID ***SYSA.***
- Alternatively, you can code the device numbers for VSE/ESA manually for each image in the VSE/ESA $IPLESA.PROC member in the IJSYSRS.SYSLIB library. Note, however, that these definitions are lost once you use the *Configure Hardware* dialog.

  For information on defining devices to VSE/ESA, see the VSE/ESA books listed in the bibliography. Note that VSE/ESA views an OSA device as a telecommunications device.

Chapter 3. Setting Up OSA/SF on OS/390, z/OS, and z/OS.e

Before you can configure and manage an OSA, you must set up OSA/SF and a user interface of your choice (OSA/SF REXX command interface or OSA/SF GUI). This chapter provides instructions for setting up OSA/SF on OS/390, z/OS, and z/OS.e.

For information about setting up and using the REXX command interface (IOACMD EXEC) and the GUI for OSA/SF, see Chapter 6, “Setting up and Using the OSA/SF Interfaces”, on page 67.

If you are running OSA/SF in a VM environment, see Chapter 4, “Setting Up OSA/SF on z/VM”, on page 51.

If you are running OSA/SF in a VSE environment, see Chapter 5, “Setting Up OSA/SF on VSE/ESA”, on page 61.

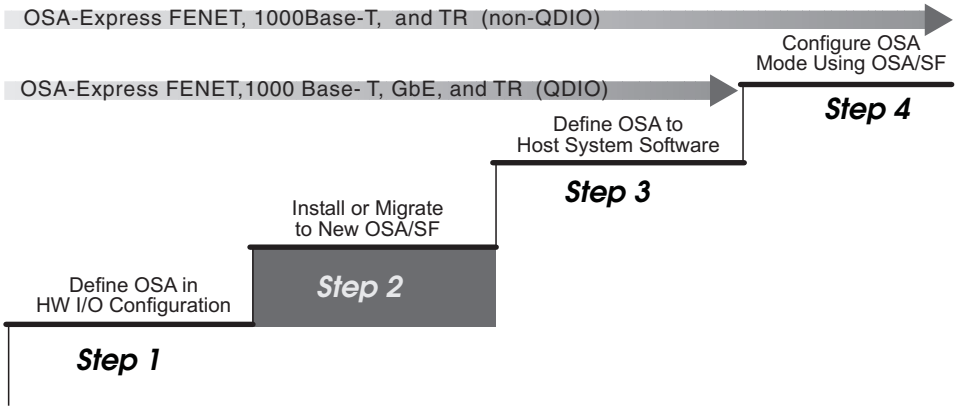

Figure 21. Step Two (OS/390, z/OS, and z/OS.e) in a Four-Step Process

Choosing the OSA Modes

Determine which OSA modes (non-QDIO or QDIO) to use for each OSA. This decision underlies all of the remaining setup tasks and whether you need to use OSA/SF:

- TCP/IP Passthru that uses the default OAT for a non-QDIO OSA-Express feature (OSE channel) does not require OSA/SF.
- Any other non-QDIO OSA-Express feature (OSE channel) requires OSA/SF to configure the OSA.
- Any QDIO OSA-Express feature (OSD channel) does not require OSA/SF.
- The OSA-Direct Express (OSD) SNMP subagent, does not require OSA/SF, but it ***is required*** for SNMP support that uses the Communications Server SNMP TCP/IP SNMP subagent. See “Support for Simple Network Management Protocol” on page 12 for more information.

OSA/SF and the OS390 or z/OS Environment

Ensure the system pre- and co-requisites are met for hardware and software in an OS/390, z/OS, or z/OS.e environment. See 21.

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Instructions: Use these instructions after you have installed OSA/SF according to the Program Directory. Once OSA/SF is installed, do the following steps:

1. "Set up the Started Procedure Task" (Required)
2. "Define the Startup Profile" on page 39 (Required)
3. "Set up OS/390, z/OS, or z/OS.e Running as a Guest of VM" on page 42 (for VM guest systems only)
4. "Set up the Configuration and Master Index Files" on page 42 (Required)
5. "Set up APPC/MVS and VTAM for OSA/SF" on page 43 (Required)
6. "Set up the Communications Server SNMP TCP/IP subagent" on page 46 (optional)

Set up the Started Procedure Task

Do the following to set up an OSA/SF Started Procedure (task) for OS/390, z/OS, or z/OS.e

__ 1. Copy the sample procedure from the **IOA.SIOASAMP** library member **IOAOSASF** into SYS1.PROCLIB or another system procedure library.

__ 2. Edit the sample procedure you just copied. See Figure 22.

OSASF1 is the name of the EXEC used in the sample, but you can change the name.

OSA/SF Started Procedure Name _____

Note: OSA/SF must be APF-authorized or it will not function. You must have SIOALMOD in either the PROGxx or IEAAPFxx member in your SYS1.PARMLIB data set. Depending on your library structure, there may be other ways to authorize OSA/SF. See *z/OS MVS Initialization and Tuning Reference* for more information.

```
//*   START OSA SUPPORT FACILITY
//*
//OSASF1   EXEC PGM=IOAMAIN,TIME=1440,REGION=6000K,DYNAMNBR=5,
//STEPLIB  DD  DSN=CEE.SCEERUN,DISP=SHR
//         DD  DSN=SYS1.SIOALMOD,DISP=SHR
//IOALIB   DD  DSN=SYS1.SIOALMOD,DISP=SHR
//IOAPROF  DD  DSN=IOA.STARTUP.PROFILE,DISP=SHR
//SYSPRINT DD  SYSOUT=A,DCB=(RECFM=FBA,LRECL=121,BLKSIZE=121)
//SYSUDUMP DD  SYSOUT=H
```

Figure 22. Sample Started Procedure (IOA.SIOASAMP Member IOAOSASF)

__ 3. Ensure that the data set names in the **STEPLIB** and **IOALIB** statements match the names used for the C runtime libraries and the OSA/SF code loadlib of your OS/390, z/OS or z/OS.e system. The Program Directory provides instructions for including the SIOALMOD data set in the link list. The LE/370 runtime libraries must be in an APF library.

__ 4. Change the IOAPROF DD statement, **STARTUP.PROFILE**, to a name that you want to use for the Startup Profile. You will copy the sample Startup Profile into this data set in the next step.

If there will be multiple OSA/SF images on the system, you can use the same Startup Profile.

Attention

If you use dynamic allocation for SYSPRINT or SYSUDUMP, you will not be warned when an existing copy of OSA/SF is already running.

Define the Startup Profile

Do the following to set up an OSA/SF Startup Profile as shown in Figure 23 on page 40:

```
 *  See the OSA/SF User's Guide for OSA-2 or the OSA-Express Customer's
 *  Guide and Reference for information on setting up the Startup Profile.
 *
 *  The SET NAME statements that follow are used to define datasets
 *  that are needed by OSA/SF.  You can have variable names in these
 *  definitions using the reserved keywords CECNAME and/or SYSNAME.
 *  Usage of these keywords are shown in the examples that follow.
 *
 *  You must specify the values these keywords will have using the
 *  SET ALIAS command before any of the SET NAME statements occur.
 *  The SET ALIAS CECNAME statement is required even if you do
 *  not use it in any of the SET NAME statements.
 *  The SET ALIAS SYSNAME statement is optional.
 *
 SET ALIAS CECNAME CEC1
 SET ALIAS SYSNAME SYSTEM1
 *
 *  IOACFG defines the OSA configuration file that is used by OSA/SF.
 *
 SET NAME IOACFG
     DATASET 'IOA.&CECNAME.OSAS.CONFIG'
     UNIT 3390
     VOLSER 339008
 *
 *  IOAINX defines the OSA master index file that is used by OSA/SF.
 *
 SET NAME IOAINX
     DATASET 'IOA.&CECNAME.MASTER.INDEX'
     UNIT 3390
         VOLSER  339005
 *
 *  IOAMSG defines the OSA message log file that is used by OSA/SF.
 *  The OSA/SF started task will add '.LPnn' to the dataset name
 *  you specify where 'nn' is the LP number that OSA/SF is running on.
 *
 *  SET NAME IOAMSG
    DATASET 'IOA.&CECNAME.MESSAGE.LOG'
    UNIT 3390
    VOLSER 33900C
 *
 *  IOADSN defines the high level qualifier OSA/SF will use when
 *  creating datasets for its own use.
 *
SET NAME IOADSN
    DATASET 'IOA.&CECNAME.OSASF'
    UNIT 3390
    VOLSER  33900C
 *
 *  The following SET APPC statement is used to specify the LU
 *  name that OSA/SF should use. If omitted, the default is IOASERV.
 *
SET APPC NAME IOASERV
 *
 *  The SET SYSINFO statements can be used to remap existing CHPID
 *  and DEVICE numbers.  See the OSA/SF User's Guide for OSA-2 or
 *  the OSA-Express Customer's Guide and Reference for details.
 *
```

Figure 23. Sample Startup Profile (IOA.SIOASAMP Member IOASPROF)

__ 1. Allocate a data set for the Startup Profile name you selected. Request primary quantity (space) of 2 tracks, secondary quantity of 2 tracks, and sequential directory blocks=0. The attributes of this data set should be RECFM=FB, LRECL=80, and BLKSIZE=5120.

__ 2. Copy the sample Startup Profile from the **IOA.SIOASAMP** library member **IOASPROF** into the Startup Profile data set you just allocated.

OSA/SF Startup Profile Name _____

__ 3. Edit the sample Startup Profile you just copied, using the instructions within the profile and the Startup Profile Guidelines on page 41.

__ a. As indicated in the header of the profile, the SET ALIAS CECNAME statement is required. Record the name you specify. The SET ALIAS SYSNAME is optional. If you use it, also record the name for later use.

SET ALIAS CECNAME = _____ (required)
SET ALIAS SYSNAME = _____ (optional)

__ b. Change the VOLSER and UNIT to identify the disk pack you want the files on. If you do not want to specify a unit type for each data set, replace UNIT 3390 with UNIT SYSALLDA. If VOLSER is specified, you must specify UNIT.

__ c. If you do not want to use the default **IOASERV** for the APPC LU name, include the statement **SET APPC NAME *luname***, replacing ***luname*** with an eight-character name that starts with an alpha character. If the statement is not included in the profile, the LU name defaults to IOASERV.

LU name for APPC = _____

Note: This APPC LU name must agree with the LU name specified for MVS and VTAM in step 2 on page 43.

Startup Profile Guidelines

- The SET ALIAS statements must occur before the SET NAME statements. SET ALIAS CECNAME is required. Specify a name with a maximum of eight characters. The SET ALIAS SYSNAME is optional. You can provide the name of the image or remove the statement.
- The SET command defines the data set names for: IOACFG, IOAINX, IOAMSG, and IOADSN.
- Data set names must be unique and contained within single quotes.
- Data set names for IOACFG and IOAINX can contain a maximum of 44 characters. IOAMSG can contain a maximum of 30 characters, and IOADSN can contain a maximum of 26 characters.
  - Periods are counted as part of the allowed number of characters.
  - Qualifiers cannot exceed eight characters.
  - The first character of all qualifiers must be a letter.
- If &CECNAME or &SYSNAME are used as variables in the data set names, they must be
  - Followed immediately by a period when used as the first item in the data set name
  - Preceded immediately by a period when used as the last item in the data set name.
- The SET APPC NAME command defines the LU name for APPC. If the command is not included, the LU name defaults to IOASERV.
- VOLSER can have a maximum of six characters and UNIT a maximum of eight characters. When VOLSER is used, there must be a UNIT specified.
- No blank lines.
- Comment lines are indicated with the first non-blank character set to an asterisk ″*″. Everything after the asterisk is omitted until the next line in the data set.

- Comments between the SET command and the other keywords (DATASET, VOLSER, and UNIT) can be used within the command.
- Data must be in columns 1 to 70.
- No wrapping is supported.
- File is not case sensitive, as all characters are translated to upper case.

Set up the Configuration and Master Index Files

The configuration and master index files are described as follows:

- **IOACFG** is the OSA configuration file used internally by OSA/SF. It defines what should be installed for each OSA. Since the same OSA CHPID can be shared by multiple systems (images), it should be defined as shared between the host images. *You do not have to do anything with this file.*
- **IOAINX** is the master index file that defines all the available OSA mode code for OSA-2 only. OSA/SF requires this data set to be defined.
- **IOAMSG** is used by OSA/SF to store messages and status. The OSA/SF started task will add '.Inn' to the data set name you specify, where 'nn' is the image number the OSA/SF is running on. IOAMSG is not shared between images.. OSA/SF will allocate and use the data set as needed. *You do not have to do anything with this file*.
- **IOADSN** is the starting high level qualifier for all data sets that are created for use by OSA/SF. These data sets have two main purposes:
  1. To store user input for configuration in a compact format until needed upon activation
  2. To store data pertaining to each OSA CHPID in files built and updated dynamically by OSA/SF

  In order to allow instances of OSA/SF running on different images to get to the same data, or perform activation on previously defined configurations, these data sets should be defined as shared across all images. The files that use this high-level qualifier will be allocated by OSA/SF as needed.

  If you are not defining a guest system to run on VM, continue with "Checklist for the OSA Configuration and Master File Index" on page 43.

Set up OS/390, z/OS, or z/OS.e Running as a Guest of VM

Continue with this section ***only if*** OS/390, z/OS, or z/OS.e is running as a guest of VM ***and*** you have a need to identify virtual CHPID numbers and device numbers. In the Startup Profile, you can associate a virtual number with a real number for CHPIDs and device numbers. Otherwise, proceed to "Checklist for the OSA Configuration and Master File Index" on page 43.

Attention

When the system is running as a VM guest,, consider the following:

- You must define the OSA to the VM host system image.
- For information about using the RMCHINFO option in the OPTION Directory Control statement, see "Decide whether to Specify RMCHINFO" on page 56.

Specifying real and virtual CHPID numbers allows the use of CHPIDs by OS/390, z/OS, or z/OS.e when running as a guest of VM.

Include the SET SYSINFO command in the Startup Profile as shown below. Specify the real and virtual CHPID numbers that you want to associate:

```
SET SYSINFO CHPID (REAL xx VIRTUAL yy)
```

- The maximum length of the command string is 70 characters.
- The command is not case sensitive.
- Replace the variables with hexadecimal numbers.
- All command parameters must be separated by spaces.
- If you include more than one SYSINFO statement, they do not have to be next to each other.
- Do not include this command if OS/390, z/OS, or z/OS.e is not running as a guest of VM.

This information will not be shared between multiple images on the same system and will not be saved between invocations of OSA/SF. It must be present in the STARTUP.PROFILE on each invocation of OSA/SF for which the remapping is required.

Checklist for the OSA Configuration and Master File Index

Allocate the following two new sequential data sets and then copy the members shown in Figure 23 on page 40 **IOA.SIOASAMP** into the new data sets. Replace *&CECNAME.* with the name used in step 3a on page 41.

```
Members in IOA.SIOASAMP        New Sequential Data Set Names

    IOACFG                       IOA.&CECNAME.OSAS.CONFIG
    IOAINX                       IOA.&CECNAME.MASTER.INDEX
```

Complete the following:

__ 1. Set the initial allocation of IOACFG to request primary space of 1 track, secondary space of 2 tracks, and the attributes of RECFM=FB, LRECL=80, and BLKSIZE=5120.

__ 2. Set the initial allocation of IOAINX to request primary space of 2 tracks, secondary space of 2 tracks, and the attributes of RECFM=FB, LRECL=80, and BLKSIZE=5120.

__ 3. Edit the IOAINX file that you just copied and update the server destination names that start in column 1 to match your specific environment. The names in the file must all start in column 1.

Set up APPC/MVS and VTAM for OSA/SF

APPC: Set up APPC/MVS for OSA/SF. If APPC/MVS is not already set up on the server, see *z/OS MVS Planning: APPC/MVS Management*. After APPC/MVS is set up on the server, do the following for OSA/SF to define the APPC local LU, no scheduling, and provide the TPDATA cataloged data set name. (OSA/SF is an APPC server and there is no dependency on the APPC scheduler for OSA/SF.)

1. Determine which APPCPM member you are using for initialization.
2. Edit member APPCPMxx in SYS1.PARMLIB and add the following statements:

```
LUADD ACBNAME(luname)
NOSCHED,
TPDATA(SYS1.APPCTP)
```

Notes:

a. Change luname to the same name defined in the Startup Profile (see step 3c on page 41). If SET APPC NAME is not included in the profile, luname

defaults to IOASERV. In that case replace luname in the APPCPMxx member with IOASERV. At least one LU name must be specified here.

b. The data set name specified by SYS1.APPCTP may be the same as an existing TP data set.

3. Implement changes with SET command as follows:

```
SET APPC=xx
```

If APPC/MVS must be stopped and restarted to include the changes, use the following commands and for **APPC** in the examples substitute the APPC procedure name for your installation:

Enter: **C APPC** to stop APPC/MVS

Enter: **S APPC,SUB=MSTR** to start APPC/MVS

If the required APPC parm is not hard-coded in the APPC procedure or it doesn't default to 00, start APPC as follows:

Enter: **S APPC,SUB=MSTR,APPC=xx**

To determine if APPC is running:

Enter: **D A,L or D A,APPC**

To determine if OSA/SF APPC LU is active:

Enter: **D APPC,LU,ALL**

VTAM: Set up VTAM for OSA/SF:

__ 1. Define the VTAM APPL statement for OSA/SF by copying Copy member **IOAAPPL** (Figure 24 on page 45) from **IOA.SIOASAMP** into SYS1.VTAMLST, renaming it from IOAAPPL to APPCOSA. Make sure SECACPT=ALREADYV.

```
*********************************************************************
*                                                                   *
**** MEMBER NAME: IOAAPPL                                           *
*                                                                   *
**** DESCRIPTIVE NAME: SAMPLE VTAM APPL STATEMENT FOR OSA/SF        *
*                                                                   *
**** FUNCTION: This APPL statement identifies OSA/SF as a VTAM      *
*              application, with one ACB defined for LU IOASERV.    *
*                                                                   *
**** SETUP:  Copy and rename this sample to APPCOSA or select       *
*            another name.                                          *
*            Use one of the following 3 methods to activate the     *
*            definition:                                            *
*            1.- Add the selected name to your VTAM APPL List       *
*            2.- Add the selected name to your VTAM ATCCONxx member *
*            3.- Activate the definition manually before you start  *
*                OSA/SF.                                            *
*                For example:                                       *
*                    V NET,ACT,ID=APPCOSA                           *
*                                                                   *
*                To verify that this worked:                        *
*                    D NET,ID=APPCOSA,E                             *
*                                                                   *
****   SUGGESTED MODIFICATIONS:                                     *
*                                                                   *
*        - SECURITY:  This APPL statement is set at a security level*
*          of "conversation" (see keyword SECACPT=CONV below.)      *
*          Set SECACPT to the security level for your installation. *
*                                                                   *
*        - This sample uses the IBM VTAM default values for         *
*          DLOGMOD and MODETAB.  You may want to specify your own   *
*          installation values.                                     *
*                                                                   *
*        - if not OS/390 then use:                                  *
*             SECACPT=CONV                                          *
*        - if OS/390 then use:                                      *
*             SECACPT=ALREADYV                                      *
*                                                                   *
*********************************************************************
*                                                                   *
IOASERV APPL   ACBNAME=IOASERV,                                    C
               APPC=YES,                                           C
               AUTOSES=0,                                          C
               DDRAINL=NALLOW,                                     C
               DMINWNL=5,                                          C
               DMINWNR=5,                                          C
               DRESPL=NALLOW,                                      C
               DSESLIM=10,                                         C
               LMDENT=19,                                          C
               PARSESS=YES,                                        C
               SECACPT=ALREADYV,                                   C
               SRBEXIT=YES,                                        C
               VPACING=1
*
********* OPTIONAL
*              MODETAB=
*              DLOGMOD=
```

Figure 24. Member IOAAPPL from IOA.SIOASAMP

__ 2. Place the new APPL member name (APPCOSA) in the APPLxx member list *or* in the ATCCONxx member.

SYS1.VTAMLST member APPLXX (include the APPCOSA name)

SYS1.VTAMLST member ATCCONxx (include the APPCOSA name)

__ 3. Vary active the new OSA/SF application to VTAM.

Enter: **V NET,ID=APPCOSA,ACT**

__ 4. Build a logmodes file and place it in the system VTAMLIB data set. You can use the sample job in SYS1.SAMPLIB member ATBLJOB to build the

LOGMODES file and place in the VTAMLIB. There is also a sample LOGMODES source input file in SYS1.SAMPLIB member ATBLMODE.

SYS1.SAMPLIB member ATBLJOB (example logmodes job)

SYS1.SAMPLIB member ATBLMODE (example logmode source)

SYS1.VTAMLIB member LOGMODES (logmode assembled program)

Set up the Communications Server SNMP TCP/IP subagent

In order for an SNMP management application to receive OSA-Express MIB data, the Communications Server SNMP TCP/IP subagent must first connect to OSA/SF. For this connection to be established, two OSA/SF components must be started:

IOAOSASF
A sample JCL procedure that can be used to start the main OSA/SF address space. The sample, shown in Figure 22 on page 38, has a jobname of OSASF1.

IOASNMP
A sample JCL procedure, shown in Figure 25, that starts the OSA/SF-provided OS/390 UNIX transport application that interconnects a subagent with OSASF1.

If you are setting up SNMP for OSE CHPIDs, ensure that the portname in the configuration file (Chapter 8, “Configuring OSA-Express Modes”, on page 97) matches the name you define in the TCP/IP profile DEVICE and LINK statements (Chapter 7, “Host Program Setup”, on page 81).

```
//*
//* START OSA SUPPORT FACILITY SNMP COMMUNICATION FACILITY
//*
//IOASNMP EXEC PGM=IOANMAIN,TIME=1440,REGION=0K,DYNAMNBR=5
//STEPLIB  DD  DSN=SYS1.SIOALMOD,DISP=SHR
//SYSPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
```

Figure 25. Sample Started Procedure (IOA.SIOASAMP Member IOASNMP)

You must also provide RACF CONTROL authority for IOA.CONNECT.FILE, which is an internal command used by OSA/SF to respond to SNMP data queries.

For more about SNMP, see *z/OS Communications Server: IP Configuration Guide*.

Controlling Access to OSA/SF

OSA/SF uses the System Authorization Facility (SAF) interface to allow you to control user access to its commands through an optional security product such as RACF. The following discussion assumes that RACF is installed but any security product using the SAF interface can be substituted. Note, however, that any such product that is installed **must be set up and activated** for the OSA/SF GUI and REXX command interfaces to function correctly.

You must give the OSA/SF job ALTER authority to the data sets (IOACFG, IOAINX, and so forth) that are used for set up.

OSA/SF supports these RACF levels of authority:

- **None**, which prevents a user ID from entering any OSA/SF command.

- **Read**, which allows a user ID to view the OSA address table (OAT) and debug information, get configuration data, and query mode information about OSA features.
- **Update**, which allows a user ID to enter all OSA/SF commands except Set Parameters, Clear Debug, Install, Start Managing with Force, and those that use Get File and Put File.
- **Control**, which allows a user ID to enter all OSA/SF commands with all the options.

The OSA/SF commands are listed in the following table. For details of each command see the appendix.

If you protect data sets, follow the same procedures that you use for other system data sets.

OSA/SF runs as a started task. So give OSA/SF access to the data sets which it uses and which are listed in the OSA/SF startup profile.

OSA/SF Tasks and Commands

We suggest you provide RACF authority for all the OSA/SF commands shown in the table. The ***Configure OSA*** command, which is not included in this list, uses many of the commands listed to accomplish its tasks. Although ***Configure OSA*** does not require RACF authority itself, many of the commands it uses do. Providing authority for all the commands in the table will assist with any problem determination in the future.

Configure OSA uses the **Query**, **Get File**, **Put File**, **Start Managing** and **Install** commands.

Command	Task	RACF Facility	Level
Clear Debug	Clears the OSA/SF message log.	IOA.CLEAR.DEBUG	Control
N/A	Internal command to allow data to be passed in response to SNMP query.	IOA.CONNECT.FILE	Control
Get Config	Gets configuration data for any OSA-Express feature	IOA.GET.CONFIG	Read
Get Debug	Gets the OSA/SF message log, OSA/SF trace table, and other OSA debug data.	IOA.GET.DEBUG	Read
N/A	Internal command to get a file.	IOA.GET.FILE	Control
Put Table with Force	Update and store an OSA-2 OAT disregarding whether an entry is in use. This command can be issued only through IOACMD.	IOA.PUT.TABLE	Control
Put Table without Force	Update and store an OSA-2 OAT only if an entry is not in use. This command can be issued only through IOACMD.	IOA.PUT.TABLE	Update
Get OAT	Gets the OSA Address Table for a specified CHPID.	IOA.GET.OAT	Read
Install	Install and activate an OSA mode configuration already set up by OSA/SF.	IOA.INSTALL	Control
N/A	Internal command to put a File.	IOA.PUT.FILE	Control
Query	Get data about an OSA, OSA/SF, and/or active OSA modes on an OSA.	IOA.QUERY	Read

Command	Task	RACF Facility	Level
Set Parameters	Set the OSA LAN port parameters that are settable with OSA/SF.	IOA.SET.PARAMETERS	Control
Start Managing with Force	Start managing an OSA by this instance of OSA/SF even if that forces another instance of OSA/SF to stop management.	IOA.START.MANAGING	Control
Start Managing without Force	Start managing the specified OSA by this instance of OSA/SF without forcing another instance of OSA/SF to stop managing the same OSA.	IOA.START.MANAGING	Update
Stop Managing	Stop managing an OSA.	IOA.STOP.MANAGING	Update

Some Examples of RACF Profile Definitions

When defining a RACF profile generically or for an individual OSA/SF command, use the RACF RDEFINE command with a class of FACILITY. Enter the fully-qualified facility name, starting with the characters IOA and using periods as separators, as shown in the following examples. For more information on the RACF commands, see *z/OS Security Server RACF Command Language Reference*.

- To define a profile for an individual OSA/SF command, for example, the Get Table command to read an OAT, enter:

  ```
  RDEF FACILITY IOA.GET.TABLE
  ```

- To define a profile to allow user IDs to enter this command, enter:

  ```
  RDEF FACILITY IOA.GET.TABLE UACC(READ)
  ```

- To allow the use of generics for a class of service facility, enter:

  ```
  SETROPTS GENERIC FACILITY
  ```

- To prevent unauthorized use of OSA/SF commands, enter:

  ```
  RDEF FACILITY IOA.* UACC(NONE).
  ```

  If you have already prohibited all user IDs from using OSA/SF commands, you must explicitly assign RACF authorization to allow designated user IDs to enter an OSA/SF command.

Some Examples of RACF Authorization Assignments

Enter the RACF PERMIT command and its parameters. The profile parameter, for example, IOA.GET.TABLE or *, determines the authorization level of the user ID identified in the ID parameter. (The Access parameter identifies the authorization given. You can use an asterisk to designate a generic class on the PERMIT parameters.)

- To allow all users to send all commands that require the Read authority, enter:

  ```
  PERMIT IOA.* ACCESS(READ) CLASS(FACILITY) ID(*)
  ```

- To assign authorization by Access level, for example, to authorize user ID RPAUL to access the Control level, enter:

  ```
  PERMIT IOA.* ACCESS(CONTROL) CLASS(FACILITY) ID(RPAUL)
  ```

- To authorize another user (GLASER) to enter all commands that require the update authorization, enter:

  ```
  PERMIT IOA.* ACCESS(UPDATE) CLASS(FACILITY) ID(GLASER)
  ```

- To assign authorization by specific OSA/SF commands, for example, to authorize all user IDs to enter the Get Table command, enter:

  ```
  PERMIT IOA.GET.TABLE ACCESS(READ) CLASS(FACILITY) ID(*)
  ```

- To authorize ID PINGCHAN to enter any command requiring the Update control option, enter:

```
PERMIT IOA.* ACCESS(UPDATE) CLASS(FACILITY) ID(PINGCHAN)
```

- To authorize a specific profile name, for example, to authorize user ID JGOLDMAN to enter the Put Table command with or without the Force option, enter:

```
PERMIT IOA.PUT.TABLE ACCESS(CONTROL) CLASS(FACILITY) ID(JGOLDMAN)
```

Starting OSA/SF

From the system console, enter the OSA/SF Started Procedure name that you selected in step 2 on page 38. **OSASF1** was the default name.

S <*procedure name*>

For an example, see "OSA/SF Message Log" on page 121.

Verifying That OSA/SF Started

To verify that OSA/SF has been started on the primary server, enter the following:

D A,<*procedure name*>

The Started *procedure name* was established in step 2 on page 38.

Deciding which OSA/SF Interface to Use

If you prefer line commands, use the OSA/SF REXX command interface to enter commands that allow you to manage an OSA. Complete the setup information for the REXX command interface in "Setting Up the REXX Command Interface" on page 67.

If you prefer a workstation interface, use the OSA/SF GUI.Complete the setup information for the OSA/SF GUI, including TCP/IP setup in "Setting up an OSA/SF GUI" on page 71.

Stopping OSA/SF

Enter the following to stop OSA/SF:

P <*procedure name*>

The Started *procedure name* was established in step 2 on page 38 to stop OSA/SF.

Note: If a step name was given with the start command, then the step name must be used with the stop command.

Chapter 4. Setting Up OSA/SF on z/VM

Before you can configure and manage an OSA, you must set up OSA/SF and a user interface of your choice (OSA/SF REXX command interface or OSA/SF GUI). This chapter provides instructions for setting up OSA/SF on VM.

For information about setting up and using the REXX command interface (IOACMD EXEC) and the GUI for OSA/SF, see Chapter 6, “Setting up and Using the OSA/SF Interfaces”, on page 67.

If you are running OSA/SF in an OS/390 or z/OS environment, see Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37.

If you are running OSA/SF in a VSE environment, see Chapter 5, “Setting Up OSA/SF on VSE/ESA”, on page 61.

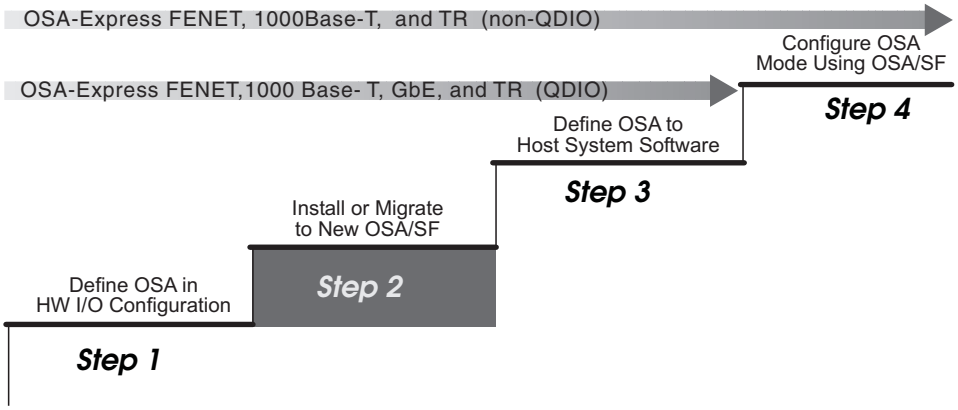

Figure 26. Step Two (VM) in a Four-Step Process

Choosing the OSA Modes

Determine which OSA modes (non-QDIO or QDIO) to use for each OSA. This decision underlies all of the remaining setup tasks and whether you need to use OSA/SF:

- TCP/IP Passthru that uses the default OAT for a non-QDIO OSA-Express feature (OSE channel) does not require OSA/SF.
- Any other non-QDIO OSA-Express feature (OSE channel) requires OSA/SF to configure the OSA.
- Any QDIO OSA-Express feature (OSD channel) does not require OSA/SF.

OSA/SF and the z/VM Environment

Ensure the system pre- and co-requisites are met for hardware and software in a z/VM environment. See “Software Requirements” on page 21.

z/VM characteristics: OSA/SF for z/VM runs in its own OSA/SF server virtual machine with the following characteristics:

- OSA/SF on z/VM runs automatically unless it is shut down with the OSA/SF Shutdown command (page 159).

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- OSA/SF is logged on when it receives an OSA/SF command. The server remains logged on in a disconnected state awaiting further commands. CMS user IDs that have been set up to communicate with the OSA/SF server virtual machine ID (OSASF) can enter OSA/SF commands, or OSA/SF can be accessed through the OSA/SF GUI that makes use of windows.
- If the OSA channel path is not defined as shared, only the managing OSA/SF with a read/write path to the OSA's minidisk can receive a Stop Managing command for that OSA.
- If the OSA channel path is defined as shared, the OSA minidisk is secure only if you use CSE XLINK. The OSA/SF that gains control is the first OSA/SF that recognizes the OSA and receives a **Start Managing** command.
- Before another OSA/SF can gain control, the managing OSA/SF must receive a **Stop Managing** command. If that is not possible, the OSASF user ID should be logged off. If the system image cannot receive that command, the CSE XLINK Reset command will release the read/write path to the OSA's minidisk.

Instructions: Use these instructions for installing OSA/SF in a z/VM environment:

1. "Install OSA/SF" (required)
2. "Define OSA/SF to a z/VM Guest Environment" on page 53 (required for a guest environment)
3. "Set Up APPC" on page 53 (required)
4. "Set Up OSA/SF" on page 54 (required).
5. "Decide whether to Specify RMCHINFO" on page 56

Install OSA/SF

OSA/SF is pre-installed, using VMSES/E, on the **z/VM** System DDRs. It is optionally installable for these releases at initial z/VM DDR install time. If you have installed OSA/SF for z/VM during VM installation, do the following:

- Allocate resources for OSA/SF and update the PROFILE EXEC and NAMES files. Follow the procedures in "Set Up APPC" on page 53 and "Set Up OSA/SF" on page 54.
- Optionally, set up the OSA/SF GUI. See "Setting up an OSA/SF GUI" on page 71.

If you want to install OSA/SF for z/VM at initial VM DDR install time, follow the Post Installation instructions in the Appendix of the *z/VM Installation Guide*. This procedure includes performing the following:

- Prepare the USER DIRECT file for the new items to be loaded
- Run the INSTALL EXEC.
- Follow the procedures in "Set Up APPC" on page 53 and "Set Up OSA/SF" on page 54.
- Optionally, set up the OSA/SF GUI. See "Setting up an OSA/SF GUI" on page 71.

OSA/SF installation creates five user ID entries in the z/VM CP system directory:

OSASF
The OSA/SF server ID, supporting the OSA/SF console.

OSAMAINT
Collects debug data. Traces and dumps are sent to this ID.

OSADMIN1 through OSADMIN3
User IDs allowing communication with OSA/SF server for REXX commands.

Define OSA/SF to a z/VM Guest Environment

OSA/SF can run on a z/VM, OS/390, z/OS, or VSE guest system of a z/VM host. Figure 27 shows OSA/SF defined to a z/VM host and a z/VM guest system set up with an OSA/SF REXX command interface and an OSA/SF GUI interface:

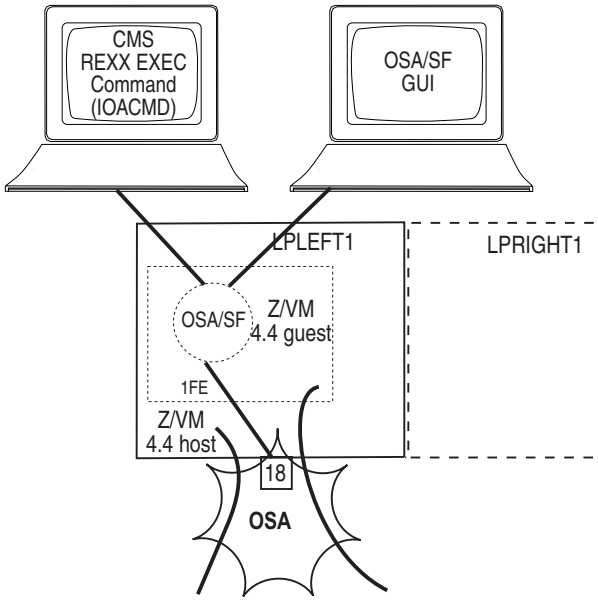

Figure 27. OSA/SF on a z/VM guest system in a z/VM Environment

When OSA/SF is running on a z/VM guest system image, you must define the OSA to the host z/VM system image as follows:

- Specify the same unit address for the guest and host systems for each device number that is required for the mode.
- Specify the same device number for OSA/SF in the guest and in the host. By definition, this must have X'FE' as its unit address. For a VSE guest, 3–digit addresses are supported.

An exception to these rules occurs if an OS/390 or z/OS system image is the guest. In that case, you can remap the channel path and device definitions.

Set Up APPC

APPC is used to pass commands from the requestor virtual machine (OSADMINx userid) to the server virtual (OSA/SF) machine and to send the results back.

The requestor ID and the server ID must be in the same z/VM system (or image).

Do the following to set up the APPC communications:

1. Verify the following directory entry for the server virtual machine (OSA/SF):
   IUCV ALLOW - See *Planning and Administration Guide* in z/VM library.
2. Verify the following entries for the PROFILE EXEC file of the server virtual machine (OSA/SF):

SET SERVER ON
SET FULLSCREEN OFF
SET AUTOREAD OFF

3. Verify the following in the global search order during the LOAD/GENMOD phase.
   - DMSSVM5
   - VMLIB
   - CMSSAA
   - COMMTXT - only if using TCP/IP
   - SCEELKED
   - SCEERUN
4. For the server virtual machine (OSA/SF), create a names file called **$SERVER$ NAMES** and add the following entries:

```
:nick.IOASERV :list.OSADMIN1
                  OSADMIN2
                  OSADMIN3
              :module.IOACMAIN
```

5. For the requestor virtual machines, OSADMIN1 through OSADMIN3, update a names file called **UCOMDIR NAMES** and add the following entries:

```
:nick.IOASERVR :luname.*USERID OSASF
               :tpn.IOASERV
```

   Attention: ***USERID** is a keyword; type it in exactly as shown. Do not substitute a userid in its place. `OSASF` is a variable. You can change it to something other than OSASF.

Set Up OSA/SF

Figure 28 on page 55 describes the steps to set up the OSA/SF on a z/VM system:

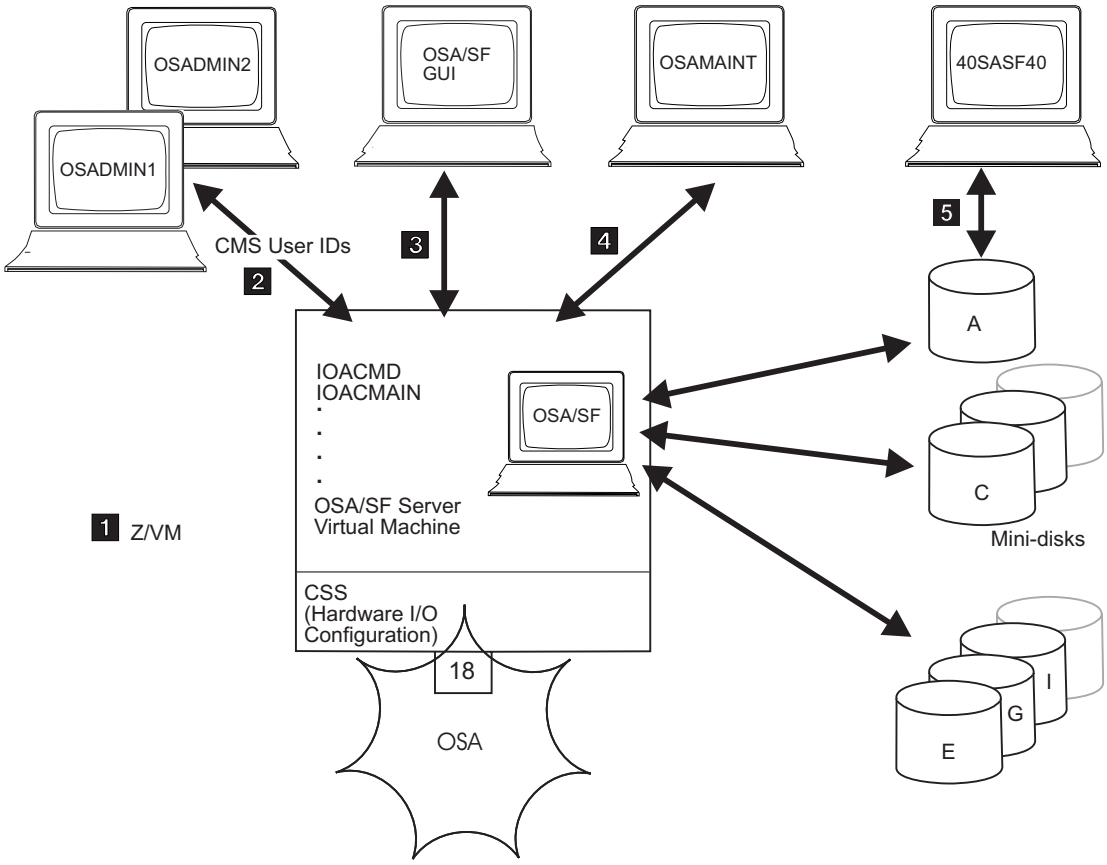

Figure 28. Setup Tasks for OSA/SF in the VM Environment

1 In a VM environment, assign the OSASF user ID to run the OSA/SF server virtual machine. OSA/SF for VM is shipped with a sample $SERVER$ NAMES file that contains this default user ID.

Note: In an ISFC environment where different OSA devices are installed on individual member systems, the OSASF server for each real system should be identified with a unique user ID. This requires changing the OSASF user ID in the CP directory and updating the UCOMDIR NAMES file on each OSADMINx ID to reflect the new ID in the .luname field.

If an OSA-Express is running in SNA mode and you want to ensure that alerts are always recorded on OSASF, make sure the following steps are taken.

- The OSASF server machine is added to the autolog list of VMs brought up during system IPL.
- The PROFILE EXEC on OSASF must have the following two lines edited in:

  ```
  'LOADMOD  IOACMAIN'
  'START'
  ```

- Make the OSASF virtual machine exempt from inactivity forcing in a manner similar to PVM and RSCS.

2 To set up a CMS user ID that can access OSA/SF, you must set up the server machine in the CMS user ID's UCOMDIR NAMES file. You must also add the CMS user ID in the OSASF $SERVER$ NAMES file. An example is shown below. For more information, see the VM books listed in the bibliography.

- To set up the UCOMDIR NAMES file of CMS user ID ***OSADMIN1*** to contain the nickname of the OSA/SF service machine:

```
:nick.IOASERV :luname.*userid OSASF
              :tpn.IOASERV
```

- Conversely, to add the CMS user ID ***OSADMIN1*** in the OSA/SF $SERVER$ NAMES file:

```
 :nick.IOASERV :list.OSADMIN1
             :module.IOACMAIN
```

For information about setting up IOACMD EXEC for the OSA/SF REXX command interface, see "Setting up the REXX Command Interface for z/VM" on page 68.

3 Ensure that the TCP/IP communications protocol is established with the platform on which OSA/SF GUI is to run, and download the OSA/SF GUI files. See "Setting up an OSA/SF GUI" on page 71.

For information on how to establish a communications protocol using an OSA in the SNA mode, refer to *VM/ESA: Open Systems Adapter Support Facility,* which is listed in the bibliography.

4 Assign OSAMAINT as the CMS user ID to which OSA/SF for VM sends its dumps and trace records. Do not change this ID.

5 At installation, establish a user ID to download data, including PTFs, to the disks that OSA/SF for VM uses. The default ID is ***40SASF40***.

C Allocate 1 minidisk to represent each OSA that is defined to the CPC where OSA/SF for VM will run.

- Allocate 5 cylinders (any model 3390 DASD) for each minidisk, and define it as ***70****cc*, replacing *cc* with the OSA-Express CHPID. Get the OSA CHPID from the *Placement Report* or *CHPID Report* produced by the IBM Configuration (CFSYSTEM) or the *Systems Assurance Product Review*, which may be available from your OSA marketing representative.
- If the OSA-Express channel path is defined as being shared among logical partitions, define the minidisks on Cross System Extensions (CSE) DASD.
- If an error has occurred in allocating the OSA minidisk, OSA/SF places an error message in the OSASF error log, which can be handled in accordance with general OSA/SF procedures.

A **E** **G** **I**
Allocate additional space for, for example, the (A) OSASF's A disk, (B) OSA/SF production files, (G) cross-partition files, and (I) OSA/SF images. Refer to the OSA/SF for VM program directory for the number of cylinders needed.

Decide whether to Specify RMCHINFO

You can use the RMCHINFO in the OPTION Directory Control statement to authorize the host virtual machine. Consider the following conditions to determine whether to specify the option:

- If you are running on a VM system, specify RMCHINFO.
- If you are running as a guest system on z/VM, do not specify RMCHINFO. You see only those devices that are attached to the guest system. Use the z/VM ATTACH command on the guest system.

Controlling Access to OSA/SF for z/VM

OSA/SF uses the System Authorization Facility (SAF) interface to let you optionally control user access to its commands. In the following OSA-specific planning information, RACF is assumed but any security product that uses the RACROUTE interface can be used. (If the security product is installed, OSA/SF assumes it is active.) For more information on RACF, refer to the manuals listed in the bibliography (page xii).

If no security product is present, the `RPIUCMS INIT` line in the OSASF userid PROFILE EXEC should be commented out.

If OSA/SF for z/VM is being used, authorize OSA/SF (OSASF user ID) to issue RACROUTE requirements as indicated in the following list.

1. Update the CP directory entry for the OSASF user ID to include an inter-user communication vehicle (IUCV) line that allows communications with the RACF service machine. Use either ANY or the name of the RACF z/VM server machine.

   `IUCV` *any* or *racf_server_machine* `PRIORITY MSGLIMIT 255`
2. If not already defined, define a profile with the name ICHCONN in the class Facility:

   ```
   RAC RDEFINE FACILITY ICHCONN UACC(NONE)
   ```
3. Authorize OSA/SF to issue RACROUTE requests:

   ```
   RAC  PERMIT ICHCONN CLASS(FACILITY) ID(OSASF) ACCESS(UPDATE)
   ```
4. If the Facility class is not active, activate it:

   ```
   RAC SETROPTS CLASSACT(FACILITY)
   ```

OSA/SF supports the None, Read, Update, and Control RACF levels of authority. The minimum authority level that is required for each command is listed in the next table. The ***Configure OSA*** command, not listed below, uses the **Query**, **Get File**, **Put File**, **Start Managing** and **Install** commands. Although CONFIGURE OSA does not require RACF authority, many of the commands it uses do. Providing authority for all the commands in the table will assist with any problem determination in the future.

Table 1. Level of Authority Required for OSA/SF Commands on z/VM

Command	Task	RACF Facility	Level
Clear Debug	Clear the OSA/SF message log.	IOA.CLEAR.DEBUG	Control
Get Config	Get the configuration data for any OSA-Express feature . This command can only be issued through IOACMD at the CMS command line.	IOA.GET.CONFIG	Read
Get Debug	Get the OSA/SF log of IOA messages and OSA/SF trace table. From the OSA CHPID, get a memory dump, SNA traces, and SNA message log.	IOA.GET.DEBUG	Read
N/A	Internal command to get a file.	IOA.GET.FILE	Control

Table 1. Level of Authority Required for OSA/SF Commands on z/VM (continued)

Command	Task	RACF Facility	Level
Get Table	Get the entries of an OSA Address Table (OAT). This command can be issued only through IOACMD at the CMS command line.	IOA.GET.TABLE	Read
Install	Install, activate an OSA mode configuration already set up by OSA/SF.	IOA.INSTALL	Control
N/A	Internal command to get a file.	IOA.GET.FILE	Control
Put Table with Force	Update and store an OSA-2 OAT disregarding whether an entry is in use. This command can be issued only through IOACMD at the CMS command line.	IOA.PUT.TABLE	Control
Put Table without Force	Update and store an OSA-2 OAT only if an entry is not in use. This command can be issued only through IOACMD at the CMS command line.	IOA.PUT.TABLE	Update
Query	Get data about an OSA, OSA/SF, and/or active OSA modes on an OSA.	IOA.QUERY	Read
Set Parameters	Set the OSA LAN port parameters that are settable with OSA/SF.	IOA.SET.PARAMETERS	Control
Shutdown	Shuts the OSA/SF virtual server machine down, releases all OSA/SF resources, and logs the OSA/SF server virtual machine off. The OSA/SF server virtual machine is automatically restarted by any subsequent OSA/SF command. This command can only be issued through IOACMD at the CMS command line.	IOA.SHUTDOWN	Control
Start Managing	Start managing an OSA.	IOA.START.MANAGING	Update
Stop Managing	Stop managing an OSA	IOA.STOP.MANAGING	Update

Some Examples of RACF Profile Definitions

When defining a RACF profile generically or for an individual OSA/SF command, use the RACF RDEF command with a class of FACILITY. Enter the fully qualified facility name, starting with the characters IOA and using periods as separators, as shown in the following examples. For more information on the RACF commands, see the RACF commands books listed in the bibliography (page xii).

- To define a profile for an individual OSA/SF command, for example, the Get Table command to read an OAT, enter: **RDEF FACILITY IOA.GET.TABLE**
- To define a profile to allow user IDs to enter this command, enter:
  RDEF FACILITY IOA.GET.TABLE UACC(READ)
- To allow the use of generics for a class of service facility, enter: **SETROPTS GENERIC FACILITY**
- To prevent unauthorized use of OSA/SF commands, enter: **RDEF FACILITY IOA.* UACC(NONE)** If you have already prohibited all user IDs from using OSA/SF commands, you must explicitly assign RACF authorization to allow designated user IDs to enter an OSA/SF command.

Some Examples of RACF Authorization Assignments

Enter the RACF PERMIT command and its parameters. The profile parameter, for example, IOA.GET.TABLE or *, determines the authorization level of the user ID

identified in the ID parameter. (The Access parameter identifies the authorization given. You can use an asterisk to designate a generic class on the PERMIT parameters.)

- To allow all users to send all commands that require the Read authority, enter:

  ```
  PERMIT IOA.* ACCESS(READ) CLASS(FACILITY) ID(*)
  ```

- To assign authorization by Access level, for example, to authorize user ID NAMEROW to access the Control level, enter:

  ```
  PERMIT IOA.* ACCESS(CONTROL) CLASS(FACILITY) ID(NAMEROW)
  ```

  And, to authorize another user (SALLY) to enter all commands that require the update authorization, enter:

  ```
  PERMIT IOA.* ACCESS(UPDATE) CLASS(FACILITY) ID(SALLY)
  ```

- To assign authorization by specific OSA/SF commands, for example, to authorize all user IDs to enter the Get Table command, enter:

  ```
  PERMIT IOA.GET.TABLE ACCESS(READ) CLASS(FACILITY) ID(*)
  ```

- To authorize ID TESTER to enter any command requiring the Update control option, enter:

  ```
  PERMIT IOA.* ACCESS(UPDATE) CLASS(FACILITY) ID(TESTER)
  ```

- To authorize a specific profile name, for example, to authorize user ID TEST to enter the Put Table command with or without the Force option, enter:

  ```
  PERMIT IOA.PUT.TABLE ACCESS(CONTROL) CLASS(FACILITY) ID(TEST)
  ```

Notes on Handling Problems with OSA/SF

Handling problems with OSA/SF follows the system procedures generally used for a z/VM facility. However, OSA/SF can also display OSA-related data, such as messages and dumps that are specific to OSA/SF operations. It sends this data to the OSAMAINT ID that you have set up.

- If a problem seems to have occurred, make sure the managing OSA/SF is identified (page 51).

  If OSA/SF GUI is being used, this can be done by clicking on the OSA/SF host icon and having the statistics notebook page displayed. A CMS user ID can issue the Query command.

- In an ISFC environment where different OSA devices are installed on individual member systems, the OSASF server for each real system should be identified with a unique user ID. This requires changing the OSASF user ID in the CP directory and updating the UCOMDIR NAMES file on each OSADMINx ID to reflect the new ID in the .luname field.

- Check for OSA/SF messages, which are in the format of IOA*xyyyz*, where *x* denotes the OSA/SF component, *yyy* is the sequence number and *z* signifies the severity of the condition.

  These messages are stored in the OSA/SF message log together with the OSA/SF commands and responses that have been issued. You can get the IOA messages with the OSA/SF Get Debug command.

- Tracing is a default operation for OSA/SF. You can, therefore, get the trace log by using the Get Debug command and specifying Trace log.

- Dumps are automatically executed when abends occur. After the dump completes, the OSA/SF server logs off. The next OSA/SF command results in an autolog and restart by the OSA/SF server.

Deciding which OSA/SF Interface to Use

If you prefer line commands, use the OSA/SF REXX command interface to enter commands that allow you to manage an OSA. Complete the setup information for the REXX command interface in “Setting Up the REXX Command Interface” on page 67.

If you prefer a workstation interface, use the OSA/SF GUI.Complete the setup information for the OSA/SF GUI, including TCP/IP setup in “Setting up an OSA/SF GUI” on page 71.

Chapter 5. Setting Up OSA/SF on VSE/ESA

OSA/SF for VSE/ESA Version 2 Release 6 or later is required for this setup procedure.

Before you can configure and manage an OSA, you must set up OSA/SF and a user interface of your choice. This chapter provides instructions for:

- Setting up OSA/SF on the server (VSE)
- Setting up a command interface (REXX EXEC - IOACMD)
- Installing and setting up a Java-based graphical user interface (Windows)

For information about setting up and using the command interface (REXX EXEC - IOACMD) and the GUI for OSA/SF, see Chapter 6, “Setting up and Using the OSA/SF Interfaces”, on page 67.

If you are running OSA/SF in an OS/390 or z/OS environment, see Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37.

If you are running OSA/SF in a VM environment, see Chapter 4, “Setting Up OSA/SF on z/VM”, on page 51.

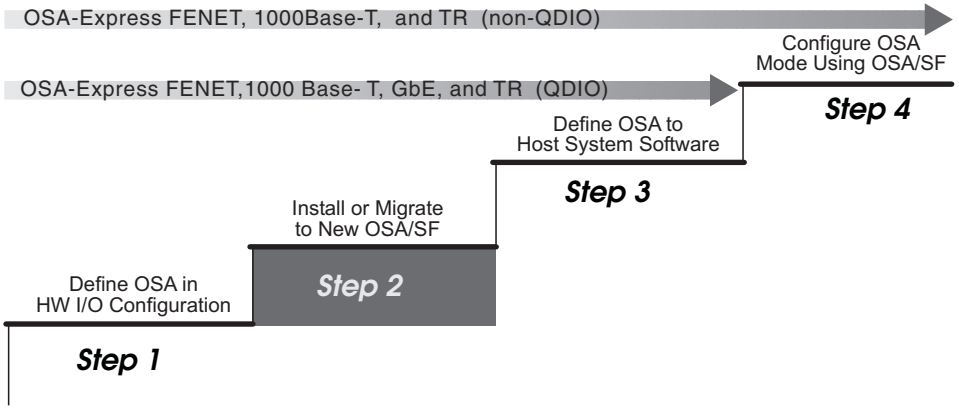

Figure 29. Step Two (VSE) in a Four-Step Process

Choosing the OSA Modes

Determine which OSA modes (non-QDIO or QDIO) to use for each OSA. This decision underlies all of the remaining setup tasks and whether you need to use OSA/SF:

- TCP/IP Passthru that uses the default OAT for a non-QDIO OSA-Express feature (OSE channel) does not require OSA/SF.
- Any other non-QDIO OSA-Express feature (OSE channel) requires OSA/SF to configure the OSA.
- Any QDIO OSA-Express feature (OSD channel) does not require OSA/SF.

OSA/SF and the VSE Environment

Ensure the system pre- and co-requisites are met for hardware and software in a VSE environment. These are listed on page 21.

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These are the high level tasks to set up OSA/SF. The detailed instructions follow the list.

1. Define the partitions for the three OSA/SF jobs.
2. Create a working sublibrary (PRD2.OSASF) for OSA/SF.
3. Submit the following jobs in this order: IOAINX, IOAMAIN, IOACMD.

Note: If you are running VSE/ESA as a guest system on z/VM, do not specify the RMCHINFO option in the VM OPTION Directory Control statement. You see only those devices that are attached to the guest system. Use the z/VM ATTACH command on the guest system.

Define the Partition for OSA/SF Jobs

The following three OSA/SF jobs will run in either a static or dynamic VSE/ESA partition.

1. Use the following as a guideline to define the partition for each job. Write down the partition for use later.
   - IOAMAIN Partition ____
   - IOACMD Partition ____
   - IOAHRUN Partition ____

The minimum sizes of the partitions are as follows:

OSA/SF Job	(VSE/ESA Partition) Allocate	Size	Comments
IOAMAIN	9.0MB	600KB	Depends on the number of OSAs installed. 9M should support a max configuration
IOACMD	8.5MB	1.1MB	Command EXEC
IOAHRUN	2.5MB	200KB	Started by the system when the GUI is started.

Figure 30. OSA/SF Jobs

You will copy the OSA/SF jobs in the following instructions. You do not have to create the job for IOAHRUN, but the partition class is required when the GUI is started and communicates to IOAMAIN. IOAHRUN is the job that runs for IOAXHSRV.

Create the Working Sublibrary (PRD2.OSASF) for OSA/SF

Use the following sample job to create the PRD2.OSASF sublibrary.

```
* $$ JOB JNM=DEFINE,CLASS=0,DISP=D
// JOB DEFINE IBM SUGGESTED OSA/SF WORKING SUBLIBRARY
// EXEC LIBR
 DEFINE S=PRD2.OSASF  REUSE=IMMEDIATE
/*
/&
* $$ EOJ
```

Figure 31. Job to Create PRD2.OSASF

Copy the Skeleton Job for the Master Index (IOAINX)

1. Copy member **IOAINX** from ICCF library 59 into a private ICCF library.

Note: A permanent copy of this member is stored in the installation library as member IOAINX.Z. The permanent copy is not an exact copy of the ICCF member and it cannot be used without modification. To use it, change all the statements that start with two periods as shown in the following example:

These changes are done for you during installation for the library 59 members.

```
..$$  Change To  $$
../*    "     "  /*
../&    "     "  /&
```

2. If required, update the host sublibrary names that start in column 1 to match your specific environment. The names in the member must all start in column one. All the IOA_xxx must be in column 56.

   Note: Beginning with VSE/ESA Version 2 Release 4, the TCP/IP and SNA, images are located in PRD1.BASE rather than in PRD2.PROD.

```
* $$ JOB JNM=IOAINX,CLASS=0,DISP=D
// JOB IOAINX
* This JOB catalogs the OSA/SF Master Index into the OSA/SF Data
* library (PRD2.OSASF is assumed to be the OSA/SF Data library).
// EXEC LIBR
ACC S=PRD2.OSASF
CATALOG xxxxxx.IOAINX     EOD=/H          REPLACE=YES
*********************************************************************************
* <-- Start entries in columns 1 and 56... -->         *
*********************************************************************************
*        PRODUCT(00:TCP/IP Passthru V1R1M0)
*********************************************************************************
DD:PRD1.BASE(IOBNULL2.0)                                IOA_NULL_IMAGE1
*********************************************************************************
*        PRODUCT(50:SNA V1R1M0)
*********************************************************************************
DD:PRD1.BASE(IOBSNA2.0)                                 IOA_SNA_IMAGE1
DD:PRD1.BASE(IOBSNAFE.0)                                IOA_SNA_IMAGEF
/*
/&
*$$ EOJ
```

Figure 32. Master Index

3. Store the member in PRD2.OSASF.xxxxx.IOAINX, replacing xxxxx with the member name you plan to specify in the next step.

Copy the Skeleton Job for IOAMAIN

1. Copy member **IOAMAIN** from ICCF library 59 into a private ICCF library.

   Note: Beginning with VSE/ESA Version 2 Release 4, the OSA/SF modules are located in PRD1.BASE rather than in PRD2.PROD.

```
* $$ JOB JNM=IOAMAIN,CLASS=x,DISP=L
// JOB IOAMAIN
* THIS JOB SAMPLE ASSUMES: OSA/SF CODE LIBRARY.. PRD1.BASE (PRD2.PROD in VSE 2.3)
*                          OSA/SF DATA LIBRARY.. PRD2.OSASF
*                          C-RUNTIME LIBRARY.... PRD2.SCEEBASE
                           Netview.............. PRD1.BASE
* If this does not match your environment, please change the
* statements below accordingly.
// SETPFIX LIMIT=100K,PERM
// LIBDEF *,SEARCH=(PRD1.BASE,PRD2.SCEEBASE)
// EXEC PGM=IOAMAIN,SIZE=IOAMAIN,PARM='PRD2.OSASF(XXXXX)'
/*
/&
* $$ EOJ
```

Figure 33. IOAMAIN Job

2. Modify the JCL according to the comments in the job.

   The EXEC statement must be modified to replace the ***XXXXX*** with a member name for the OSA/SF data sets. One choice for member name might be the LP name OSA/SF is running on. The member name you specify will become the prefix for members used by OSA/SF. Some of the members OSA/SF uses are the following:
   - XXXXX.IOAINX - Master Index (See Figure 32 on page 63)
   - XXXXX.IOACFG
   - XXXXX.IOAMSGXX

   Note: IOACFG and IOAMSGXX are set up and used by OSA/SF. You do not have to do anything with these members.

   We suggest that you use **PRD2.OSASF** as the sublibrary. PRD2.OSASF will be used in the remainder of these instructions. Write down the member name you choose as the prefix for OSA/SF members.

   PRD2.OSASF._____.***member type***
3. Submit the job to the VSE/POWER RDR queue. Do not release the job yet.

Copy the Skeleton Job for IOACMD

Job IOACMD is used to enter OSA/SF commands from JCL. If you plan to only use OSA/SF GUI, continue at “Move the Jobs into the Power RDR Queue” on page 65.

1. Copy member **IOACMD** from ICCF library 59 into a private ICCF library.

   We recommend you set up the job as it is shown in the figure. Only one EXEC REXX=IOACMD line should be included. The other two lines that start with an asterisk are shown as an example of other ways to use the EXEC. Submitting the job as shown in the figure will always show you a list of OSA/SF commands and prompt you to enter one. This is the preferred method.

   This example will also store the IOACMD debug files into sublibrary PRD2.OSASF. The first parameter must specify a library and sublibrary for the debug files. If you choose to use a different location, write it down for future reference and change the JCL accordingly.

   Note: Beginning with VSE/ESA Version 2 Release 4, the OSA/SF modules are located in PRD1.BASE rather than in PRD2.PROD.

   ```
   Sublibrary for IOACMD Debug Data _____________________________
   ```

```
// JOB IOACMD
// OPTION NODUMP
// LIBDEF *,SEARCH=(OSA.JMF,PRD2.PROD,PRD2.SCEEBASE)
// EXEC PROC=LIBDEF
*  LIBLIST PHASE,*     ,list where members are that its finding
*  EXEC REXX=IOACMD,PARM='OSA.JMF'               SIZE=1000K
*  EXEC REXX=IOACMD,PARM='OSA.JMF GET_OAT 78 osa.vse.joel.oat'
// EXEC REXX=IOACMD,PARM='OSA.JMF GET_OAT    FC                        C
              OSA.JMF.OAT.CHPFC'
*  Continuation chars MUST start in column 16
// EXEC LISTLOG
/*
/&
```

Figure 34. IOACMD Job

2. Submit the job to the VSE/POWER reader queue. Do not release the job yet.

Move the Jobs into the Power RDR Queue

Run the jobs to set up and start OSA/SF. Release job IOAINX and then release job IOAMAIN. If you are not using the OSA/SF GUI, you will need to release job IOACMD as required.

What To Do Next

If you are going to use the OSA/SF GUI, continue at “Using the OSA/SF GUI” on page 78.

If you are not going to use the GUI, continue at “Using the REXX Command Interface to Configure OSA-Express CHPIDs” on page 98.

VSE/ESA Running as a Guest of VM

If VSE/ESA is running under VM and only the current image has the OSA online, the support element (SE) functions of the hardware management console (HMC) are not required to reset the OSA. Use the following vary commands:

```
VARY OFFLINE CHPID nn FORCE
VARY ONLINE  CHPID nn
```

Consider the following precautions:

1. Stop all VTAM nets (XCA and SWNET) that pertain to the OSA if any are active.
2. Then **OFFLINE *cua*** for each device on the OSA (CHPID) from VSE/ESA.
3. Either **DET *cua*** from the guest for each device on the OSA (CHPID) or use the FORCE on the VM VARY OFFLINE command.
4. VARY OFFLINE CHPID nn FORCE
5. VARY ONLINE CHPID nn (WAIT for devices to come online to VM.)
6. ATT cua TO vse_guest for each CUA (or ATT cua1-cuan to vse_guest)
7. Then **ONLINE *cua*** each and every cua from VSE/ESA
8. Restart VTAM nets.

Stopping OSA/SF

Issue the following command from the VSE/ESA operator command line to stop OSA/SF:

```
CANCEL xx,NODUMP
```

Where xx is the VSE/ESA partition where OSASF (job IOAMAIN) is running.

Chapter 6. Setting up and Using the OSA/SF Interfaces

You can use two interfaces to configure and manage OSA-Express features:

- REXX command interface (IOACMD EXEC). See “Setting Up the REXX Command Interface” and “Using the IOACMD EXEC Interface” on page 69.
- OSA/SF Graphical User Interface (GUI) (Java-based application). See “Setting up an OSA/SF GUI” on page 71 and “Using the OSA/SF GUI” on page 78.

The REXX command interface (IOACMD EXEC) allows you to enter commands from the host system to manage an OSA. For information about the commands, including parameter descriptions and examples, see Chapter 13, “OSA/SF Commands for REXX”, on page 141.

The OSA/SF GUI offers the advantages of a graphical application that runs on a Windows or Linux platform at a programmable workstation. It provides interactive function panels with pull-down menus and online help panels. You can set up and start multiple OSA/SF GUI sessions on the workstation, but you must log on to each image through the GUI host window.

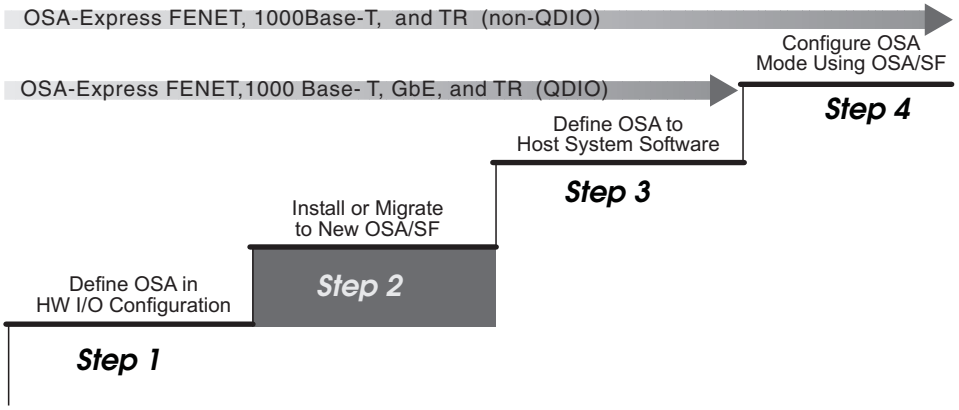

Figure 35. Step Two (for all operating systems) in a Four-Step Process

Setting Up the REXX Command Interface

Use the following instructions to set up the REXX command interface (IOACMD EXEC) for OSA/SF:

- “Setting up the REXX Command Interface for OS/390, z/OS, and z/OS.e” on page 68
- “Setting up the REXX Command Interface for z/VM” on page 68
- “Setting up the REXX Command Interface for VSE” on page 68

If you plan to use the OSA/SF GUI, see “Setting up an OSA/SF GUI” on page 71.

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Setting up the REXX Command Interface for OS/390, z/OS, and z/OS.e

Before Starting

- You can copy the EXEC into a local CLIST or EXEC data set that is allocated to //SYSPROC DD of a TSO logon proc.
- During installation of OSA/SF, the program directory gave the installer the option of making the OSA/SF program library accessible either by the LNKLSTxx, or by including the OSA/SF program library (SIOALMOD) in a STEPLIB of the OSA/SF startup proc. If the SIOALMOD library was not put in LNKLSTxx and a STEPLIB was used instead, you must also place the SIOALMOD library in a STEPLIB within the users TSO logon proc in order for the TSO user to have access to the OSA/SF code.

Do the following to set up the REXX command interface (IOACMD EXEC) that you can use from TSO or the Ready prompt to enter OSA/SF commands.

__ 1. Allocate a data set for the IOACMD.EXEC, requesting primary space of 350 blocks with secondary space of 35 blocks. The attributes of this data set should be: RECFM=FB, LRECL=80, and BLKSIZE=5120.

Fully-qualified data set name for IOACMD.EXEC

_____

__ 2. Copy the EXEC from **IOA.SIOASAMP** library member **IOACMD**.

IOACMD is used to enter OSA/SF commands from TSO or a Ready prompt. Two data sets are written each time the command is entered, one for input, the other for output. These data sets are used for problem determination by IBM. The data sets are cataloged using the userid that issued the command as the high-level qualifier. If you wish to use a different high level qualifier, a note at the beginning of the EXEC contains information for changing the high-level qualifier of the data sets. This is just for your awareness. You do not have to do anything with these data sets.

Setting up the REXX Command Interface for z/VM

After the install process described in “Set Up OSA/SF” on page 54, place the IOACMD EXEC on the 2B2 disk.

Setting up the REXX Command Interface for VSE

Copy the Skeleton Job for IOACMD. Job IOACMD is used to enter OSA/SF commands from JCL.

1. Copy member **IOACMD** from ICCF library 59 into a private ICCF library.

   Sset up the job as it is shown in the figure. Only one EXEC REXX=IOACMD line should be included. The other two lines that start with an asterisk are shown as an example of other ways to use the EXEC. Submitting the job as shown in the figure will always show you a list of OSA/SF commands and prompt you to enter one. This is the preferred method.

   This example will also store the IOACMD debug files into sublibrary PRD2.OSASF. The first parameter must specify a library and sublibrary for the debug files. If you choose to use a different location, write it down for future reference and change the JCL accordingly.

```
// JOB IOACMD
// OPTION NODUMP
// LIBDEF *,SEARCH=(PRD2.OSASF,PRD1.BASE,PRD2.SCEEBASE)
// EXEC PROC=LIBDEF
*  LIBLIST PHASE,*     ,list where members are that its finding
*  EXEC REXX=IOACMD,PARM='PRD2.OSASF'          SIZE=1000K
*  EXEC REXX=IOACMD,PARM='PRD2.OSASF GET_OAT 78 osa.vse.joel.oat'
// EXEC REXX=IOACMD,PARM='PRD2.OSASF GET_OAT    FC       C
              OSA.JMF.OAT.CHPFC'
*  Continuation chars MUST start in column 16
// EXEC LISTLOG
/*
/&
```

Figure 36. IOACMD Job

2. Submit the job to the VSE/POWER reader queue.
3. Ensure that you have released jobs IOAINX and IOMAIN. For information, see “Move the Jobs into the Power RDR Queue” on page 65. Release job IOCMD.

Using the IOACMD EXEC Interface

When you have set up the IOACMD EXEC command line interface to OSA/SF, you can use the interface with any operating system OSA/SF supports.

There are four ways to use the EXEC:

- Full prompting
- Command prompting by the IOACMD EXEC
- Entering parameters without prompting
- Starting the IOACMD EXEC and asking for help

Full Prompting

If you enter the following, the EXEC will show you a list of the OSA/SF commands and prompt you for the command and parameters.

In OS/390, z/OS, or z/OS.e:

```
EX 'IOACMD.EXEC' EXEC
```

In VM:

```
IOACMD
```

In VSE:

```
// EXEC REXX=IOACMD PARM='PRD2.OSASF',SIZE=1100K
```

Command Prompting by the IOACMD EXEC

Enter the name of the EXEC and the OSA/SF command with no parameters. The EXEC then prompts for all the parameters needed. Help messages, when available for some of the parameters, are displayed.

After you enter the parameters, the EXEC processes the command and parameters. The data is used to generate the proper input needed by OSA/SF. The results are then put in the specified file or data set, and in some cases, displayed.

In OS/390, z/OS, or z/OS.e:

```
EX 'IOACMD.EXEC' 'GET_OSA_ADDRESS_TABLE' EXEC
```

In VM:

```
IOACMD GET_OSA_ADDRESS_TABLE
```

In VSE:

```
// EXEC REXX=IOACMD PARM='PRD2.OSASF GET_OSA_ADDRESS_TABLE',SIZE=1100K
```

In this example you are requesting the OAT from an OSA. You are prompted for the CHPID and data set or filename.

Entering Parameters without Prompting

Enter the name of the exec followed by the OSA/SF command and parameters. Some commands require a data set name or filename to be specified. The results are put in the specified data set or file, and, for some commands, displayed.

In OS/390, z/OS, or z/OS.e:

```
EX 'IOACMD.EXEC' 'GET_OSA_ADDRESS_TABLE 4b userid.getaddr' EXEC
```

In VM:

```
IOACMD GET_OSA_ADDRESS_TABLE 4b userid getaddr
```

In VSE:

```
// EXEC REXX=IOACMD PARM='PRD2.OSASF GET_OSA_ADDRESS_TABLE 4b PRD2.OSASF.userid.getaddr',SIZE=1100K
```

where:

- **GET_OSA_ADDRESS_TABLE** is the command.
- **4b** is the CHPID parameter **userid.getaddr** is the data set name parameter for OS/390, z/OS, z/OS.e, VSE.
- **userid getaddr** is the `filename filetype` parameter for VM.

Starting the IOACMD EXEC and Asking for Help

Enter the name of the EXEC followed by **HELP**. This displays a list of all the OSA/SF commands. You can then enter the name of the EXEC with the command name and the EXEC will prompt you for parameters.

You can also get help for a specific command by entering the command name.

In OS/390, z/OS, or z/OS.e:

```
EX 'IOACMD.EXEC' 'HELP QUERY' EXEC
```

In VM:

```
IOACMD HELP QUERY
```

In VSE:

```
// EXEC REXX=IOACMD PARM='PRD2.OSASF HELP QUERY', SIZE=1100K
```

This example shows you the parameters for the Query command.

For More on IOACMD

To see how to change MAC addresses using IOACMD, see page 116.

For syntax and usage information on all IOACMD parameters, see Chapter 13, “OSA/SF Commands for REXX”, on page 141.

Setting up an OSA/SF GUI

Perform the steps described in these topics:

- "Customize a TCP/IP Connection"
- "Download and Install the Java Runtime and JavaHelp[tm] Files" on page 74
- "Download the IOAJAVA GUI Code and Define the CLASSPATH Environment Variable" on page 75

Customize a TCP/IP Connection

If you plan to use the OSA/SF GUI, use the following section to set up the connection from the workstation to the server running OSA/SF. The OSA/SF GUI uses TCP/IP to connect to OSA/SF. To enable the connection, you must start an OSA/SF TCP/IP server (IOASRV). Information for the appropriate host system is provided as follows:

- "Customize a TCP/IP Connection for OS/390, z/OS, or z/OS.e"
- "Customize a TCP/IP Connection for z/VM" on page 73
- "Customize a TCP/IP Connection for VSE" on page 74

Customize a TCP/IP Connection for OS/390, z/OS, or z/OS.e

If you plan to use the OSA/SF GUI, use the following section to set up the connection from the workstation to the server running OSA/SF. The OSA/SF GUI uses TCP/IP to connect to OSA/SF. To enable the connection, you must start an OSA/SF TCP/IP server (IOASRV). Although the user does not directly log on to a TSO/E user ID, access to a valid system user ID and password is required for this connection. The TCP/IP server uses the user ID and password to verify that the user has authorization to access the OS/390 OSA/SF server resources.

Assumptions

- TCP/IP is installed on OS/390, z/OS, or z/OS.e.
- Workstation-to-server connection is available

  Note: Either do not use the Open Systems Adapter for this connection, or have at least one connection through two different OSA cards for redundancy purposes.
- You know the server TCP/IP Name or IP address.

__ 1. Create IOASRV procedure member in SYS1.PROCLIB(IOASRV). IOASRV is the TCP/IP server (daemon) that TCP/IP starts and allows the workstation to communicate with the OSA/SF server program. A sample IOASRV.PROC can be found in IOA.SIOASAMP. (In Figure 37 on page 72, PARM=2000 specifies the port number 2000; you can specify a different unused port number.)

```
//*
//*   Sample TCP/IP Server Proc
//*
//SERVER   PROC
//SERVER   EXEC PGM=IOAXTSRV,PARM=2000,REGION=2M,TIME=1440
//IOALIB   DD  DSN=SYS1.SIOALMOD,DISP=SHR
//STEPLIB  DD  DSN=SYS1.SIOALMOD,DISP=SHR
//         DD  DSN=CEE.SCEERUN,DISP=SHR
//SYSPRINT DD  SYSOUT=*,DCB=(RECFM=FBA,LRECL=121,BLKSIZE=121)
//SYSUDUMP DD  SYSOUT=H
```

Figure 37. OSA/SF IOASRV Startup Procedure

__ 2. Update the TCP/IP profile.

Add IOASRV (the started procedure created in the last step) to the AUTOLOG section of the TCP/IP profile. This causes the IOASRV server (daemon) to be started whenever TCP/IP is started.
Create a TCP/IP configuration file for the TCP/IP address.

```
AUTOLOG
       IOASRV        ;OSA/SF Server
ENDAUTOLOG
```

Figure 38. AUTOLOG Section of the TCP/IP Profile

__ 3. Use the TCP/IP port number in the IOASRV started procedure to define the port number used by the OSA/SF GUI. The socket number is used to connect the GUI to TCP/IP on the server. This TCP/IP port number must also be specified at the GUI workstation as a parameter when communications are started with TCP/IP. In this example, port number 2000 is used in the IOASRV started procedure, but you can use any unused port number.

```
PORT
   .
  2000 TCP IOASRV    ; OSA/SF Server
   .
ENDPORT
```

Figure 39. TCP/IP Port Number

__ 4. Use a file, for example, *yourprefix*.TCPIP.DATA, to specify the configuration information required by the TCP/IP client programs.

- To specify the TCP server name of this system, use the HOSTNAME statement or let the name default to the node name specified in the IEFSSN*xx* PARMLIB member.

  ```
  HOSTNAME  OSASF
  ```

- Use the TCPIPJOBNAME statement to specify the member name (JOBNAME) of the procedure used to start the TCP/IP address space. If you do not specify the name and if your TCP/IP started procedure name (JOBNAME) is not the default name of TCPIP, clients will fail at startup with an irrecoverable interaddress communication error.

  ```
  TCPIPJOBNAME TCPIPSF
  ```

- Specify the DATASETPREFIX statement in *yourprefix*.TCPIP.DATA data set. The parameter in this statement, which can be up to 26 characters and must *not* end with a period, takes precedence over either the distributed or the modified data set prefix name as changed by the EZAPPRFX installation job. If this statement is used in a profile or configuration data set that is allocated to a client or server, that client or server dynamically allocates additionally required data sets using the statement's parameter value as the data set name prefix.

```
DATASETPREFIX TCPIPSF
```

__ 5. If more than one TCP/IP image is running on the server, you must distinguish which TCP/IP image is controlling the IOASRV program. To do this, take the following steps.

a. Uniquely identify the TCP/IP configuration profile data set with the following PROFILE statement:

```
//PROFILE DD DSN=yourprefix.PROFILE.TCPIP
```

in the TCP/IP startup JCL. During initialization of the TCP/IP address space, system operation and configuration parameters are read from the configuration profile data set. (See “Specify Configuration Statements in PROFILE.TCPIP” in *z/OS Communications Server: IP Configuration Guide*

b. Place the ‘//SYSTCPD DD’ statement in the TSO logon procedure and in the JCL of any client or server executed as a background procedure. The SYSTCPD statement identifies the data set to be used to obtain the parameters defined by TCPIP.DATA.

```
//SYSTCPD   DD DISP=SHR,DSN=yourprefix.TCPIP.DATA
```

c. Ensure the IOASRV member you copied from the IOA.SIOSAMP library into SYS1.PROCLIB has the ‘//SYSTCPD DD’ line in it to associate IOASRV to the specific TCP/IP image.

```
//SYSTCPD   DD  DSN=yourprefix.TCPIP.DATA,DISP=SHR
```

Customize a TCP/IP Connection for z/VM

If you plan to use the OSA/SF GUI, use these instructions and examples to set up communications between a workstation running the OSA/SF GUI and OSA/SF on the z/VM host. The connection is from the OSA/SF GUI that uses an *authorized* VM ID and then to the OSA/SF server virtual machine.

Setting Up TCP/IP: The OSA/SF GUI makes use of the TCP/IP as its communication interface method. Use either method of instructions to set up the TCP/IP communications between the OSA/SF GUI and OSA/SF on the host.

Method 1:

1. Determine which userids need to be authorized to use the GUI and provide CP Privilege Class B authority for those IDs (normally OSADMINx).
2. Verify that TCPMAINT 592 is accessed as the ’H’ disk.
3. Call **IOAXTSRV 2000** at the end of the PROFILE EXEC.

   This allows the authorized userids to connect to socket 2000.
4. Have the authorized userid **IOAXTSRV** autologged by the VM Management Resource of your installation.

Method 2:

1. Verify that **REXECD** is running on the host and the authorized userids have authorization.

   Default value for REXECD is to FORCE OFF the user if no screen activity occurs after 240 seconds. This value can be changed by the TCP/IP administrator by changing the startup profile for the REXECD server.
2. Enter the following from a Windows workstation or Linux command window to start the server:

   REXEC *hostname* -L *authorized ID* **-P *password* IOAXTSRV 2000**

When the command is entered, the ID will be autologged and receive the IOAXTSRV 2000 command. This makes it ready to accept TCP/IP communications from the workstation.

If the command is successful, the window where the command was entered will appear to be waiting for FORCE or LOGOFF of the ID.

Starting the TCP/IP Connection: Do the following to see if the TCP/IP connection is working:

1. Double-click on **OSA/SF Hosts** for the OSA/SF GUI.
2. Enter the host name, port number, user ID, and password for the *authorized* id.
3. Select the Open pushbutton.

   If the connection is successful, a **Command Output** window and a **Channels View** window will be displayed.
4. To verify the connection between the host and workstation, use the NETSTAT and PING commands.

For information about the OSA/SF **Host Open Window**, see "OSA/SF Host Open Window" on page 78.

For information about defining TCP/IP stacks for z/VM, see *TCP/IP Planning and Customization*

Customize a TCP/IP Connection for VSE

Assumptions

- TCP/IP is installed and running on the VSE Server. To enable the TCP/IP connection for VSE, you must start an OSA/SF TCP/IP Server (IOAXTSRV). A valid VSE userid is required for the TCP/IP connection.
- Workstation-to-server connection is available.
- You know the VSE Server TCP/IP Name or IP Address.

1. Copy member IOAXTSRV from ICCF library 59 into a private ICCF library. This sample specifies port number 2000, but you can use any unused port number. This port number must be used at the GUI workstation as a parameter when communications are started with OSA/SF on VSE.
2. Submit the job to the VSE/POWER RDR queue and release it from there.
3. When this job has started successfully, the VSE System is ready to receive input from the OSA/SF GUI. To verify the base TCP/IP connection between your workstation and the VSE system, use the the `ping` command.

Download and Install the Java Runtime and JavaHelp™ Files

Follow your installation's instructions for downloading the latest Java runtime files (Java 1.4 or higher) and JavaHelp™ files (JavaHelp™ 1.1.2 or higher) from the Internet. For software requirements, see "For OSA/SF" on page 24.

Download the IOAJAVA GUI Code and Define the CLASSPATH Environment Variable

When to Use These Instructions

Use these instructions after you have:

- Installed OSA/SF using the Program Directory
- Set up OSA/SF

Creating a Directory for ioajava.jar

Create a directory on your windows workstation where you can place the code for the GUI (ioajava.jar). For example, you might create the following directory:

```
osajavagui
```

For Linux, you can define a subdirectory off of the `usr` directory:

```
mkdir /usr/osajavagui
```

Download the GUI Code

The following instructions assume that you have 3270 emulator support from Personal Communications Manager/3270 on your workstation. If you do not have 3270 emulator support , you can use FTP to transfer the OSA/SF GUI data set from TSO/E to your workstation and store the files. See “Using FTP to Download the GUI Code” on page 76.

__ 1. Close the current OSA/SF GUI on your workstation.

__ 2. Establish a 3270 emulator session on the workstation. You might have to start Personal Communications/3270 if no server (host) sessions are started. To install the emulator on Linux, download the RPM file from the following website:

```
www.rpmfind.net
```

then use the following command to install the RPM:

```
rpm -ivh x3270-3.2.19-1mdk.i586.rpm
```

__ 3. For OS/390 or z/OS, log on to a TSO/E User ID that can access the member **IOAJAVA**. This member contains the OSA/SF file in the partitioned data set (PDS) `HLQ.SIOJAVA` where `HLQ` is the high-level qualifier of the data set.

For z/VM, log on to userid `osadmin1` and download the file `ioajava bin e`.

For information about VM and VSE and IOAJAVA, see the program directory.

Note: IBM supplies this PDS; if your server personnel changes the name, you need to obtain the new name and use it in place of HLQ.SIOJAVA in the following instructions.

__ 4. Position your TSO session at the READY prompt, *or* select **COMMAND** from the ISPF Primary Option Menu.

__ 5. On the menu bar of the emulator screen, select **Actions** or **Transfer**. (This might vary depending on the level of sotware you are using.) From the pull down, select **Receive Files from Host**. You get a transfer screen.

__ 6. Ensure that the following fields are set:

- For **host file name**:

  ```
  'hlq.sioajava(ioajava)'
  ```

- Specify the following names depending on whether you are downloading to Windows or Linux.

Windows: For **PC file name**:

```
c:\osajavagui\ioajava.jar
```

In this example the directory is called `osajavagui`, but you can specify your own name for the directory where the GUI code is to reside.

Linux: For **PC file name**:

```
/usr/osajavagui/ioajava.jar
```

In this example the directory is called `usr/osajavagui`, but you can specify your own name for the directory where the GUI code is to reside.

- For **transfer type**:

  ```
  binary
  ```

__ 7. Click **Receive** to transfer the file to the workstation or Linux system.

Using FTP to Download the GUI Code

If you are not using Personal Communications Manager/3270 on a workstation, you can use FTP to download the GUI code from TSO/E:

1. Ensure that TCP/IP for the OSA/SF GUI is started on the host system.
2. For z/OS, ensure that the FTP daemon is active.
3. From the Linux shell or Windows prompt, issue the following command:

   ```
   ftp IP_address
   ```

   where *IP_address* is the IP address of the TCP/IP GUI for the system
4. Logon with a valid user ID for the host system and issue the following commands. In this example for Linux, the directory is called `usr/osajavagui`, but you can specify your own name:

   ```
   lcd /usr/osajavagui
   cd 'hlq..SIOAJAVA'
   bin
   get ioajava ioajava.jar
   bye
   ```

Defining the CLASSPATH environment variable

After you have downloaded the GUI code, define the CLASSPATH environment variable for Windows or Linux.

For Windows 2000, use one of the following procedures to obtain the **Environment variables** window:

- Go to the **Control Panel**. Double click on **System** icon, then click **Advanced** tab → **Environment Variables**. See “To define the CLASSPATH environment variable for Windows 2000 or XP” on page 77.
- From a DOS command prompt, type SYSEDIT. See “Using DOS to define the CLASSPATH environment variable” on page 77.

For Windows XP, use one of the following procedures to obtain the **Environment variables** window:

- Go to the **Control Panel**. Double click on **Performance and Maintenance**, then click **System** → **Advanced Page** → **Environment Variables**. See “To define the CLASSPATH environment variable for Windows 2000 or XP” on page 77.
- From a DOS command prompt, type SYSEDIT. See“Using DOS to define the CLASSPATH environment variable” on page 77.

For **Linux**, see "To define the CLASSPATH environment variable for Linux"

To define the CLASSPATH environment variable for Windows 2000 or XP: Do the following from the **Environment variables** window:

1. On the **System variables** window, select the following variable and click **Edit**:

   `CLASSPATH`

   If you do not find CLASSPATH listed, click **New** to create it.
2. For CLASSPATH **Variable Value**, specify the directories where you have stored the Java runtime libraries, the Java help files, and the OSA/SF GUI code that you transferred. For example, you might have the following CLASSPATH definitions for **Variable Value**:

   ```
   C:\ProgramFiles\Java\jh1.1.3\javahelp\lib\jh.jar;C:\osajavagui\ioajava.jar
   ```

   If you are creating `CLASSPATH` for the first time, you need to specify the name for **Variable Name** in the window.

   Click OK on each open window to save the data and exit.

Note: Java runtime libraries need to be specified in the Windows PATH system environment variable or through the SET PATH command from a DOS window.

Using DOS to define the CLASSPATH environment variable: **For Windows 2000 or XP**: From a DOS command prompt, type SYSEDIT to display a window that includes CONFIG.SYS. Set the variable as follows in CONFIG.SYS:

`CLASSPATH=`*`directory_path`*

where *directory_path* is the location of the JavaHelp files and the ioajava.jar files. For the runtime Java files, ensure that you have defined the location as follows:

`PATH=`*`directory_path`*

where *directory_path* is the location of the Java runtime files.

You can also set CLASSPATH and PATH variables through the following DOS commands:

```
SET CLASSPATH=directory_path
SET PATH=directory_path
```

where *directory_path* is the location of the appropriate Java files. You can define or append directories to an existing string.

To define the CLASSPATH environment variable for Linux:

1. Issue an `export` command for CLASSPATH and specify the directories where you have stored the Java runtime libraries (from the PATH statement), the Java help files, and the OSA/SF GUI code that you transferred. For example, you might issue the following command with these definitions:

```
export CLASSPATH=/usr/osajavagui/ioajava.jar:/usr/java/jh1.1.3/javahelp/lib/jh.jar
```

2. To verify if the variable is set correctly, issue the following command:

   ```
   echo $CLASSPATH
   ```

You can update the .bash_profile so that you do not need to retype the export CLASSPATH command each type that you log on. You update the file depending on how you log on:

- If you log on as root, update the file in /root:

  ```
  /root/.bash_profile
  ```

- If you log on as a user, update the file in the /home/*userid* directory, where *userid* is the id of the user. Edit the file and add the export command to the bottom of the file. You might need to create the /home/*userid* directory and the .bash_profile file if they do not exist. Update the attributes to make the file executable:

  ```
  chmod +x.bash_profile
  ```

Starting the OSA/SF GUI

Although you can start the OSA/SF GUI on any platform that supports graphics and a Java 1.4 environment, this document describes how to start the GUI only on Windows and Linux system platforms. For both Windows and Linux, ensure the following actions have been completed before you try to start the GUI:

- OSA/SF GUI TCP/IP connection is set up for your workstation. See "Customize a TCP/IP Connection" on page 71.
- OSA/SF IOASRV task is started on the host system.

To start the OS/SF GUI on Windows: Open a new Command Prompt (DOS) window, change to the directory where the ioajava code resides, and enter the following command from the C:\> command prompt:

```
java ioajava
```

To start the OS/SF GUI on Linux: Specify the directory where the ioajava code resides, and issue the command to run the GUI on the Linux terminal session. Note that the command text is case sensitive:

```
/usr/java/j2rel.4.0_02/bin/java ioajava
```

Using the OSA/SF GUI

After you have completed the steps for setting up the OSA/SF GUI, you can use the command windows to configure an OSA. The help panels that are part of the GUI interface provide information for each window.

OSA/SF Host Open Window

The **Host-open** window allows you to connect to the OSA/SF host. When you start the OSA/SF GUI, you enter the name of the OSA/SF host system. Although the window only allows access to a single host system, you can have multiple windows open on your workstation for other host systems. See "Using the OSA/SF GUI with Different OSA/SF Hosts" on page 79.

Figure 40 on page 79 is an example of the OSA/SF Host Open window to access the OSA/SF GUI:

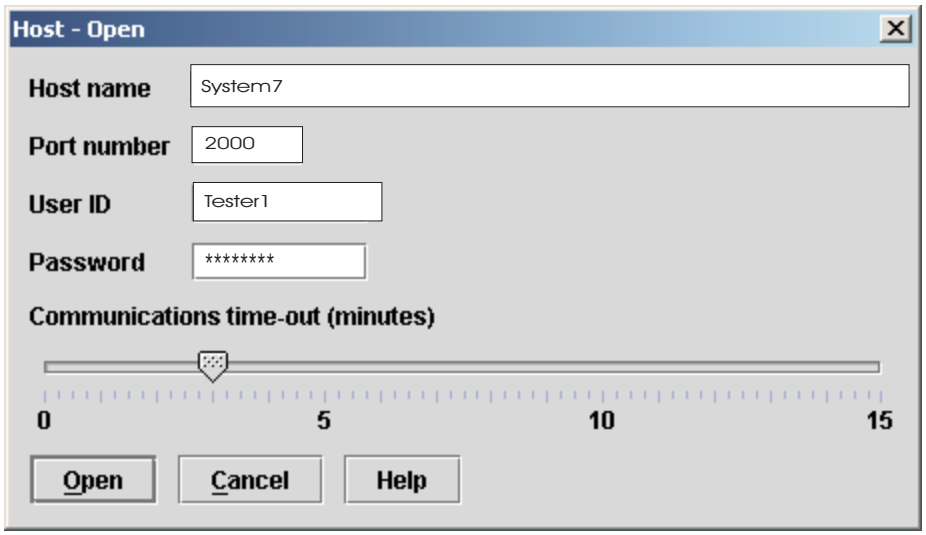

Figure 40. OSA/SF Host Open Logon

Enter the following information:

- Name of the host system or IP address of the host
- Port (specified in IOASRV)
- User ID for the system
- User password

OSA/SF Commands

When you enter the required information and press **Open** on the window, the OSA/SF GUI displays the **OSA/SF Commands** window. You can launch all OSA/SF GUI tasks from the **OSA/SF Commands** window. For a description of each command option, see the help for the window.

CHPID View Window to display Channel Information

The option **CHPID View** on the **OSA/SF Commands** window shows a list of each CHPID that is defined in the channel subsystem on which OSA/SF is running. From this window, you can review all of the CHPID numbers and ports for the OSA features and perform tasks such as the following:

- Display, modify, or install CHPID configurations
- Display settings for a CHPID or port
- Display OSA devices and OATs

Using the OSA/SF GUI with Different OSA/SF Hosts

Your installation might have more than one host with OSAs that you need to manage. For example, you might have one of the following OSA configurations:

- A second OSA/SF image for backup
- Different physical processors
- Nonshared images and OSAs for security reasons

Regardless of the number of host systems, one OSA/SF GUI attaches to one system. You can start multiple OSA/SF GUI sessions, then specify the host name or IP address on the open-host window to access a different host.

Problems starting the OSA/SF GUI

For error messages and corrective actions to take when you try to start the OSA/SF GUI, see “Error Messages for the OSA/SF GUI” on page 228.

Chapter 7. Host Program Setup

Each OSA-Express feature must be defined in the system software configuration using Communications Server for OS/390 or any other host program product, such as VTAM, installed on the server. After you complete the QDIO tasks in this section, your OSA-Express features are ready to go. For non-QDIO OSA-Express features, see Chapter 8, “Configuring OSA-Express Modes”, on page 97.

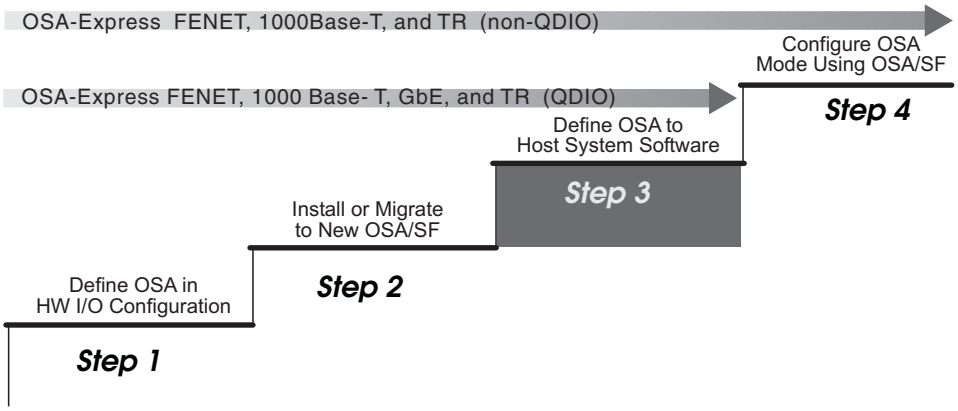

Figure 41. Step Three in a Four-Step Process

Overview

The host definitions required to set up your OSA-Express feature vary depending on the following:

- Operating System
- OSA-Express Feature Type
- OSA-Express Mode

At a minimum you need to update a TCP/IP profile for Passthru mode.

The following topics summarize requirements for each OSA-Express feature by QDIO or non-QDIO mode:

- “OS/390, z/OS, and z/OS.e”
- “z/VM” on page 82
- “VSE/ESA” on page 83
- “Linux” on page 83

For OS/390 and z/OS host systems, the table directs you to the appropriate section in this chapter for more information. For the other hosts, reference information is provided.

For TPF, see *Transaction Processing Facility: Transmission Control Protocol/Internet Protocol* or visit the following web site:

`www.s390.ibm.com/products/tpf/`

OS/390, z/OS, and z/OS.e

See “Software Requirements” on page 21 for the host program version and release needed for each OSA feature/mode combination.

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Table 2. Host Program Definition Summary for OS/390, z/OS, and z/OS.e

OSA Feature	Mode	VTAM Defs	TCP/IP DEV Type	TCP/IP LINK (or interface) Type	See Page
GbE	QDIO (IP)	TRL	MPCIPA (IPv4 only)	IPAQGNET, IPAQENET (IPv4), IPAQGNET6, IPAQENET6 (IPv6)	85
FENET and 1000Base-T	QDIO (IP)	TRL	MPCIPA (IPv4 only)	IPAQGNET, IPAQENET (IPv4), IPAQGNET6, IPAQENET6 (IPv6)	85
FENET and 1000Base-T	TCP/IP Passthru		LCS	ETHERNet, 802.3, ETHERor802.3	92
FENET and 1000Base-T	SNA	XCA/SWNET			93
TR	QDIO (IP)	TRL	MPCIPA	IPAQTR	85
TR	TCP/IP Passthru		LCS	IBMTR	92
TR	SNA	XCA/SWNET			93

The following publications from your IBM Communications Server library are useful resources:

z/OS Communications Server: IP Configuration Guide

z/OS Communications Server: SNA Resource Definition Reference

z/VM

QDIO and IP Passthru modes require DEVICE and LINK statements in the TCP/IP profile. SNA mode requires that you build an External Communication Adapter (XCA) node for VTAM. See “Software Requirements” on page 21 for the host program version and release needed for each OSA feature/mode combination.

Table 3. Host Program Definition Summary for z/VM

OSA Feature	Mode	VTAM Defs	TCP/IP DEV Type	TCP/IP LINK Type
GbE	QDIO (IP)		OSD	QDIOETHERNET
FENET and 1000Base-T	QDIO (IP)		OSD	QDIOETHERNET
FENET and 1000Base-T	TCP/IP Passthru		LCS	ETHERNET
FENET and 1000Base-T	SNA	XCA		
TR	QDIO (IP)		OSD	QDIOTR
TR	TCP/IP Passthru		LCS	IBMTR
TR	SNA	XCA		

The following publications provide detailed information:

TCP/IP Planning and Customization

TCP/IP User’s Guide

and

VTAM V4R2 for MVS/ESA, VM/ESA, VSE/ESA Resource Definition Reference

VSE/ESA

The QDIO and IP Passthru modes require DEVICE and LINK statements in the TCP/IP profile. See “Software Requirements” on page 21 for the host program version and release needed for each OSA feature/mode combination.

Table 4. Host Program Definition Summary for VSE.

OSA Feature	Mode	VSE ADD Statement	VTAM Defs	TCP/IP DEFINE LINK Statement	TCP/IP DEFINE ADAPTER Statement
GbE	QDIO (IP)	OSAX		TYPE=OSAX	
FENET and 1000Base-T	QDIO (IP)	OSAX		TYPE=OSAX	
FENET and 1000Base-T	TCP/IP Passthru	OSA		TYPE=OSA	TYPE=ETHERNET
TR	QDIO (IP)	OSAX		TYPE=OSAX	
TR	TCP/IP Passthru	OSA		TYPE=OSA	TYPE=Token_Ring
TR	SNA	XCA			

See the following publications for more information.

TCP/IP for VSE V1R4.0 User's Guide

VTAM V4R2 for MVS/ESA, VM/ESA, VSE/ESA Resource Definition Reference

Linux

The Linux kernel version 2.4 network driver supports the following OSA-Express feature/mode combinations:

- FENET and GbE features in QDIO mode
- FENET feature running TCP/IP Passthru (using LCS device type)
- Token Ring feature

Linux kernel version 2.4.14 adds IPv6 support for OSA-Express GbE and FENET features in QDIO mode.

The same Linux kernel versions that support OSA-Express features GbE and FENET support OSA-Express feature 1000Base-T Ethernet.

See “Software Requirements” on page 21 for the host program version and release needed for each OSA feature/mode combination.

Table 5. Host Program Definition Summary for Linux

OSA Feature	Mode	Device Driver	Interface Name Prefix
GbE	QDIO (IP)	QETH	eth*n*
FENET and 1000Base-T	QDIO (IP)	QETH	eth*n*
FENET and 1000Base-T	TCP/IP Passthru	LCS	eth*n*
TR	QDIO (IP)	QETH	tr*n*

Steps to configure Linux: Although a thorough discussion of Linux networking is beyond the scope of this document, the following steps briefly describe commands that can be used for OSA-Express configuration. Other methods may be available, depending on the Linux distribution.

Step 1: Configure OSA-Express devices (QDIO only)

Use the **add_parms** channel devices layer command to assign a portname to a range of device addresses and to define these addresses for a particular device type, for example,

```
add_parms,0x10,0xAA00,0xAA02,portname:QDIO4
```

where 0x10 defines addresses 0xAA00 through 0xAA02 as QDIO devices and the portname ″QDIO4″ is assigned to these devices. There are many other options that can be included on this line, but these are the minimum required options that will allow Linux to use a QDIO OSA CHPID.

Step 2: Configure OSA-Express devices

Identify the device driver, specify an interface number (if desired), and define the read, write, and data devices to be used by Linux. For example, for any OSA-Express CHPID in QDIO mode:

```
qeth3,0xAA00,0xAA01,0xAA02
```

where the 3 in qeth3 specifies that the number 3 is to be used in the interface name resulting from this command. This number is appended to either the *eth* or *tr* interface name prefix (see Table 5 on page 83.) In this case, the interface name would either be eth3 or tr3, depending on the type of CHPID being used and on the alias defined in /etc/modules.conf. (In this example, if -1 was used instead of 3, then the next available interface number would have been assigned to this interface.)

For OSA-Express FENET running TCP/IP Passthru mode:

```
lcs-1,0x7c00,0x7c01
```

specifies that the next available interface number be appended to the *eth* prefix to create the interface name, and that 7c00 be used for the read address and 7c01 the write address for this device.

Step 3: Load modules

For OSA-Express features running in QDIO mode:

```
insmod qdio
insmod qeth
```

For OSA-Express FENET in TCP/IP Passthru mode:

```
insmod lcs
```

This may be done automatically, depending on your configuration.

Step 4: Configure IP addresses

Use the ifconfig command to configure the IP addresses and activate the interface:

```
ifconfig eth0 192.168.10.20 netmask 255.255.255.0 up
```

For More Information

For complete information about device driver setup for OSA-Express, see *Linux for zSeries: Device Drivers and Installation Commands*, LNUX-1103, available at www10.software.ibm.com/developerworks/opensource/linux390/index.shtml

For general information on Linux, see

www.linux.org/docs

QDIO Definitions for Channel Type OSD on z/OS, z/OS.e, or OS/390

Use these directions to set up all OSA-Express features running in QDIO mode. See “Gigabit Ethernet Configuration Examples” on page 253 for more sample definitions.

Setting Up a TRLE Statement for QDIO

Follow these instructions for each image planned to use the OSA.

A TRLE (transport resource list) statement is required for the OSA-Express to transfer data using TCP/IP.

To define a transport resource list major node, include the following definition statements:

- One VBUILD definition statement to begin the transport resource list major node.
- One transport resource list element (TRLE) definition statement for each OSA-Express feature.

For additional examples showing the TRLE along with the TCP/IP profile and HCD input, see Figure 61 on page 254. For specific details about a TRLE, see *z/OS Communications Server: SNA Resource Definition Reference*.

Use the following example as a reference.

```
TRL      VBUILD TYPE=TRL
*********************************************************************
*                   TRLE STMT DEFINES THE OSA
*
* PORTNAME MUST MATCH THE DEVICE NAME IN THE TCP/IP DEVICE and LINK Statement
*
*********************************************************************
***
***  DEFINITION USING CHPID(F8) DEVICES = 590-592
***
TRL36F8A  TRLE LNCTL=MPC,
               READ=590,
               WRITE=591,
               DATAPATH=(592),
               PORTNAME=OSDPORT1,
               MPCLEVEL=QDIO
```

Figure 42. Sample VTAMLST member TRL36F8 for OSD CHPIDs

1. Specify a TRL name of your choice in place of TRL36F8A. Observe the following rules to avoid naming conflicts:
   a. The TRL name (also known as the OSANAME) **must not match** the VTAMLST member name of the TRLE statement containing this transport resource list major node definition. (In Figure 42, TRL name TRL36F8A is defined in member TRL36F8.)
   b. Each TRL defined for a single OSA-Express port must use the same PORTNAME across all images.
   c. In a given image, each active TRL must have a unique TRL name defined in its TRLE statement.
   d. In a given image, only one TRL can be activated for a single OSA-Express port.
2. **TRLE** and **LNCTL=MPC** are required.

3. Specify one number for the READ device, one for the WRITE, and one DATAPATH device number for each instance of TCP/IP in the image. For example, if you wanted three instances of TCP/IP in the image to be able to access the OSA-Express port in Figure 42 on page 85 instead of only one as shown, you would code the DATAPATH operand as follows:

   ```
   DATAPATH=(592,593,594),
   ```

   or

   ```
   DATAPATH=(592-594),
   ```

   These device numbers must be defined in the hardware configuration.
4. Enter a *PORTNAME* that is unique in your network environment. This must be the same for all users. A port name is required for QDIO reqardless of the operating system. This port name must match the device name specified for all TCP/IP stacks using this CHPID.Write the name down because you will use it in the device and link statements of the TCP/IP profile.

   PORTNAME _____
5. **MPCLEVEL=QDIO** is a required entry.
6. Activate the TRL deck which contains the TRLE definition.

   Example: **V NET,ACT,ID=*trl36f8***

What to do next

Continue at “Updating the TCP/IP Profile for QDIO” below.

Updating the TCP/IP Profile for QDIO

TCP/IP uses the OSA as a multipath channel (MPC) device.

Note: MPC devices respond to the IOS VARY ON and IOS VARY OFF commands regardless of whether these resources are allocated.

This requires you to define a device statement, link statement, and home statement in the TCP/IP profile. The following instructions provide the minimum details for updating the TCP/IP profile. Suggestions for additional profile specifications are listed in “Recommendations” on page 90. If you require additional information about the TCP/IP profile, see *z/OS Communications Server: IP Configuration Guide*.

Follow these instructions for each image planned for use with the OSA.

__ 1. Edit the TCP/IP profile. Within the ***Hardware Definitions*** section of the profile, add a device statement and a link statement using the following instructions. Figure 43 on page 87 shows an example.

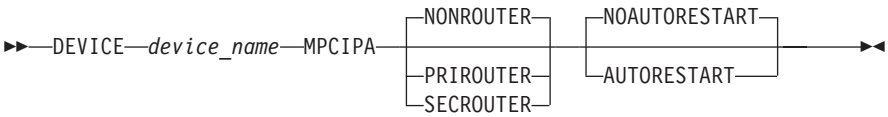
```
; Hardware definitions:
; OSA-Express CHPID F8
DEVICE OSDPORT1 MPCIPA NONRouter
LINK OSD1 IPAQGNET OSDPORT1

; Token Ring LINK statement is
; LINK OSD1 IPAQTR OSDPORT1 NONCANONICAL ALLRINGSBCAST

; HOME Internet addresses of each link in the host.
HOME
10.10.11.161     OSD1

; IP Routing information for the host.  All static IP routes should be added here.
;
GATEWAY
; Direct Routes - Routes that are directly connected to my interfaces.
;
; Network  First hop   Driver   Packet size  Subnet mask  Subnet value

; OSA-Express OSD
  10           =        OSD1       1492       0
.
.
.
; Start all the defined devices.
  START OSDPORT1
```

Figure 43. Hardware Definitions in the TCP/IP Profile for OSA-Express Features in QDIO Mode. See the following descriptions for various options and requirements.

The definitions are similar for any OSA-Express feature set up as an OSD channel for QDIO mode in IPv4.

__ 2. Define each OSA-Express port using the appropriate statement: for IPv4, create a DEVICE, LINK, and HOME statements as shown in steps 2a through 2c on page 89. For IPv6, create an INTERFACE statement as shown in step 2d on page 89. When configuring a single device for both IPv4 and IPv6, use DEVICE/LINK/HOME for the IPv4 definition and INTERFACE for the IPv6 definition.“Sample TCP/IP Profile (IPv4 and IPv6)” on page 261 contains examples of both statements.

a. For IPv4, define one DEVICE statement for the OSA-Express port.



device_name
Specify a device name. The name must be the same name that you specified for the PORTNAME in the TRLE statement (step number 4 on page 86).

MPCIPA
Specifies that the device belongs to the multipath channel (MPC) family of interfaces and uses the IP assist based interface.

NONROUTER
When this is specified, OSA-Express features will not forward unknown packets in QDIO mode.

PRIROUTER
Primary router for unknown packets from the LAN. If a datagram is received at this device for an unknown IP address, the datagram will

be routed to this TCP/IP instance. Only one primary router may be specified for a single port across all TCP/IP instances.

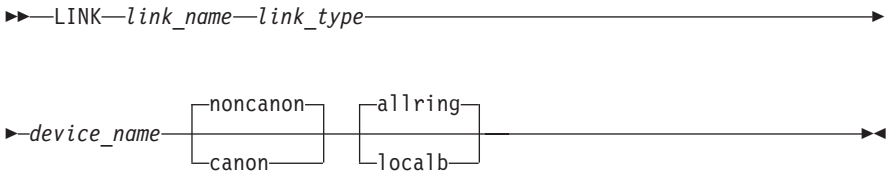
When running the OSA-Express feature dedicated to one image, the primary router flag must be specified if the dedicated image is to be used as a router. When the primary router flag is set, the OSA-Express feature will forward all IP packets received that do not contain a destination IP address registered with the feature. The HOME IP statements in each TCP/IP stack are the addresses registered to the OSA Express feature. If the primary router flag is NOT specified, then all packets received by the OSA-Express feature without a registered IP address are dropped. This includes all packets to be routed through the dedicated image that is serving as a router to other networks.

SECROUTER
Secondary router for unknown packets from the LAN when the primary router is not available. If a datagram is received at this device for an unknown IP address and there is not an active TCP/IP instance defined as PRIROUTER, then the datagram will be routed to this TCP/IP instance. Multiple secondary routers may be specified for an OSA-Express GbE or FENET port running in QDIO mode, but only one secondary router may be specified for any other OSA-Express port.

NOAUTORESTART
For most device failures, specifying NOAUTORESTART indicates that the TCP/IP address space will not attempt to reactivate these devices.

AUTORESTART
In the event of a device failure, the TCP/IP address space will attempt to reactivate the device.

b. Define one LINK statement for the IPv4 OSA-Express port.



link_name
Specify a name for this link. The maximum length is 16 characters. This name is also used in the home statement.

link_type
Required indicating that the link uses the IP Assist interface. For OSA-Express FENET, and Gigabit Ethernet features set up as OSD channels to run in QDIO mode, specify **IPAQGNET**. For These OSA-Express features, you may specify a LINK type of **IPAQENET** instead of IPAQGNET when Communications Server for OS/390 R10 or later is used.

For OSA-Express Token Ring features set up as OSD channels to run QDIO mode, specify **IPAQTR**.

device_name
Specify the same name you used in the device statement and for the PORTNAME in the TRLE statement. See 4 on page 86.

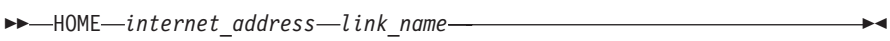
CANONical (For IPAQTR LINK type only)
MAC addresses in Address Resolution Protocol (ARP) packets are in canonical IEEE 802.5 form. See "Canonical versus Noncanonical Format" on page 115.

NONCANONical (For IPAQTR LINK type only)
MAC addresses in Address Resolution Protocol (ARP) packets are in non-canonical form. This is the default for the IPAQTR LINK type. See "Canonical versus Noncanonical Format" on page 115.

ALLRINGsbcast (For IPAQTR LINK type only)
All IP and ARP broadcasts are sent as all-rings broadcasts, which are propagated through token ring bridges. This is the default.

LOCALBcast (For IPAQTR LINK type only)
All IP and ARP broadcasts are sent only on the local ring and are not propagated through token ring bridges.

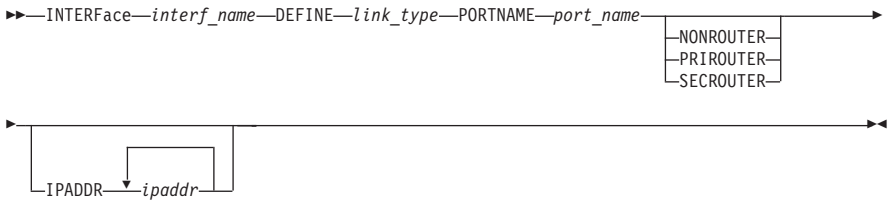
c. Define the Home IP address for each IPv4 link.



internet_address
Specify an IP address for this link in the form x.x.x.x.

link_name
Specify the link name you choose in the link statement.

d. For IPv6 only, define one INTERFACE statement for the GbE or FENET OSA-Express port.



intf_name
Specify a name for the interface no more than 16 characters in length.

link_type
Must be IPAQENET6 or IPQAGNET6.

port_name
The PORT name specified in the TRLE definition for the QDIO interface.

NONROUTER
When this is specified, OSA-Express features will not forward unknown packets in QDIO mode.

PRIROUTER
Primary router for unknown packets from the LAN. If a datagram is received at this device for an unknown IP address, the datagram will

be routed to this TCP/IP instance. Only one primary router may be specified for a single port across all TCP/IP instances.

SECROUTER
Secondary router for unknown packets from the LAN when the primary router is not available. If a datagram is received at this device for an unknown IP address and there is not an active TCP/IP instance defined as PRIROUTER, then the datagram will be routed to this TCP/IP instance. Multiple secondary routers may be specified for an OSA-Express GbE or FENET port running in QDIO mode, but only one secondary router may be specified for any other OSA-Express port.

IPADDR
Optional for link types IPAQENET6 and IPAQGNET6. If not specified, TCP/IP will enable autoconfiguration for the interface.

ipaddr
One or more prefixes or full IPv6 addresses.

See “Sample TCP/IP Profile (IPv4 and IPv6)” on page 261 for an example. Additional parameters must be defined in this statement for VIPA. See *z/OS Communications Server: IP Configuration Guide* and *z/OS Communications Server: IP Configuration Reference* for more information.

__ 3. Define the routes using direct (static) routes through the GATEWAY statement or use the RouteD router daemon to do it dynamically.

__ 4. Define one START command for each OSA device.

Note: If you do not want to start using the OSA at this time, do not include the START command. You can issue

```
VARY TCPIP,,START,GIGPORT1
```

to start a device.

Figure 43 on page 87 shows an example of hardware definitions in a TCP/IP profile.

After the TCP/IP profile is updated and started you can check that the devices were started. The following command checks the read, write and data devices (assuming device numbers 590–592).

d u,,,590

If all is OK, you will see for the read, write, and data devices, respectively:

```
590    A-BSY
591    A
592    A-BSY
```

Recommendations

Although the following TCP/IP profile parameters are not required for OSA-Express, we suggest that you consider adding them. See *z/OS Communications Server: IP Configuration Guide* for details.

MTU The maximum transmission unit (MTU) size controls the maximum packet size that the IP layer can transmit onto a Network Interface. The value for the MTU size is dependent upon the network configuration. The OSA-Express Gigabit Ethernet feature supports multiple MTU settings, each of which is used for different network configurations.

If your network contains all Ethernet DIX clients, then set the MTU in your GATEWAY statement or OMPROUTE configuration to a maximum of 1500. This is the maximum IP packet which can be transmitted in a ″pure″ Ethernet DIX configuration.

If your network contains any IEEE 802.3 clients to which the OSA-Express adapter will communicate, set the MTU in your GATEWAY statement or OMPROUTE configuration to a maximum of 1492. This is the maximum IP packet which can be transmitted in an 802.3 Ethernet configuration. This MTU size is 8 bytes less than the Ethernet DIX format due to the 3 byte LLC and 5 byte SNAP headers which are used in the 802.3 environment. When using the 1492 MTU size, you can communicate to either Ethernet DIX or 802.3 clients through the same OSA-Express Ethernet adapter.

The OSA-Express Gigabit Ethernet feature also supports the Jumbo Frames feature. This feature can only be used if all the clients and Ethernet switches in the network to be connected through the OSA-Express Gigabit adapter also support the Jumbo Frames feature. When using this feature, set the MTU in your GATEWAY statement or OMPROUTE configuration to the maximum of 8992.

See *IP Configuration* for more details on 802.3 and DIX. For a thorough discussion of MTU size, see the Appendix in *z/OS Communications Server: IP Diagnosis*.

DATAGRAMFWD
Add this parameter to the IPCONFIG statement to enable the transfer of data between networks.

; NOFWD
Make sure that the NOFWD parameter is **NOT** specified in the ASSORTEDPARMS statement, or is commented out. It prevents transfer of data between networks.

PATHMTUDISCOVERY
Add this parameter to the IPCONFIG statement to prevent fragmentation of datagrams.

Setting Up Priority Queuing

All OSA-Express features operating in QDIO mode (channel type OSD) support priority queuing, which allows the definition of four priority levels based on *service differentiation*: the way in which you define different traffic types to Communications Server. Once you have defined your traffic types, you can assign them priority levels by defining for each a *service level policy*. You define service differentiation and service level policy to the OS/390 UNIX Service Policy Agent through a policy configuration file.

When you activate the OS/390 UNIX Policy Agent, it reads the policy configuration file containing the control statements defining service differentiation and service level policy. Priority queuing can be defined in three control statements:

SetSubnetPrioTosMask statement
Defines as many as eight unique 8–bit Type of Service (TOS) identifiers and assigns each a priority level.

ServiceCategories statement
Correlates the TOS identifier and priority with an IP traffic characteristic.

ServicePolicyRules statement
Defines the transmission conditions for each category of IP traffic.

There are additional control statements you can specify in the policy control configuration file that are beyond the scope of this discussion.

See *z/OS Communications Server: IP Configuration Guide* for a detailed description of how to set up the OS/390 UNIX Services Policy Agent.

Appendix B, “Examples and Notes from Our Test Team”, on page 241 contains a description of how priority queuing was set up in our test environment.

IP Modes for Channel Type OSE (non-QDIO) on z/OS, z/OS.e, or OS/390

The following OSA-Express features can be run in TCP/IP Passthru mode exclusively or concurrently with SNA mode:

- FENET
- 1000Base-T
- TR

TCP/IP Definition Requirements for OSE CHPID IP Modes

In this book, only the simplest forms of TCP/IP profile statements are used. The following discussion is meant to put OSA-related parameters into the context of the host server program, but it is beyond the scope of this book to describe TCP/IP statements fully. For more information, See the TCP/IP books and CS for OS/390 books listed in the bibliography (page xi).

An OSA running in the TCP/IP Passthru mode is viewed as a LAN channel station (LCS) device by the TCP/IP, which uses the device pair required by the IP duplex protocol to establish the data path to the OSA port. You must therefore define the lower device number of the pair (the READ device) in the IP program’s Device statement as the LCS address. And, you must define the OSA port number as the link number in the corresponding Link statement.

To transfer an IP packet across an OSA, two data paths must be defined: one inbound data path for IP packets whose destination is a Home IP address, and one outbound data path for IP packets whose destination is a network IP address. Each data path requires an entry in the OSA address table (OAT). To specify data paths for IP packets through an OSA, Passthru OAT entries are used in the TCP/IP Passthru mode, and MPC entries are used in the Before proceeding to a discussion of these types of OAT entries, consider the following points.

To send an inbound IP packet to an S/390 program, a LAN client first sends an ARP broadcast. If an OSA adapter or the S/390 server has the target IP address in the ARP as one of its HOME addresses, an ARP response is sent back to the sending station. The ARP response contains the MAC address of the OSA port that has the connection to the specified IP address.

To send an outbound IP packet to a network client, the GATEWAY statement must define the IP networks and the corresponding LINK out of which packets destined for these networks should be sent. The DEFAULTNET parameter can also be specified to handle IP traffic destined for any network not explicitly routed.

OSA supports IP unicast and IP broadcast destination addresses in all the modes for OSE CHPIDs in which IP data packets are transferred. (IP broadcast is also supported on OSD CHPIDs beginning with Linux kernel version 2.4.14, z/OS V1R4, and z/VM V4R3.)

OSA supports IP multicast destination addresses on all OSA-Express features. You can use OSA/SF to display the IP multicast addresses of the registered members of the multicast group for a selected OSA.

Notes:

1. A MAC address is significant in TCP/IP Passthru mode to identify the port on a directly-attached LAN.
2. You must also specify the Home IP address of the image associated with an inbound Passthru OAT entry if access to the OSA port is to be shared. You can specify more than one Home IP address to provide redundant pathing.

SNA Modes for Channel Type OSE on z/OS, z/OS.e, or OS/390

This section describes the OSA-related VTAM statements for SNA mode. For more information on these VTAM macros, see the VTAM books listed in the bibliography. For information on the Communications Server SNA, also See the books listed in the bibliography.

Notes:

1. Define each OSA port in the XCA mode to provide APPN-to-APPN communications via an OSA.

   An OSA port can be used to connect a composite network node or an end node or a network node with any other type of APPN node.
2. Define each OSA port in the XCA mode and each peripheral device in the SWNET node to provide peripheral support.

   Peripheral support attaches VTAM to peripheral nodes connected to the directly-attached LAN or emulated LAN (ELAN).
3. Define each OSA port in the XCA mode and each subarea connection in the SWNET to provide subarea support.

   Subarea support attaches VTAM to a subarea node that is connected to the LAN or ELAN.
4. Specify the maximum number of stations, or PUs, for each port. A maximum of 4096 PUs can be specified for an OSA-Express CHPID. See page 94 and the SNA mode requirements for each operating system in the earlier chapters.

   Note also that once a PU is activated within an XCA for a given OSA port, it cannot become available for another instance of VTAM.
5. For parameter values needed for HPR over XCA support, See the VTAM books listed in the bibliography (page xiii).

External Communication Adapter (XCA) Major Node for SNA

Associate one XCA major node for each OSA port that will be used. Define:

1. The node type in the VBUILD Definition statement
2. The OSA port used in the PORT Definition statement
3. The switched peripheral nodes that are attached to the LAN or ELAN through the OSA port in the GROUP, LINE, and PU Definition statements.

   If you have both subarea nodes (type 4 and type 5 nodes) and peripheral nodes (type 1, type 2, type 2.1, and subarea nodes that appear as type 2.1 nodes) attached to the LAN or ELAN, you must code two GROUP definition statements in this XCA major node (one for the peripheral devices, and one for the subareas).

VBUILD Definition Statement for SNA

Specify one VBUILD Definition statement for each OSA port, that is, for each connection between VTAM and the LAN, ELAN, or SNA network management service.

name **VBUILD TYPE=XCA**

name
Specify the unique name for this major node.

PORT Definition Statement for SNA

Specify one PORT Definition statement for each VBUILD statement to define the OSA port number and port type as well as the device address (OSA device number) for VTAM to use.

name **PORT ADAPNO=*adapter_number*, CUADDR=*device_address*, MEDIUM=*medium_type*, SAPADDR=*address*, TIMER=*timeout_value***

name
Specify the VTAM name you want to associate with the OSA port.

adapter_number
Specify the OSA port number for data transfer (0 or 1).

device_address
Specify the device address to be used by VTAM. This value is the OSA device number. In the device address, the unit address defaults to the last 2 digits of the device number.

medium_type
Define the type of LAN (or ELAN) connected to this OSA port. Specify RING for token ring, CSMACD for Ethernet.

SAP address
Specify the service access point (SAP) address for the connection to a LAN attached through an OSA that is defined by this XCA major node. This value must be a multiple of 4 and must be unique for each VTAM that is sharing an OSA port.

timer
Specify a value that exceeds (T1 * 9). If you accept the default T1 value of 2 seconds, the default XCA timeout value of 30 seconds meets this requirement. The T1 value is described on page 103.

GROUP Definition Statement for SNA

Specify a line group for type 2 or 2.1 nodes attached through OSA. You also need to define LINE and PU statements for each switched line and each peripheral node with which VTAM will communicate.

You must set a maximum PU limit for each OSA-Express port.

name **GROUP AUTOGEN=(*number_of_autogens, line_seed_char, pu_seed_char*) DIAL=*dial_value***

name
Specify the minor node name of the line group.

number_of_autogens
Specify the number of VTAM generated LINE and PU statements.

line_seed_char
Define the first character to be used by VTAM to create a name for the generated LINE statements.

pu_seed_char
Define the first character to be used by VTAM to create a name for the generated PU statements.

LINE and PU Definition Statements for SNA

Either specify them separately or let them be generated automatically with the AUTOGEN parameter on the GROUP definition statement.

Switched Network (SWNET) Major Node for SNA

Define one SWNET major node for the switched connections to the peripheral nodes that are attached to the LAN or ELAN connected to the OSA port.

- Define the node type in the VBUILD Definition statement.
- For each PU, define its associated logical units (LUs).
- Optionally, you define a path in the Path Definition statement.

VBUILD Definition Statement for SNA

Define one SWNET major node for any peripheral devices connected to the LAN defined by the associated XCA major node.

name **VBUILD TYPE=SWNET MAXNO=*max_number* MAXGRP=*max_group***

name
Specify the name for this major node.

max_number
Specify the number of unique numbers that are defined in the DIALNO operand of all PATH definition statements with the switched major node.

max_group
Specify the number of unique path groups (group names) that are defined in the GRPNM operand of all PATH definition statements within the switched major node.

PU Definition Statement for SNA

Define one PU for each physical unit that is connected to the LAN defined by the associated XCA major node.

name **PU ADDR=*link_station_address* CPNAME=*control_point_name* PUTYPE=*pu_type***

name
Specify the minor node name of the physical unit represented by this definition statement.

link_station_address
Specify the hexadecimal station address for the physical unit.

control_point_name
Specify the control point name of a type 2.1 peripheral node. A type 2.1 node requires the CPNAME of both IDBLK and IDNUM on the PU definition statement.

pu_type
Specify the PU type for this peripheral. Specify 2 for PU type 2 or 2.1.

PATH Definition Statement for SNA

Define a path to a physical unit (PU) in a switched major node.

name **PATH DIALNO=*number*** **GRPNM=*group_number***

name
Specify the name for the Path definition statement.

number
The 1st byte is a placeholder (usually 01). The 2nd byte is the SAP address, and the 3rd through 8th bytes are the MAC address of the peripheral (attached workstation).

If an Ethernet LAN station, or PU, is connected across a LAN bridge to a non-Ethernet LAN, the destination MAC address must be coded differently in the DIALNO. Because the LAN bridge flips the bits in every byte of the MAC address, the MAC address should be coded in the inverted (noncanonical) order in the DIALNO parameter. (See the notes on MAC addresses on page 114.)

group_name
Specify this name as the name of the logical group definition of the associated XCA major node.

LU Definition Statement for SNA

Define one LU for each logical unit associated with a type 1 or 2 PU within a switched major node.

name **LU LOCADDR=*loc_address***

name
Specify the minor node name of the logical unit represented by this definition statement.

loc_address
Specify the logical unit's local address at the physical unit.

At the Physical Unit (PU)

- Configure the unit to support the SNA protocol.
- Specify the CPNAME or the IDBLK/IDNUM pair. This must match the information specified on the PU definition statement under the switched major node.
- Define the MAC address of the OSA port that should be used to connect to VTAM. An OSA port's MAC address can be set to a local MAC address (page 114) to help you avoid reconfiguring existing units.

Chapter 8. Configuring OSA-Express Modes

Follow the instructions in this chapter to use OSA/SF to configure the OSA-Express features that are defined as OSE channels to run in **non-QDIO** mode (TCP/IP Passthru, SNA, , or both modes concurrently):

- FENET
- 1000Base-T
- TR

For OSA-Express features that run in non-QDIO mode (OSE channels), you must configure the physical port and create an OAT to set up the data paths between the OSA and host programs. If any of these non-QDIO mode features uses the default OAT without port sharing, OSA/SF is not required.

OSA-Express features that run in QDIO mode (OSD channels) require only HCD definitions and host program setup. Once you have defined both the hardware and software definitions, the data path between any OSA-Direct Express feature and the host programs are automatically set up in an OSA Address Table (OAT).

You can use the following OSA/SF interfaces to configure an OSA-Express feature to run in non-QDIO mode:

- REXX command interface (IOACMD EXEC) (“Using the REXX Command Interface to Configure OSA-Express CHPIDs” on page 98)
- OSA/SF GUI (“Using the GUI to Configure OSA-Express CHPIDs” on page 101)

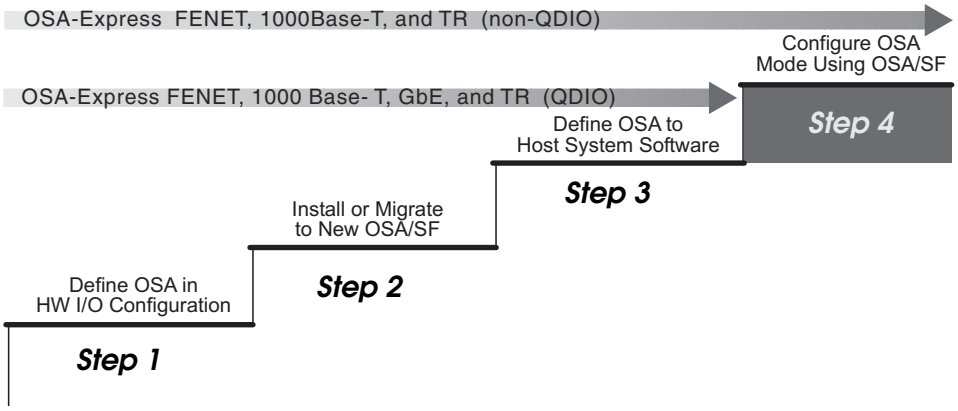


Figure 44. Step Four in a Four-Step Process

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Using the REXX Command Interface to Configure OSA-Express CHPIDs

Use these instructions to customize OSA-Express TR, and FENET features, without the use of an OSA/SF GUI. References to more detailed information are included when necessary.

Attention: Before Starting

__ 1. If you are not familiar with the OSA address table (OAT) and you need more information than is provided here, see Chapter 12, "About the OSA Address Table (OAT)", on page 135.

__ 2. Make sure the hardware configuration (IOCDS) is complete. See Chapter 2, "OSA-Express Hardware Configuration", on page 25.

__ 3. Make sure OSA/SF is running on the server.

__ 4. Make sure the OSA (CHPID) is configured online and that the OSAD device is online.

Sample configuration files and OAT templates: Sample configuration files and OAT templates are provided for all OSA-Express features in the following files or data sets:

IOA.SIOASAMP on z/OS and OS/390

E (200) disk on VM/ESA and z/VM.

PRD1.BASE on VSE/ESA

REXX Command Interface Instructions for Configuring OSA-Express CHPIDs

The REXX command interface instructions include the following tasks:

"1) Getting and Modifying a Configuration File".

"2) Getting an OAT Template" on page 99.

"3) Modifying the OAT Template" on page 99.

"4) Activating the Configuration" on page 100.

"5) Verifying the Configuration" on page 100.

1) Getting and Modifying a Configuration File

A configuration file is required for each OSA-Express CHPID.

1. Copy and modify the appropriate member from IOA.SIOASAMP or the E (200) minidisk on VM.
   - For an OSA-Express FENET (including 1000Base-T) feature, copy IOAFENET
   - For an OSA-Express GIGABIT feature, copy IOAGIGA
   - For an OSA-Express TR feature, copy IOATR

   These files contain the input parameters and instructions for modification. You can find detailed explanations of the parameters in "Using the GUI to Configure OSA-Express CHPIDs" on page 101.

   Write down the new name of the file that you copied. It will be used as input with IOACMD.

   ```
   New name of the copied configuration file _____________________________
   ```

2. Modify the copy of the configuration file for your installation. The instructions appear in the header of each configuration file.
3. Modify SNA information. See “SNA Settings” on page 103.

For OSA features that run in QDIO mode (OSD channels), go to “4) Activating the Configuration” on page 100.

2) Getting an OAT Template

There are two ways to get an OAT template for non-QDIO OSA configurations:

- Use the sample templates listed in Table 6.
- For FENET or TR, use the **Get OAT** command to get the OAT that is currently on the OSA. A new OSA ships with a default OAT.

  The default OAT contains entries for all images and ports. Because so many entries are included in a default OAT, you might find it easier to use the samples provided. The samples include only a few entries, which you can use as templates for making your own OAT. The instructions that follow show both methods of getting a template.

Using Samples

The following templates are samples. There is not a sample for every situation. Most configurations are shown in IOAOSHRA. Use the instructions in the template to add and delete information as required.

__ 1. Copy one of the following templates based on the OSA mode and type of OAT you want to install on the OSA:

```
New data set or filename
the copied OAT template  _____________________________________
```

Table 6. OAT Samples for OSA-Express TR and FENET including 1000Base-T Features

OSA Mode	Name in IOA.SIOASAMP (z/OS, OS/390), E (200) Disk (VM), or PRD1.BASE (VSE)	Type of Template
TCP/IP Only	IOAOSHRT	Ports Shared Between images
SNA Only	IOAOSHRS	Ports Shared Between images
TCP/IP and SNA	IOAOSHRA	Both Modes With Ports Shared Between images

__ 2. Continue at “3) Modifying the OAT Template”.

Using the Get OAT Command

You can use the **Get OAT** command instead of samples to copy an OAT:

1. Enter the following to get a copy of an existing OAT.

   For OS/390, z/OS, or z/OS.e,

   EX ’IOACMD.EXEC’ ’GET_OAT’ EXEC

   For VM,

   IOACMD GET_OAT

   When prompted, enter the CHPID (OSA number) and the data set or filename of where you want to store the OAT.
2. Continue at “3) Modifying the OAT Template”.

3) Modifying the OAT Template

The format of the OAT varies according to how you obtain the OAT.

- If you use the samples from IOA.SIOASAMP or the E (200) minidisk, follow the instructions included in the template.
- If you use the **Get OAT** command, see the legend at the bottom of the OAT.

4) Activating the Configuration

Before activating a configuration change that removes devices from the configuration, vary off those devices from the operating system.

1. Enter the following to configure the OSA.

   For OS/390, z/OS, or z/OS.e:

   EX 'IOACMD.EXEC' EXEC

   For VM:

   IOACMD

   For VSE:

   // EXEC REXX=IOACMD PARM='PRD2.OSASF',SIZE=1100K

   A list of commands will be displayed. Select **CONFIGURE OSA CHPID**.

2. **Follow the prompts**. You will be asked to choose several options and to specify the CHPID number, as well as the names of the configuration file and the OAT. You will be asked to select one of the following:

   Activate (with install)
   Select this option when you want to activate the OSA at the current time.

   Activate (without install)
   Select this option if you want to defer the installation until later. At such time you can complete the installion as follows:

   Using REXX command interface on OS/390, z/OS, or z/OS.e Enter: **EX 'IOACMD.EXEC' 'INSTALL *xx* EXEC**

   Using REXX command interface on VM Enter: **IOACMD INSTALL *xx***

   Where ***xx*** is the OSA number (CHPID).

   The activation takes a few minutes; monitor the command output window and the console.

   If any configuration change resulted in the removal of devices from the OSA Address Table (OAT), be sure to vary off these devices from the operating system. If any changes added devices to the OAT, vary these devices online. Devices for which an OAT was changed must be varied off, then on again.

   When a configuration change results in the removal of a device, and if that device was online, that device may display a status of *Offline and Boxed* (F-BOX) or *Online and Boxed* (O-BOX) until it is redefined in the configuration, or until an IPL of the operating system. ″Permanent Error″ messages may also appear on the operator console for those devices.

5) Verifying the Configuration

Run the QUERY command to verify your configuration entries. See “QUERY” on page 154.

Using the GUI to Configure OSA-Express CHPIDs

OSA/SF GUI configuration windows make it easy to configure OSA-Express features. Because mode configuration data for all OSA-Express features defined as OSD channels is automatically acquired from HCD and Communications Server definitions, no configuration window entries are required for Gigabit Ethernet, TR, and FENET (including 1000Base-T) features in QDIO mode.

The OSA/SF GUI enables you to define and save configurations by name so that you can change or activate different modes of operation for any TR or FENET (including 1000Base-T) OSA-Express feature.

Start Managing an OSA

To start managing an OSA, log on to the OSA/SF **Host Open** window of the image that is to manage the OSA. You can select **Start Managing** for an OSA in two ways:

1. From **CHPIDs View**: highlight a CHPID or port, then from the menu bar, select **Command** → **Manage Channel** → **Start Managing**.
2. From the OSA/SF **Command Window**: select **Start Managing**. (On the next window, you need to specify the CHPID number.)

You receive the **Start managing** window. (For a description of the FORCE or NO FORCE options, see “START_MANAGING” on page 160.)

Creating or Modifying a CHPID Configuration

After you are logged on, select **CHPID View** from the **Command Window** and perform the following steps:

1. Highlight the CHPID number or the port number for the CHPID that you want to configure.
2. From the menu bar at the top of the window, click **Selected** → **Configurations.**
3. From the pull down, select one of the following options:
   - **Configuration** to review or change settings for the selected CHPID configuration.
   - **Planning configurations** to create a configuration for a new CHPID that is not currently available or to select another CHPID type. Specify a CHPID number and CHPID type and click **OK**.

   You receive the configuration settings panel for the CHPID.

Give the configuration a unique name, then click on **File** from the menu bar and select one of the following options:

- **New** to obtain a blank configuration panel for the configuration.
- **Get current configuration** to retrieve the currently active OSA configuration. You can use the values as a model for your changes.
- **Open saved configuration** to retrieve a list of existing OSA configurations that the GUI has saved for the current CHPID type. You can select a configuration and load the values to modify.
- **Save configuration** to save the current OSA configuration that you have open.

What to do next

Unless you want to set local or group MAC addresses, or select a LAN speed, no configuration entries are required for an OSA-Express feature defined in QDIO mode (OSD channel).

If you are configuring an OSA-Express non-QDIO (OSE channel) for FENET or 1000Base-T, go to "FENET and 1000Base-T Configuration Data".

If you are configuring an OSA-Express non-QDIO (OSE channel) for TR, go to "Token Ring Configuration Data" on page 103.

To activate a configuration using the GUI, see "Activating the Configuration" on page 110.

FENET and 1000Base-T Configuration Data

If the OSA-Express FENET or 1000Base-T feature is set up in QDIO mode (channel type OSD), the configuration window is displayed and no entries are required.

For both QDIO (OSD channels) or non-QDIO (OSE channels), you can specify the following settings:

- **User data:** You can enter up to 32 characters of descriptive information.
- **Local MAC address:** You can specify a locally administered address that is valid for the LAN to which the OSA port is attached.
- **Group MAC addresses:** You can enter multiple addresses of any destination group from which the port is to receive frames.
- **Port name:** For OSE CHPIDs that use SNMP, this name must match the name in the TCP/IP profile DEVICE and LINK statements; otherwise, the field is ignored.
- **Port speed: Auto-negotiate** is the IBM default. For FENET and 1000Base-T, you can specify 10 or 100 Mb/ps; for 1000Base-T, you can also specify 1000 Mb/ps full duplex only.

For complete information on these fields, see the help panel. For information about Local MAC address, Group MAC addresses, or User data, see "MAC Addresses" on page 114.

For OSD channels, you can save the configuration or define additional configurations.

For OSE channels, continue to define or modify the following modes for the port:

- **TCP/IP** (see "The TCP/IP OAT Entries" on page 103)
- **SNA** (see "SNA Settings" on page 103)

Note: You cannot define MPC OAT entries for FENET or 1000Base-T on the z990 processor.

To activate the configuration, see "Activating the Configuration" on page 110.

Token Ring Configuration Data

If the OSA-Express TR feature is set up in QDIO mode (channel type OSD), the configuration window is displayed and no entries are required.

For both QDIO (OSD channels) or non-QDIO (OSE channels), you can specify the following settings:

- **User data:** You can enter up to 32 characters of descriptive information.
- **Local MAC address:** You can specify a locally administered address that is valid for the LAN to which the OSA port is attached.
- **Group MAC addresses:** You can enter multiple addresses of any destination group from which the port is to receive frames.
- **Port name:** The field is ignored, but you can add additional user data.
- **Port speed:** Auto-negotiate is the IBM default.
- **Functional address:** The bit mask represents all token ring functional addresses for which the port accepts frames.

For complete information on these fields, see the help panel. To set or change a Local MAC address, Group MAC addresses, or User Data, see “MAC Addresses” on page 114.

For OSD channels, you can now save the configuration or define additional configurations.

For OSE channels, continue to define or modify the following modes for the port:

- **TCP/IP** (see “The TCP/IP OAT Entries”)
- **SNA** (see “SNA Settings”)

To activate the configuration, see “Activating the Configuration” on page 110.

The TCP/IP OAT Entries

Define TCP/IP OAT entries for TR, FENET, or 1000Base-T on the **TCP/IP Passthru OAT Entry Definition** window. You can define the following fields. For complete information, see the help panel:

- **Image number**
- **Even Unit address**
- **Default entry indicator**
- **Home IP address**

For **Image number**, the format is `css.x`, where `css` is the channel subsystem identifier and x is the image number id. For sample TCP/IP OAT entries, see “OAT Examples” on page 139.

What Next

Define additional configurations, if desired. For SNA, see “SNA Settings”.

SNA Settings

Specify SNA Timer Values for TR , FENET, or 1000Base-T on the **SNA Management** window.

Inactivity timer (Ti)

For a TR or FENET OSA-Express port, the Ti timer is initialized to be enabled and set to its maximum value of 90 seconds.

- You can disable or enable the Ti timer.
- If the Ti timer is enabled, you can set its timeout value in increments of 0.12 seconds from 0.24 to 90.00 seconds.

An enabled inactivity timer (Ti) periodically tests the viability of the network media. The timer setting applies to all the clients on the target LAN, not to individual clients. The timer interval indicates how quickly a failure of the network media can be detected when the connection is quiescent.

- If the Ti timer times out, a supervisory poll frame is sent over the connection. The T1 response, or reply, timer clocks the supervisory poll.
- If the T1 timer times out, the supervisory poll is retransmitted. OSA can retransmit a supervisory poll up to 8 times.
- If no response is received after the last retransmission, the link is declared inoperative, and the S/390 program issues a message.

If you set the Ti timer, make sure its interval exceeds the T1 timer limit. Consider setting the Ti timer to a value that is at least 5 times greater than the T1 timer.

If you set the Ti timer using the REXX command interface and you do not specify the increment properly, OSA/SF rounds the value up to the nearest increment.

Response timer (T1)

The T1 timer clocks link events that require responses from clients on the network. These link events include SABME / UA exchanges, I-frame link protocol data unit (LPDU) transmissions, and supervisory polls.

T1 timer is initialized to 2 seconds and can be set to a timeout value from 0.20 up to 51.00 seconds in increments of 0.20 seconds. Set the T1 timer to a value not less than the average round-trip transit time from the OSA to the clients and back.

If the round-trip transit time is small, consider setting the T1 timer to a relatively low value because recovery will be initiated more quickly when an I frame is dropped. Further, a T1 timer interval that exceeds 2 seconds can result in noticeable delays to those responses that must be retransmitted. However, retransmissions should occur infrequently and only during bursts of peak activity on the network.

Check the timer parameter value that is specified in the XCA Port Definition statement. Make sure the XCA timer is set to a value that is greater than (N2+1)*T1. Since N2=8 (retransmissions) for OSA, set the timer to a value that is greater than (9*T1). N2 = the maximum number of retransmissions.

If you set the T1 timer using the REXX command interface and you do not specify a multiple of 0.20 seconds, OSA/SF rounds the value up to the nearest increment of 0.20 seconds to a maximum of 51 seconds.

Acknowledgment timer (T2)

An OSA starts the T2 timer when it receives an I-format LPDU and stops when it sends an acknowledgment. An acknowledgment is sent either when an outgoing I frame is sent, which acts as the acknowledgment, or when N3 number of I-format LPDUs has been received. If the T2 timer times out, the OSA must send an acknowledgment.

If the N3 Maximum I frames before ack setting = 1, which means only one I frame can be received before an acknowledgment is sent, the T2 timer is disabled.

If N3>1, this allows a maximum of N3 I-format link protocol data unit (LPDU) frames to be received before the OSA-Express sends an acknowledgment.

If you set the T2 timer, bear the following in mind.

- Set it to a value from 0.08 seconds up to 20.40 seconds in increments of 0.08 seconds.
- Set it to a value that is less than the T1 interval to ensure that the remote link station receives the delayed acknowledgment before the T1 timer expires. A typical value for the T2 timer is 0.08 seconds.
- Set it to a value that depends on the media speed and the maximum latency that can be tolerated to complete a transaction. This latency will be realized when a transaction contains a number of packets that is not divisible by the N3 value.

If you set the T2 timer using the REXX command interface and you do not specify a multiple of 0.08 seconds, OSA/SF rounds the value up to the nearest increment of 0.08 seconds to a maximum of 20.40 seconds.

Maximum I frames before ack (N3)

When determining the maximum I-frames that can be sent before an acknowledgment is sent (N3 count) and the maximum number of outstanding I-format link protocol data units (LPDUs) (TW count), consider the N3 and TW counts that are set at the clients as well.

The N3 count is initialized to 1. For a TR or FENET OSA-Express you can set the N3 count as an integer from 1–4.

The maximum number of I-format link protocol data units (LPDUs) that can be received by an OSA before it sends an acknowledgment (N3 count) is also called the receive window count.

For a TR or FENET OSA-Express set N3>1 only if you want to reduce the number of acknowledgment frames sent by the OSA. Bear in mind that N3>1 can result in increased latency.

Do not set the N3 count to a value that is greater than the TW count set any of the clients. Otherwise, network response can be severely degraded.

Maximum transmit window (TW)

The TW count is initialized to 8. You can set it only for a TR or FENET OSA-Express. Set it as an integer from 1–16.

The maximum number of outstanding I-format link protocol data units (LPDUs) (TW count) is also called the maximum transmit window count or the maximum window out count.

The TW count allows the sender to transmit frames before that sender is forced to halt and wait for an acknowledgment. Therefore, the receiver should be able to absorb that number of frames, either in its service access point (SAP) buffers or within the buffers in workstation memory.

A small TW count reduces the risk that frames will be retransmitted owing to buffer congestion at the receiver.

In Summary:	TR and FENET OSA-Express
Ti and T1 LLC timers	Settable
T2 LLC timer	Settable if N3>1
N3 count	Settable (N3=1–4)
TW count	Settable (TW=1–16)

Notes:

1. The maximum number of SAPs that can be opened is one for each application in each image.

   This number of SAPs excludes the null SAP.
2. For the SNA availability options (page 106), only one SAP can be opened per port (page 109).

Enhanced SNA Availability Options for Token Ring

When configuring an OSA-Express Token Ring feature , several options exist for enhancing the availability of SNA sessions for your TR ports.

Do not open more than one SAP unless you are using the Redundancy option.

Overflow: This option causes the specified port to stop responding to connection requests when it reaches its maximum station count, or PU limit. The maximum PU limit, which is defined for the port to VTAM or the SNA function of Communications Server, defines that port's overflow threshold. Once the OSA port is in an overflow condition, it stops responding to connection requests.

Note that OSA makes no attempt to ensure even distribution of the clients across the participating OSA ports. If more than one port is responding to connection requests, the first response that the client receives typically determines which OSA port is selected for the connection. However, other factors can affect this selection. Therefore, the exact distribution of connections across the OSA ports depends on delays in the network and the implementation of the clients.

For example, assume the following configuration and current state.

Port	Option	Max PU limit	Current session count	Status
A	Overflow	347	347	Online (Note 1)
B	Overflow	300	183	Online (Note 2)
C	Overflow	347	27	Online (Note 2)

Notes:

1. With the current session count equal to the maximum PU limit, port A has reached its overflow threshold and stopped responding to connection requests.
2. Whether port B or port C is selected for a connection is governed by delays in the network.

Overflow and Redundancy: This option, together with the session-delay time that you define for the port, prescribes that the specified port delay its response to a connection request by that amount of time. This delay allows the port to provide a backup, or redundant, path for a port for which the overflow option is specified.

For example, assume the following configuration and current state.

Port	Option	Session delay	Max PU limit	Current session count	Status
A	Overflow	N/A	347	0	Failed
B	Overflow	N/A	300	300	Online (Note 1)
C	Overflow and Redundancy	0.32 sec	347	5	Online (Note 2)
D	Overflow and Redundancy	0.32 sec	300	62	Online (Note 2)

Notes:

1. With its current session count equal to its maximum PU limit, port B has reached its overflow threshold and stopped responding to connection requests.
2. Ports C and D will respond after their specified session delays, which is 0.32 seconds in this example. Additional connections will be established to ports C and D in an order that depends on delays in the network. The first port that reaches its maximum PU limit will stop responding, and any remaining connection requests will be logged onto the other port.

   For instance, suppose there are more connection requests and port D reaches its maximum PU limit first. Now, port C will respond to the remaining connection requests until it reaches its overflow threshold.

   In this example, a satisfactory redundant configuration is represented for up to 647 connections assuming that it was intended to accommodate the simultaneous failure of both ports A and B.

Load Balancing: With this option, you allow two or more ports to balance their connection requests. Load balancing is only related to the *number* of connections (PUs); it is not related to either the traffic volume or the workload across those connections.

For example, assume the following configuration and current state.

Port	Option	Load balance factor	Max PU limit	Current session count	Status
A	Load balancing	0.08 sec	256	256	Online (Note 1)
B	Load balancing	0.08 sec	480	256	Online (Note 2)
C	Load balancing	0.08 sec	1024	238	Online (Note 2)

Notes:

1. Port A has a maximum PU limit that is much lower (256) than the limit for ports B (480) and C (1024). Because port A has reached its maximum PU limit, it has stopped responding to connection requests.
2. The current session count for port B is 256 and for port C it is 238 sessions. Both ports will respond to connection requests.

   Because the load balancing option has been specified for both of them, the delay for each port is proportional to the number of connections it has before the response to the next connection request is issued.

   To calculate the total delay for the next connection request for each port, obtain the multiplier factor from the table on page 109.

- With a current session count of 256 sessions, port B's total delay time = 0.08 * 6 = 0.48 seconds.
- With a current session count of 238 sessions, port C's total delay time = 0.08 * 5 = 0.40 seconds.

Port C would therefore respond to a new connection request before port B. Hence, a connection would be established for port C, which would bring its session count up to 239. Although, typically the first response that a client receives determines which OSA port is selected for the connection, note that other factors can affect this selection.

Load Balancing and Redundancy: This option allows you to specify redundant paths for the ports for which you specified the load-balancing option.

For example, assume this configuration and current state.

Port	Option	Load balance factor	Session delay	Max PU limit	Current session count	Status
A	Load balancing	0.08 sec	N/A	1000	324	Online (Note 1)
B	Load balancing	0.08 sec	N/A	1000	362	Online (Note 1)
C	Load balancing and redundancy	0.08 sec	0.80 sec (Note 2)	1000	0	Online
D	Load balancing and redundancy	0.08 sec	0.80 sec (Note 2)	1000	0	Online

Notes:

1. As you can see from the table on page 109, the multiplier factor is 6 for both ports A and B. Since ports C and D have a 0 current session count, it is currently 0 for these ports.

   In the current state, the total delay for ports A and B is 0.48 seconds (0.08 * 6), so the port that acquires the next connection will be determined by delays in the network. When either port A or port B reaches 384 connections, its delay will be 0.54 seconds (0.08 * 7). At that time, the other port will respond 0.08 seconds sooner until its total connection count reaches 384.
2. When deciding on the session delay time for the two redundant ports C and D, look at the maximum delay that can occur for the primary ports, which are ports A and B in this example.

   In this example, the maximum delay for the primary load-balancing ports (A and B) cannot exceed 0.72 seconds (0.08 * 9), and is reached when 1000 connections are logged onto either of these two ports.

   To prevent any traffic from being established on the redundant ports C and D while ports A and B are still responding to connection requests, set the session delay for the redundant ports (C and D) to a value that at least equals the longest potential delay for the primary ports (A and B). Since a connection request for port A or B can be delayed by 0.72 seconds, 0.80 seconds was chosen for the session delay time for the two redundant ports (C and D).

Redundancy: This option allows you to open more than one SAP for a primary path and a secondary path by disallowing an overflow of connections between the two paths.

This option requires that you specify the Redundancy option for the secondary path and the Disabled option for the primary path. For example, assume the following configuration and current state.

Port	Option	Max PU limit	Session delay	SAPs open	Max connections	Current session count	Status
A	Disabled	1000	N/A	SAP 04 SAP 08 SAP 0C	256 511 324	424	Online: responding
B	Redundancy	1000	0.32 sec	SAP 04 SAP 08 SAP 0C	256 511 324	0	Online

Disabled: When each OSA-Express is shipped, its SNA session availability option is initialized to the Disabled option. In this context, Disabled means that none of the other SNA session availability enhancement options are active for this port.

Session Delay (0.4–15.00 Seconds) for Redundancy: When each OSA-Express is shipped, its session delay is initialized to 0 seconds. For the Redundancy, Load balancing and Redundancy, and Overflow and Redundancy options:

- Specify a nonzero delay time in increments of 0.04 seconds up to 15 seconds.

  Base the value on the longest delay time that can be incurred by the non-redundant members of the set for which the port is a backup. For example, you could specify a session delay of 10 seconds.
- To calculate the total delay time for a port if you specify the Load balancing and Redundancy option, add the session delay time to the delay that you calculated for the load balancing option.

Load Balance Factor (0.4-1.00 Seconds): The load balance factor is initialized to 0 seconds. For the two options, Load balancing and Load balancing and Redundancy, specify a nonzero factor in 0.04-second increments up to 1 second.

In general, the load balancing factor should be set to the same value for all the ports configured for load balancing. Although the optimal setting depends on the network configuration, a reasonably high degree of balance can be obtained with a small load balance factor. For most networks, a load balance factor of .08 seconds is suitable. You should set the same load balance factor for all the ports in the set for which you specify this option.

To calculate the total delay time for a session, multiply the load balance factor by a multiplier factor (*m*). For the Load balancing and Redundancy option, add the session delay time to this result. As the following table shows, *m* is a function of the number of sessions that are logged on to the port.

Current Session Count	Multiplier factor *m*	Current Session Count	Multiplier factor *m*	Current Session Count	Multiplier factor *m*
0–15	0	256–383	6	2048–2559	12
16–31	1	384–511	7	2560–3071	13
32–47	2	512–767	8	3072–3583	14
48–63	3	768–1023	9	3584–4095	15
64–127	4	1024–1535	10	4096	16
128–255	5	1536–2047	11		

For the Load Balancing option: the total delay is not just the load balance factor. For example, assume that you specified a load balance factor of 0.08 seconds. There is no delay for the first 15 sessions logged on to a port (0 * 0.08); the 16th through the 31st sessions are delayed by 0.08 seconds (1 * 0.08); the 32nd through 47th session are delayed by 0.16 seconds (2 * 0.08), and so on.

For the Load Balancing and Redundancy option: add the session delay time to the delay that you would calculate for load balancing. Continuing with the example, assume that you had specified a session delay of 1.2 seconds in addition to the load balance factor of 0.08 seconds for the redundant ports for which you select the Load balance and redundancy option.

- The total delay for each of the first 15 connections is 0.12 seconds (0 * 0.08 + 1.2).
- The delays for connections 16 through 31 is 1.28 seconds by 1.28 seconds (1 * 0.08 + 1.2).
- The delays for connections 32 through 47 is 1.36 seconds (2 * 0.08 + 1.2), and so on.

Continue with the SNA OAT entries on page 110.

The SNA OAT Entries

SNA OAT Entries are defined for FENET, 1000Base-T, or TR on the **SNA OAT entry Definition** window. You can define the following fields. For complete information, see the help panel:

- **Image number**
- **Unit address**

For **Image number**, the format is `css.x`, where `css` is the channel subsystem identifier and x is the image number id. For sample SNA OAT entries, see “OAT Examples” on page 139.

What Next

Define additional configurations, if desired.

Activating the Configuration

To activate the configuration, click on **Activate** from the menu bar and select one of the following options:

- **Activate with install** to activate the configuration immediately
- **Activate without install** to ready a configuration for installation at a later time

Part 2. OSA-Express Reference

Part 2 contains information for setting up the OSA. It also provides information about the normal course of operation, service, problem determination, and command reference.

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Chapter 9. OSA Port Management

An OSA port is used to transfer data between the system platform and the network attached to the port. The physical characteristics of the OSA ports are discussed in Chapter 1.

Enabling and Disabling Ports

You can use IOACMD REXX commands or the OSA/SF GUI to enable and disable the LAN traffic state on a port.

Using the GUI

To display the port settings for a port on the OSA/SF GUI, click on the **Command Window**, then **CHPID View**. In the list, find and highlight the port for the CHPID that you want to display and double click the entry. You receive the settings panel for the port.

To change the enabled/disabled traffic state for the port, click on **Settings** on the settings panel. You find one of the following settable fields:

LAN traffic state
For OSA-Express features

Hardware state
For OSA-2 features

Click on **Set**. In the LAN traffic or hardware state window, change the state, and click **OK**.

Using IOACMD

Use the IOACMD SET_PARAMETERS command to specify the enable or disable parameter for the port on a specific type of OSA-Express feature. For example, on OS/390:

```
EX 'IOACMD.EXEC' 'SET_PARMS 54 0 GIGA_ENABLE_lan_traffic_physical_port'
```

This would enable LAN traffic on Gigabit physical port 0 on CHPID 54.

When using the SET_PARMS command, you can substitute a numeric value for the text version of the parameter:

```
EX 'IOACMD.EXEC' 'SET_PARMS 54 0 390'
```

would accomplish the same task.

The VM version of the command is:

```
IOACMD SET_PARMS 54 0 GIGA_ENABLE_lan_traffic_physical_port
```

or

```
IOACMD SET_PARMS 54 0 390
```

To disable the same port, specify the `GIGA_DISABLE_lan_traffic_physical_port` parameter or `391`.

See the SET_PARAMETERS command on page 157 for a complete list of parameters.

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Using the Support Element

If you have system programmer authority, you can use the Support Element of the z990 processor to enable and disable ports.

1. Under the **Support Element Workplace**, go to the **CHPIDs Work Area** view that shows all of the PCHID icons for the CHPIDs. To get to this view, double-click on the **Groups** icon and then on the **CPC** icon. Then right click on the processor icon and then left click on **Channels**.
2. Click on the desired PCHID icon to select it.
3. Double Click on **Advanced Facilities** to the right of the PCHID icons. Advanced Facilities is under the Channel operations menu. You can use the arrows at the bottom right-hand corner of the window to circulate through the different menus.
4. Click on the radio button for **Card specific advanced facilities...** and click on **OK**.
5. Highlight **Enable or disable ports..**. and click on OK.
6. Click on the desired radio buttons and then click on **Apply**.
7. After the command is complete, click on **OK** to close the job completion confirmation window. Then click **Cancel** on each of the subsequent windows (2) to close them if you are finished making changes.
8. If the PCHID icon is still highlighted, click on it to deselect that PCHID.

MAC Addresses

A media access control (MAC) address uniquely identifies a port that is physically attached to a LAN. Therefore, each port on any OSA-Express feature is shipped with its unique, or universal, MAC address.

You can set a local MAC address and specify that a port receives frames for a group destination MAC address as discussed in the following sections. Use OSA/SF, the support element (SE), or single object operations through the hardware management console.

Local MAC Address

Set a locally-administered MAC address for an OSA LAN port for the following reasons:

- A local MAC address can be easier to identify by network personnel because it conforms to the network's or site's naming convention.
- A local MAC address does not need to be changed if the OSA is physically replaced. A replaced OSA has its own universal MAC address already with it.

A local MAC address must be unique within the network in which it is used and administered by a local authority. It is therefore a unicast MAC address.

You can set a local MAC address for a port with the **Local MAC address parameter** for any OSA-Express feature. Follow one of the procedures in "Setting MAC Addresses" on page 115. You can also use the support element (SE) or single object operations through the hardware management console to set a local MAC address for a port. For procedural information, see the operator's guide for the hardware platform.

For a local MAC address to take effect, the OSA channel must be configured offline from, and then back online to, all the images to which the OSA feature is defined.

Canonical versus Noncanonical Format

Set a MAC address for an Ethernet connection in the *canonical* format as shown in the following table.

Set a MAC address for a Token Ring connection in the *noncanonical* format as shown in the following table.

The difference between a canonical and noncanonical address is that in non-canonical the bits within each byte are transposed (swapped). In the canonical format of an Ethernet MAC address, bit 6 indicates whether the address is an individual (0) or group (1) address; bit 7 indicates whether the MAC address is universal (0) or local (1). In the noncanonical format of a Token Ring MAC address, bit 0 indicates whether the MAC address is an individual (0) or group (1) address, and bit 1 indicates whether the MAC address is universal (0) or local (1).

For these types of LANs and ports	Specify as shown
For an Ethernet port	• Set bit 6=1 and bit 7=0 • Set bits 0–5 and 8– 47 to the 46-bit local MAC address If an Ethernet LAN station is connected across a bridge to a non-Ethernet LAN, the destination MAC address in the VTAM PATH Definition statement may need to be coded differently (page 96).
For a Token Ring port	• Set bit 0=0 and bit 1=1 • Set bits 2 through 47 to the 46-bit local MAC address

Group MAC Address

A group MAC address allows the port to receive frames with that group's destination MAC address.

You can assign a group MAC address of all zeros, but not an address of all X'FF'. For a nonzero group MAC address:

- Set bit 7 to 1 for an Ethernet LAN connection.
- Set bit 0 to 1 for a token ring LAN connection.

You can view a Local and Group MAC addresses in the OSA-Express Port Setting pages, shown below. You can set these addresses as follows:

Setting MAC Addresses

Using the OSA/SF GUI

To configure a Local MAC Address, Group MAC Addresses, and User Data for an OSA-Express, open a configuration panel for the desired port associated with the CHPID. You can make changes in the fields provided. For information on using the GUI to display and modify existing configurations or define new configurations for an OSA, see "Using the GUI to Configure OSA-Express CHPIDs" on page 101.

After you enter and save the configuration parameters, select **Activate** from the menu bar, then **Activate without install**. When you are ready, restart the applications.

Using the REXX EXEC (IOACMD)

To configure a Local MAC Address and Group MAC Addresses for the OSA-Express using the IOACMD exec, do the following:

1. Edit and customize the configuration file, following the instructions in the header. You can use the samples (**IOAGIGA** and **IOAFENET**) from **IOA.SIOASAMP** on OS/390, z/OS, or z/OS.e, or the E (200) minidisk on VM. Alternatively, at the command line, enter: **EX 'IOACMD.EXEC' EXEC** (or just **IOACMD** on VM) and then select **Get Configuration File**. If you need assistance using IOACMD, see Chapter 13, "OSA/SF Commands for REXX", on page 141.
2. At the command line, enter: **EX 'IOACMD.EXEC'** (**IOACMD** on VM) and then select **Configure OSA CHPID**.

Using the Hardware Consoles (HMC or SE)

If you have access to either the Hardware Management Console or the Support Element of the processor, you can use the following instructions to do OSA-specific tasks. If OSA/SF is not installed and you want to use a Local MAC address, do the following.

1. From the HMC or SE, select (double-click) CPC Group from the **Groups Work Area** that shows all of the PCHID icons for the CHPIDs. Double-click on the **Groups** icon and then on the **CPC** icon. Right click on the processor icon and then left click on **Channels**.
2. Click on the desired **PCHID** icon.
3. Scroll to get to Channel Operations. From there double-click on **Advanced Facilities** to the right of the PCHID icons.
4. Select **Standard Channel Advanced Facilities**.

Attention: If you changed the local MAC address and are not using OSA/SF, the associated CHPID must be reset in order for the change to take effect. To do so, first vary all devices offline from *every* image that has the CHPID online. Configure the CHPID offline from *every* image that has the CHPID online. Then configure the CHPID back online to any images that will use it and vary the devices back online.

Querying and Purging the ARP Cache

The Address Resolution Protocol (ARP) cache resides on the OSA-Express feature. When TCP/IP is started in QDIO mode, it downloads all the home IP addresses in the stack and stores them in the ARP cache. When running OSA-Express features in QDIO mode in a z/OS V1R4, z/VM Version 4 Release 4, or Linux environment, you can query and purge the contents of the ARP cache.

Communications Server for z/OS V1R4 adds support for querying and purging the ARP cache using the following commands:

To purge the ARP cache on z/OS

VARY TCPIP,,PURGEcache,*linkname* for example,

```
v tcpip,,purge,link4
```

To query the ARP cache on z/OS

DISPLAY TCPIP,,NETSTAT,ARP,*ip_addr* for example,

```
d tcpip,,net,arp,10.11.91.200
```

or

TSO NETSTAT command, for example,

```
netstat arp all tcp tcpip
```

To query the ARP cache on z/VM

TSO NETSTAT command, for example,

```
netstat arp *
```

See *z/VM TCPIP Users Guide*.

The **Linux** qetharp utility is available to query or purge the contents of the ARP cache, for example:

```
qetharp -q eth0
```

shows all ARP entries for OSA-Express interface eth0, while

```
qetharp -p eth0
```

removes all entries from the ARP cache for OSA-Express port eth0. See *Linux for zSeries: Device Drivers and Installation Commands*, LNUX-1103, for a complete description of this command.

OSA-Express Direct SNMP Support

The OSA-Express direct SNMP subagent provides access to OSA-Express management information bases (MIBs) without OSA/SF, which is required when accessing OSA SNMP data through the Communications Server TCP/IP subagent. If you are running z/OS V1R4 or Linux, you can access the OSA-Express direct SNMP subagent by following the steps below. The OSA-Express direct SNMP subagent only communicates with OSD (QDIO) CHPIDs. For OSA-Express features defined as OSE (non-QDIO) CHPIDs, use the CS TCP/IP SNMP subagent described in “Set up the Communications Server SNMP TCP/IP subagent” on page 46. For earlier releases of z/OS or for OS/390, the CS TCP/IP SNMP subagent provides the only access to OSA-Express MIBs.

The OSA-Express MIB support consists of:

- OSA-Express Channel, Performance, and PE (Product Engineering) MIB values for OSA-Express Ethernet and Token Ring
- OSA-Express Ethernet Port tables for OSA-Express Ethernet type adapters
- OSA-Express Token Ring Port tables for ODSA-Express Token Ring adapters

Requirements

The following requirements apply to implementing direct SNMP support for OSA-Express:

Hardware: z900 or z990 processors.

Software: For the latest requirements, see IBM **Resource Link**:

https://www.ibm.com/servers/resourcelink

Setting up OSA-Express Direct SNMP Support for z/OS

In order for the SNMP management application to receive OSA-Express MIB data, the Communications Server for z/OS SNMP master agent, OSNMPD, must be running. OSNMPD runs in a separate address space that executes load module EZASNMPD. OSNMPD can be started with or without parameters. For more information about OSNMPD, including details on optional parameters, see *z/OS Communications Server: IP Configuration Reference*.

Once the SNMP master agent, OSNMPD, is running, you can start the OSA-Express direct SNMP subagent with the IOBSNMP procedure. IOBSNMP has four optional parameters shown in Figure 45, the sample JCL procedure provided.

```
//IOBSNMP  PROC P='-s TCPIP'
//*
//*   START OSA direct SNMP subagent
//*
//IOBSNMP  EXEC PGM=IOBSNMP,TIME=1440,REGION=4096K,DYNAMNBR=5,
//         PARM='&P.'
//*
//SYSPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//*
//* The options available for the PARMS referenced by P are
//* -d level   - turn on specified debugging
//*              0 - no tracing
//*              1 - minimal tracing
//*              2 - maximum tracing
//*             >2 - maximum tracing plus SNMP traces
//* -c community   - use specified community name
//* -p port number - use specified port number
//* -s stack       - send request to specified stack
//*
//* Defaults:  -d 0 -c public  -p 161  -s Default_stack
```

Figure 45. Sample Procedure (Member IOBSNMP)

Update cataloged procedure IOBSNMP by copying the sample in hlq.SEZAINST(IOBSNMP) to your system or recognized PROCLIB. Change the data set names as required to suit your local configuration. The IOBSNMP address space requires access to the IBM C/370 Library during execution.

IOBSNMP must have certain RACF authorities set up in order to function properly. See member hlq.SEZAINST(EZARACF) for security product considerations for started tasks.

Additional Resources

See*z/OS Communications Server: IP Configuration Guide* for information on configuring SNMP.

The MIB that matches your server's MCL can be installed by either:

- Selecting **Advanced Functions** on the Support Element

or

- Downloading from http://www.ibm.com/servers/resourcelink.
  - After logging in, select **Library**
  - Under ″Library shortcuts″ on the right side of the screen, select **Open System Adapter (OSA) Library**
  - Select ″OSA-Express SNMP Direct MIB Module″ for a description, or click on ″TXT″ for the module
  - Save the MIB file to the location required by your SNMP management application

See your SNMP application product information for management commands and procedures.

Setting up OSA-Express Direct SNMP Support for Linux

The OSA-Express direct SNMP subagent extends the capabilities of the ucd-snmp master agent (snmpd), which is required, and can retrieve SNMP management data from any OSA-Express feature defined as CHPID type OSD, running in QDIO mode. In order for the subagent to obtain management data, the OSA-Express feature must be active and must be defined in the appropriate files for the Linux distribution, for example, /etc/modules.conf and /etc/chandev.conf.

Starting the OSA-Express Direct SNMP Subagent

Use the osasnmpd command to start the subagent:

```
# osasnmpd options

options:
-h              Displays this usage message
-v              Version information
-l LOGFILE      Print warnings/messages to LOGFILE
                (By default LOGFILE=/var/log/osasnmpd.log)
-A              Append to the logfile rather than truncating it
-L              Print warnings/messages to stdout/err
-f              Do not fork() from the calling shell
-P PIDFILE      Save the process ID of the subagent in PIDFILE
```

How to Stop the Subagent: Stop the OSA-Express direct SNMP subagent issuing either a SIGINT or SIGTERM command to the main thread, for example:

```
killall osasnmpd
kill PID_of_subagent_main_thread
```

Note: Do not use kill -9 or kill -SIGKILL to stop the subagent under normal circumstances. This will prevent the OSA-Express MIB objects from being unregistered by the SNMP master agent and may cause problems when restarting the subagent.

Additional Resources

Refer to *Linux for zSeries: Device Drivers and Installation Commands*, LNUX-1103, available at www10.software.ibm.com/developerworks/opensource/linux390/index.shtml, for more information.

The MIB that matches your server's MCL can be installed by either:

- Selecting **Advanced Functions** on the Support Element

or

- Downloading from http://www.ibm.com/servers/resourcelink.
  - After logging in, select **Library**
  - Under ″Library shortcuts″ on the right side of the screen, select **Open System Adapter (OSA) Library**
  - Select ″OSA-Express SNMP Direct MIB Module″ for a description, or click on ″TXT″ for the module
  - Save the MIB file to the location required by your SNMP management application

For ucd-snmp downloads and information, see http://net-snmp.sourceforge.net/.

See your SNMP application product information for management commands and procedures.

For more on Linux, see

www10.software.ibm.com/developerworks/opensource/linux390/index.shtml
and

www.linux.org/docs.

Chapter 10. Problem Determination Aids

You must have OSA/SF installed in order to use OSA problem determination aids. OSA/SF problem determination aids include:

- Messages from OSA/SF (see Chapter 14, “OSA/SF Messages and Codes”, on page 163)
- Messages from OSA/SF GUI (see “Error Messages for the OSA/SF GUI” on page 228)
- “OSA/SF Message Log”
- “OSA/SF Trace Table” on page 122
- “OSA/SF Dump” on page 122
- “IOACMD Debug Data Sets” on page 123
- “OSA/SF Workstation Debug Settings” on page 123

Using OSA/SF Problem Determination Aids

OSA/SF Message Log

OSA/SF has a message log that contains a record of all OSA/SF commands issued, responses, and error messages. All error messages are logged, even when multiple failures occur that cause only one message to be displayed.

You can look at the message log and send the log to the IBM support center. Each OSA/SF image has a message log.

If the OSA/SF message log becomes full, a new message log is started and the log that is full is stored for your reference. A message is displayed indicating that the log is full and then another message displays the name of where the message log is stored. Both of these messages are put in the new message log.

The name of the message log is specified in the Startup Profile. The message log that becomes full is stored with the name specified in the Startup Profile with the Julian date appended to the end of the name.

If you want the message log for the logged-on system, you can use either the OSA/SF GUI or the REXX command (IOACMD EXEC) interface.

Using the GUI

1. From the **OSA/SF Commands** window, click on **Debug**.
2. Select **Get OSA/SF message log**.
3. Enter the **Workstation file name** for the workstation where the information is to be stored.
4. Click the **Set** pushbutton.

Using the REXX Command GET_DEBUG

See “GET_DEBUG” on page 148.

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```
IOAC101I OSA Support Facility initialization started 02/12/2003 10:34:32
IOAC100I OSA Support Facility version H0GI400 APAR H0GI400
IOAC153I Processing of OSA/SF startup profile started
IOAC152I Finished OSA/SF startup profile processing
IOAC150I 10:34:35 Interrupt handler component started
IOAK326I CHPID 02 is currently managed by image 0.1
IOAK326I CHPID 03 is currently managed by image 0.1
IOAK326I CHPID 10 is currently managed by image 0.1
IOAK326I CHPID 11 is currently managed by image 0.1
IOAC144I 10:34:40 ALL OSA devices initialized
IOAC141I 10:34:40 API APPC component started
IOAC174I 10:34:40 AutoLog component started
IOAC102I OSA Support Facility initialization completed 02/12/2003 10:34:40
```

Figure 46. Example of a Message Log

OSA/SF Trace Table

Each OSA/SF image has its own trace table. The trace table contains, in a format for IBM internal use, the 8000 most recent trace records generated during program execution. When the trace table is full, the oldest entries are overwritten.

Note: The IBM support center might request that you provide a trace table for OSA/SF.

If you want the trace table for the logged-on system, you can use either the OSA/SF GUI or the REXX command (IOACMD EXEC) interface.

Using the GUI

1. From the **OSA/SF Commands** window, click on **Debug**.
2. Select **Get OSA/SF trace table**.
3. Enter the **Workstation file name** for the workstation where the information is to be stored.
4. Click the **Set** pushbutton.

Using the REXX Command GET_DEBUG

See “GET_DEBUG” on page 148.

OSA/SF Dump

If OSA/SF on OS/390, z/OS, or z/OS.e abends, the OSA/SF dump is sent to a dump data set, SYS1.DUMPxx. After an abend, OSA/SF must be restarted.

On VM, a non-formatted IPCS dump is sent to the OSAMAINT userid’s reader. If possible, OSA/SF then shuts down, cleans up its resources, and logs off the OSA/SF virtual machine. Reinitialization occurs upon receipt of the next OSA/SF command.

OSA/SF has a unique dump title that contains the abend code for the failure, the failing module, and the recovery routine that sent the dump:

```
ABEND aaa IN bbbbbbbb, COMPID=5688-008, ISSUER=cccccccc
```

where:

aaa
Is the abend code.

bbbbbbbb
Is the failing control section (CSECT) name.

cccccccc
Is the recovery routine that sent the dump.

IOACMD Debug Data Sets

Whenever you run the IOACMD exec, two data sets are produced for use in debugging. One contains the data sent to the main OSA/SF address space (input), and the other contains the data returned from the OSA/SF address space (output) when the command completes, whether or not it was successful.

In OS/390 these data sets have the following names,

- **USERID.IOACMD.INPUT.*command_name***
- **USERID.IOACMD.OUTPUT.*command_name***

In VM they have the following names on the A-disk of the user who issued the command.:

- **IOACMDIN *command_name***
- **IOACMDOT *command_name***

In VSE they have the following names and are located where OSASF was started:

- ***library.sublibrary*.IOACMDIN.*command_name***
- ***library.sublibrary*.IOACMDOT.*command_name***

By default, IOACMD assigns the value of the USERID issuing the command as the high level qualifier in the data set name. This is how IOACMD.EXEC worked before APAR OW21887. To prepend USERID with a new high level qualifier that takes a different value, edit the IOACMD EXEC and find the line where `hlq=""` appears. Specify your value (up to 8 valid MVS characters are allowed) between the quotation marks. For example, to name the debug data sets **SYS1.USERID.IOACMD.INPUT.*command_name***, edit the line to `hlq = "SYS1"`.

OSA/SF Workstation Debug Settings

When the problem is not obvious, the OSA/SF GUI **Workstation Error and Trace Log Settings** window is available for use at the direction of IBM Support.

The **Workstation Error and Trace Log Settings** window is accessed from the **OSA/SF Workstation Interface** window.

From the window, select **Options** → **Workstation debug settings**. Figure 47 on page 124 is a sample window:

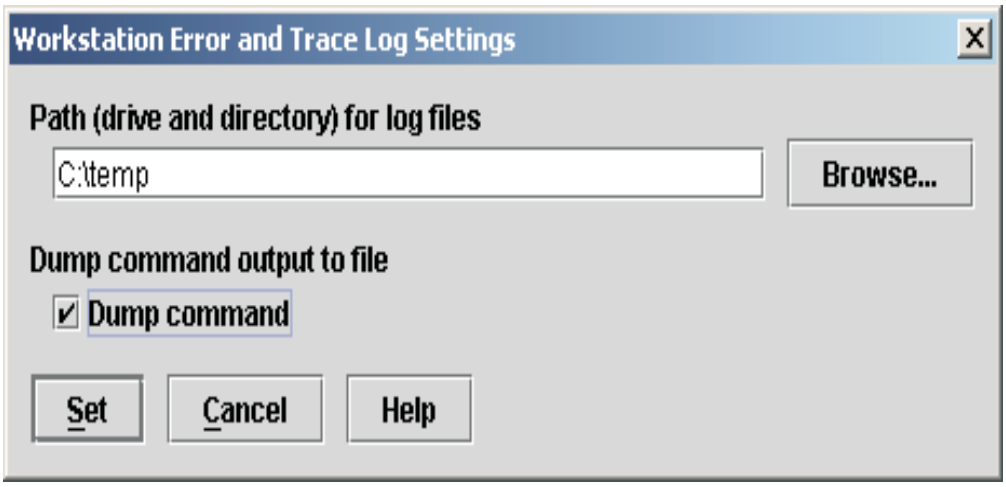

Figure 47. Specify GUI Trace and Dump Options

Path (drive and directory) for log files
Set this to a predefined directory of your choice.

Dump command output to file
Select **Dump command** when you want to write the contents of storage after the next GUI command is executed.

The dump output is written to the same directory in two files named IOADxxx.BIN (binary) and IOADxxx.DMP (ASCII), where xxx reflects the command for which the dump was collected:

MNG Start or Stop Managing

SET Set Parameters

QRY Query

INS Install

OAT Get OATs

DBG Get debug

CFG Get config

CLR Clear debug

CHPID Problems

Consider the following problem determination for CHPIDs.

- As an I/O channel with associated devices, an OSA is subject to the same problem determination procedures that apply to any other type of channel. For information on hardware procedures, refer to the system books listed in the bibliography.

  Although the high availability with which OSA has been designed makes channel failure unlikely, such a possibility should be considered in the planning of your general management of an OSA in its network traffic. For example, by designing alternate connections for server-to-network and server-to-client traffic, you can prevent the OSA features in your enterprise from being candidates for a single point of failure.

- If an OSA memory dump or trace is required for the resolution of a problem, you will be directed by support personnel to obtain this information using the Get Debug command. This is described in the Commands section of the Appendix.
- An OSA LAN port can be managed by the LAN management tools available to the LAN administrator.
- If port diagnostics must be run, remember that an OSA is an z/OS channel type. The OSA CHPID must be configured online, and then LAN traffic to the port must be stopped.

  If OSA/SF is managing the OSA, the associated entries in its OSA address table, or OAT, are useful when determining the status of the devices associated with the port. From the OSA/SF GUI **CHPID View** window, highlight the port associated with the CHPID, then from the menu bar choose **Select → Open OAT information**. For the IOACMD REXX exec, use the **Get OAT or Query** command.
- Some hardware failures are disruptive only to the port, and you would prefer to disable the port without configuring the channel off. You can do this using OSA/SF, the hardware support element or single object operations via the hardware management console.

Performance Data

You can use OSA/SF to obtain performance information for an OSA. From **CHPID View** on the OSA/SF GUI, highlight and double-click the CHPID entry. You receive the **Settings** window. Click on **Performance** to obtain the settings. For the REXX command, use **Query**:

PCI bus utilization (by CHPID)
: The average, over the indicated time interval, of the percentage of time that the PCI bus was used to transfer data. This does not include idle time or time used by routine maintenance tasks.

Processor utilization (by CHPID)
: The average, over the indicated time interval, of the percentage of time that the CHPID processor was used to transfer data. This does not include idle time or time used by routine maintenance tasks.

KBs read (by image)
: The average number bytes read during the indicated time interval, expressed in KB/s.

KBs written (by image)
: The average number bytes written during the indicated time interval, expressed in KB/s.

Processor utilization (by image)
: The average percentage of processor resource usage during the indicated time interval.

All values displayed are set to zero when the CHPID is reset.

As Figure 48 on page 126 shows, this performance data is averaged over three time intervals. If you display this page before enough time has elapsed since the CHPID has been reset, no data is displayed in the columns for the longer time intervals.

Performance data is also available through the Resource Measurement Facility, an element of OS/390, z/OS, and z/OS.e.

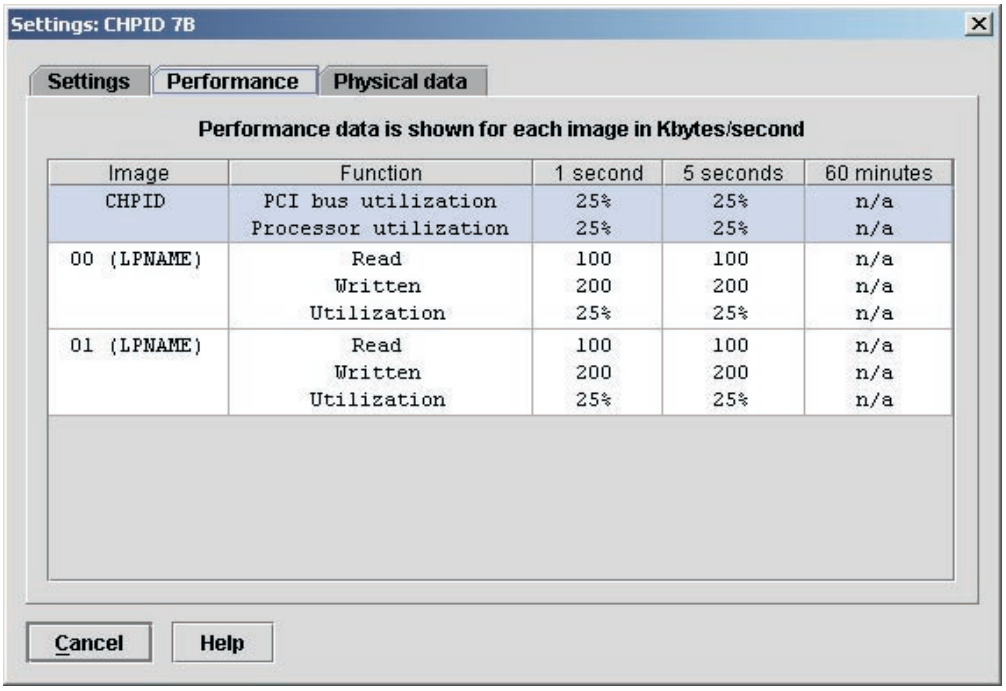

Figure 48. CHPID Performance Data in Channel Settings

Resource Measurement Facility

Resource Measurement Facility (RMF), an element of OS/390, z/OS, and z/OS.e, measures and reports on the performance and availability of such system resources as processors, channel paths, devices, and storage. RMF can be set to issue reports about performance problems as they occur, so that your installation can take action before problems become critical. Your installation can also obtain long-term measurements of system performance that can be used for system tuning and capacity planning.

One of the RMF reports available is the *Channel Path Activity* report. For OSA-Express CHPIDs only, the Channel Path Activity report includes an *extended measurement mode* with five new fields, highlighted in Figure 49. These fields aid in the performance analysis of the multipath channel connection used by OSA-Express, which consists of one logical device for READ, one for WRITE, and another for data transfer (DATAPATH).

```
                                  C H A N N E L   P A T H   A C T I V I T Y                                  PAGE  3

          Z/OS                          SYSTEM ID  S31                DATE  02/30/2003                INTERVAL  00.10.073
          REL.  01.04.00                RPT VERSION 2.7.0             TIME  14:24:17                CYCLE  1,000 SECONDS

 IODF = 71    CR-DATE:  03/25/03    CR-TIME:  07:21:32    ACT:  ACTIVATE    MODE:  LPAR    CPMP:  EXTENDED MODE

CHANNEL  PATH      UTILIZATION(%)      READ (MS/SEC)          WRITE (MB/SEC)      CHANNEL  PATH      UTILIZATION(%)      READ (MS/SEC)          WRITE (MB/SEC)
  ID  TYPE  SHR    PART    TOTAL    BUS    PART    TOTAL    PART    TOTAL        ID  TYPE  SHR    PART    TOTAL    BUS    PART    TOTAL    PART    TOTAL
  C8  OSD   Y     32.44    32.44  42.50   35.28   35.28   35.60   35.60        CE  OSD        OFFLINE
  C9  OSD   Y     12.90    12.90  25.34   16.44   16.44   66.32   66.32        CF  OSD        OFFLINE
  CA  OSD   Y     85.30    85.30  96.12   78.60   78.60   85.55   85.55
  CB  OSD       OFFLINE
  CD  OSD       OFFLINE
```

Figure 49. RMF Channel Path Activity Report

The leftmost field in the shaded area represents the percentage of bus cycles that are busy, relative to the theoretical limit.

You may see utilization values other than zero due to broadcast traffic on the LAN.

Under the READ heading, the PART value is the data transfer rate from the OSA-Express to the channel for this image. The value under Total represents the data transfer rate from the OSA-Express to the channel for the entire system.

Under the WRITE heading, the PART value is the data transfer rate from the channel to the OSA-Express for this image. The value under Total represents the data transfer rate from the channel to the OSA-Express for the entire system.

The reported data transfer rate is the total number of bytes handled for a given connection.

OSA-Express CHPIDs (device types OSD and OSE) may appear in the RMF Device Activity Report with messages reporting “NO H/W DATA” or “NO TIMING FACILITY”. It is also possible for zeroes to appear for these devices.

For these device types the data reported is not meaningful in the Device Activity Report and you may want to remove them from your specification list of devices. For data useful in tuning and capacity planning, see the RMF Channel Activity Report.

For information, see *z/OS RMF User’s Guide* and *z/OS RMF Report Analysis*.

Reporting OSA/SF Problems to IBM

If you cannot correct a problem using the problem determination information provided, report the problem to the IBM support center. Use the following checklist for the call:

__ 1. Have your account name, license number, and other customer identification available.

__ 2. Have the following product-related information available:

- __ a. FMID:
  HOG1400 for z/OS V1R4 base program
- __ b. PUT Level: ID of the latest program update tape installed
- __ c. Service Level:
  See report headings and output data sets of the OSA/SF Main Menu for the OSA/SF service level.

__ 3. Have information available on any recent system definitions, or installed products that could be relevant.

__ 4. Have your record of service and updates to OSA/SF available.

__ 5. Report any OSA/SF service that has been bypassed.

__ 6. Have information available relevant to the type of problem.

In general, you will need to provide:

- __ a. A description of the problem
- __ b. The sequence of events leading to the problem; for example, the command being processed and the operands specified
- __ c. A list of the relevant messages, including both their identifiers and text

__ d. An indication of how many times the error occurred and any other symptoms that appear relevant.

Chapter 11. Servicing OSA-Express and OSA/SF

Use these instructions after an OSA device is replaced or when a PTF is installed for OSA/SF.

Service for an OSA Hardware Replacement

Do the following whenever an OSA feature must be replaced and the new OSA will operate in the same OSA mode as the previous OSA. If you want to change the OSA mode of the new feature, you must customize the OSA mode from the beginning. See Chapter 8, “Configuring OSA-Express Modes”, on page 97.

Instructions are provided for using the REXX EXEC from the TSO/E userid or the OSA/SF GUI.

__ 1. Stop the affected host products for the OSA modes installed on the OSA.
   - If the OSA is configured for SNA mode, stop the use of OSA with VTAM.
   - If the OSA is configured for TCP/IP mode, stop the use of OSA with TCP/IP on the host.

__ 2. Vary off the OSA devices and then configure the OSA (CHPID) offline from all images that can use or share the CHPID.

__ 3. Service personnel installs the new OSA device.

__ 4. Configure the CHPID and OSAD device back online to the appropriate images. Use the REXX command (IOACMD EXEC) interface or OSA/SF GUI to issue the **Install** command for the configuration.

__ 5. Vary the OSA devices online.

Installing a PTF for OSA/SF

If the PTF affects OSA/SF, install the PTF using SMP/E (OS/390, z/OS, or z/OS.e) or SES (VM), stop OSA/SF, then restart OSA/SF. If the PTF affects VSE, follow the PTF install steps for IUI Install IBM Service, IUI Fastpath 1422/1423.

Note: The description for the PTF will identify what is affected.

If the PTF affects the OSA/SF GUI, see “Setting up an OSA/SF GUI” on page 71.

Migrating to the OSA/SF Java–based GUI

When you migrate to the Java-based OSA/SF GUI from earlier versions of the OSA/SF GUI, consider the following restrictions:

- The earlier versions of the OSA/SF GUI cannot share files with the Java-based OSA/SF GUI.
- Any configuration that you have created with earlier versions of the OSA/SF GUI are not accessible to the Java-based OSA/SF GUI.

The Java-based OSA/SF GUI can read and save any configuration for a currently installed OSA. In order to obtain OSA configuration data that has been saved through the non-Java based OSA/SF GUI, perform the following steps from the Java-based GUI:

1. Start the GUI and from **CHPID View**, highlight the CHPID whose data you want to save.

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2. From the menu bar, choose **Select** → **Configurations** → **Configuration** to open the configuration window for the CHPID.
3. From the configuration window menu bar, select **File** → **Get current configuration**. The configuration data for the OSA is loaded into the configuration window.
4. Give the OSA configuration a name. From the menu bar, select **Save configuration**. The OSA configuration data is saved to the host list for use by the Java based OSA/SF GUI.

Migrating to a New Version or Release of OSA/SF on OS/390 z/OS, or z/OS.e

If a previous version or release of OSA/SF is installed, use the following to migrate to the new version or release.

__ 1. Follow the program directory instructions to install OSA/SF.

__ 2. Use the same startup profile that was setup for the previous OSA/SF. The default data set name was **IOA.STARTUP.PROFILE**. Do not change any of the data set names in the startup profile. These data set names will allow you to use configurations created by the previous version of OSA/SF.

Note: **CECNAME** is required and **SYSNAME** is optional. If you want to review the changes, see page 41.

__ 3. Replace the existing command EXEC (**IOACMD.EXEC**) with the new one from **IOA.SIOASAMP** member **IOACMD**.

__ 4. If you want to use the OSA/SF GUI, see “Setting up an OSA/SF GUI” on page 71.

Removing Data Sets or Files

During activate, OSA/SF creates various data sets for use during the configuration process. When you move an OSA from one CHPID to another or use a new processor and no longer use some of the CHPIDs, you do not need these configuration data sets or files. You can remove them from the system without affecting performance of the OSA or OSA/SF.

The following situations describe when you might remove unneeded data sets or files from your system:

- You no longer need a CHPID.
- A new machine is installed, and the CHPIDs are different types
- You have migrated from the non-Java-based version of the OSA/SF GU, and you are using the OSA/SF Java-based GUI.

Examples of Removing Data Sets or Files from the System

In the following descriptions, &IOADSN indicates the high-level qualifier for your system as follows:

- For OS/390 or z/OS, &IOADSN is specified in the system OSA/SF startup profile (IOAPROF).
- For VSE, &IOADSN is specified in the library on the PARM= statement that you use to start OSA/SF.

For VM, the files that the REXX IOACMD EXEC or OSA/SF GUI creates during activate are stored on one of the 70xx minidisks. If you no longer use the CHPID, you can delete this minidisk.

Configuration Data Sets and Files created by the REXX IOACMD EXEC

If you have used the REXX command interface (IOACMD EXEC) to configure an OSA and you do not want to use the data sets or files for other CHPIDs, you can delete the data sets or files that you created as input on the **Configure OSA** command.

During **Configure OSA** command processing, the REXX IOACMD EXEC takes the user input and creates various data sets or files for use by OSA/SF. You can also delete these data sets and files. Table 7 shows the CHPID type and the corresponding data sets or files that the command creates on OS/390 and z/OS or VSE. You can delete these data sets and files. Use the following key:

xx CHPID number

z Port number

c A character that can be P, E, N, or S

Table 7. CHPID numbers and corresponding data sets and files created by the CONFIG OSA command

CHPID type	OS/390 or Z/OS	z/VM	VSE
OSA-2 ATM	&IOAINATM.OATxx &IOAINMATM.ATMxx &IOAINATM.PVCxx	IOAINATM.OATxx IOAINATM.ATMxx IOAINATM.PVCxx	&IOADSN.OATxx) &IOADSN.ATMxx) &IOADSN.PVCx)
OSA-2 FDDI, ENTR or FENET	IOADSN.IOAINSNA.OATxx	IOASNAVM.OATxx	&IOASNAVM.OATxx)
OSA-Express Gigabit	&IOADSN.IOAINOSD.OSDxx	IOAINOSD.OSDxx	&IOADSN.OSDxx)
OSA-Express FENET	&IOADSN.IOAFENET.OATxx &IOADSN.IOAFENET.CFGxx &IOADSN.IOAFENET.SNAxx	IOAFENET.OATxx IOAFENET.CFGxx IOAFENET.SNAxx	&IOADSN.OATxx) &IOADSN.CFGxx) &IOADSN.SNAxx)
OSA-Express Token Ring	&IOADSN.IOATR.OATxx &IOADSN.IOATR.CFGxx &IOADSN.IOATR.SNAxx	IOATR.OATxx IOATR.CFGxx IOATR.SNAxx	&IOADSN.OATxx &IOADSN.CFGxx &IOADSN.SNAxx
OSA-Express ATM	&IOADSN.IOAxxzzc.OSEOAT &IOADSN.IOAxxzzc.OSDCFG &IOADSN.IOAxxzzc.OSECFG	IOAINOSE.OATxx IOAxxzzc.OSDCFG IOAxxzzc.OSECFG	&IOADSN.OATxxzzc) &IOADSN.OSDxxzzc) &IOADSN.OSExxzzc)

Configuration Data Sets and Files created by the OSA/SF GUI

If you have used the OSA/SF GUI to configure an OSA, you can delete all the data sets or files that you created as a result of the GUI processing. The following tables show information about the OSA configuration and the configuration data sets and files based on the version of the OSA/SF GUI that creates them. (For VM, the files that the OSA/SF GUI creates are stored on one of the 70xx minidisks. If you are migrating from an old version of the GUI to the Java-based version, you can delete the configuration files from the minidisk.)

Non-Java-based OSA/SF GUI on OS/2 or Windows: Table 8 on page 132 shows the CHPID type and its corresponding data sets or files for configurations that have been created through the non-Java based version of the OSA/SF GUI (OS/2 or Windows). You can delete these data sets and files. Use the following key:

xx CHPID number

yy[yy] 2- or 4-character configuration number

z Port number

Table 8. CHPID numbers and corresponding data sets and files created by the non-Java based OSA/SF GUI on OS/2 or Windows

Configurations	Z/OS or OS/390	z/VM	VSE
Configuration list (1 configuration per CHPID)	&IOADSN.PWSOSAxx.CFGLIST	PWSOSAxx CFGLIST	&IOADSN.CFGLIST)
Configuration files (Up to 8 conigurations per CHPID)	&IOADSN.PWSOSAxx.CFGNUMyy	PSWOSAxx CFGNUMyy	&IOADSN.CFGNUMyy)
OSA2 OAT	&IOADSN.PWSOSAxx.OATFILE	PWSOSAxx OATFILE	&IOADSN..CFGyyOxx)
OSA2 ATM Configuration	&IOADSN.PWSOSAxx. ALECFG	PWSOSAxx ALECFG	&IOADSN.ALECFGxx)
OSA2 ATM PVC	&IOADSN.PWSOSAxx.PVCFILE	PWSOSAxx PVCFILE	&IOADSN.PVCxx)
OSE ATM Native	&IOADSN.OSExxCN0	OSExxCN0 CONFIG	&IOADSN.OSExxCN0)
OSE ATM Native OAT	&IOADSN.OSExxON0.	OSExxON0 CONFIG	&.IOADSN.OSExxON0)
OSD or OSE ATM Physical	&IOADSN.OSExxCPH	OSExxCPH CONFIG	&.IOADSN.OSExxCPH)
OSD or OSE ATM Emulated :	&IOADSN.OSExxCEz	OSExxCEz CONFIG	&.IOADSN.OSExxCEz)
OSD or OSE ATM SNA	&IOADSN.OSExxCSz	OSExxCSz CONFIG	&.IOADSN.OSExxCSz)
OSD or OSE ATM Emulated OAT	&IOADSN.OSExxOEz	OSExxOEz CONFIG	&IOADSN.OSExxOEz)
OSD or OSE FENET, 1000Base-T, or TR	&IOADSN.OSExxCPH	OSExxCPH CONFIG	&IOADSN.OSExxCPH)
OSD or OSE FENET, 1000Base-T, or TR SNA	&IOADSN.OSExxCSN	OSExxCSN CONFIG	&IOADSN.OSExxCSN)
OSD or OSE FENET, 1000Base-T, or TR OAT	&IOADSN.OSExxOAT	OSExxOAT CONFIG	&IOADSN.OSExxOAT)
OSD Gigabit	&IOADSN.PWSOSAxx.OSDCFG	PWSOSAxx OSDCFG	&IOADSN.OSDCFGxx)

Java-based OSA/SF GUI on Windows or Linux: Table 9 on page 133 shows the CHPID type and its corresponding data sets or files for configurations that have

been created through the Java based version of the OSA/SF GUI (Windows or Linux). You can delete these data sets and files. Use the following key:

xx CHPID number

yy[yy] 2- or 4-character configuration number

z Port number

c A character that can be A, D, or E depending on the OSA type

Table 9. CHPID numbers and corresponding data sets and files created by the Java based OSA/SF GUI on Windows or Linux

Configurations	Z/OS or OS/390	z/VM	VSE
Configuration list (1 list)	&IOADSN.CFGLIST	CFGLIST.PWS	&IOADSN.CFGLIST)
Saved configuration name	&IOADSN.CFGyyyy	CFGyyyy.PWS	&IOADSN.CFGyyyy)
OSA2 ATM Configuration	&IOADSN.OScxxCFG	OScxxCFG CONFIG	&IOADSN.OScxxCFG)
OSA2 ATM PVC File	&IOADSN.OSAxxPVC	OSAxxPVC CONFIG	&IOADSN.OSAxxPVC)
OSE ATM Native	&IOADSN.OSExxCNT	OSExxCNT CONFIG	&IOADSN.OSExxCNT)
OSD or OSE ATM Emulated	&IOADSN.OScxxCEz	OScxxCEz CONFIG	&IOADSN.OScxxCEz)
OSD or OSE ATM Physical	&IOADSN.OScxxCPH	OScxxCPH CONFIG	&IOADSN.OScxxCPH)
OSA2 or OSE OAT	&IOADSN.OScxxOTz	OScxxOTz CONFIG	&IOADSN.OScxxOTz)
OSE SNA	&IOADSN.OSExxCSz	OSExxCSz CONFIG	&IOADSN.OSExxCSz)
OSD Gigabit	&IOADSN.OScxxCPH	OScxxCPH CONFIG	&IOADSN.OScxxCPH)
OSD or OSE FENET, 1000Base-T, or TR	&IOADSN.OScxxCPH	OScxxCPH CONFIG	&IOADSN.OScxxCPH)

Migrating to a New Version or Release of OSA/SF on VM

When migrating to a new version or release of OSA/SF on VM, use the VMSES/E procedure as instructed in the program directory.

To update the OSA/SF GUI, see “Setting up an OSA/SF GUI” on page 71.

Migrating to a New Version or Release of OSA/SF on VSE

When migrating to a new release of VSE, do not use any IOAxxx reader files created during a previous OSA/SF installation.

After installing a new release of VSE, follow the instructions in “OSA/SF and the VSE Environment” on page 61 to move all the necessary JCL from ICCF library 59 to your reader.

If any of the OSA/SF REXX procedures require service with a PTF, they will be included in IOAOCMD.O in your library.

To make these fixes active, delete the old IOACMD.PROC and rename the .O member to .PROC.

To update the OSA/SF GUI, see “Setting up an OSA/SF GUI” on page 71.

Migrating From OSA-2 to OSA-Express

If you are replacing an OSA-2 with an OSA-Express OSE CHPID, (that is, you are, using an OSA-Express in non-QDIO mode to provide the same LAN connectivity that a currently installed OSA-2 provides) you can use the OSA-2 OAT to configure the OSA-Express. You must use the REXX commands as follows, since the OSA/SF GUI does not allow you to use OSA-2 OAT data copied to an OSA-Express CHPID. (When you replace an OSA-2 with an OSA-Express OSD CHPID, the new OAT is automatically generated.)

1. **On OS/390 or or z/OS**: Enter the following command:

   ```
   EX 'IOACMD.EXEC' 'GET_OAT CHPID OAT.DAT' EXEC
   ```

   On VM: Enter the following command:

   ```
   IOACMD GET_OAT CHPID OAT DAT
   ```

   On VSE/ESA: Enter the following command:

   ```
   // EXEC REXX=IOACMD PARM='PRD2.OSASF GET_OAT CHPID PRD2.OSASF.OAT.DAT', SIZE=1100K
   ```

   where *CHPID* is the OSA-2.

   This command gets the OSA address table for the OSA-2 and, saves it as OAT.DAT on OS/390 or z/OS and as (OAT DAT on VM. You can specify any filename you want. For more information, see “GET_OSA_ADDRESS_TABLE | GET_OAT | GET_OSA | GET_TABLE” on page 150.

2. **On OS/390 or or z/OS**: Enter the following command:

   ```
   EX 'IOACMD.EXEC' 'CONFIG_OSA' EXEC
   ```

   On VM: Enter the following command:

   ```
   IOACMD CONFIG_OSA
   ```

   On VSE/ESA: Enter the following command:

   ```
   // EXEC REXX=IOACMD PARM='PRD2.OSASF CONFIG_OSA', SIZE=1100K
   ```

   The command prompts you for the required input, including the name of the OAT saved in the previous step.

Chapter 12. About the OSA Address Table (OAT)

About the chapter

If you are installing any OSA feature other than channel type OSD and you are not using the OSA/SF GUI, this chapter provides useful information.

If either of the following cases apply, you don't need to know the details in this chapter, but you might want to use the information for reference:

- If you are installing OSA-Express features to run only as a channel type OSD (QDIO mode), the correct OAT entries are automatically created from I/O hardware configuration data and Communications Server.
- If you are using the OSA/SF GUI to customize any OSA feature other than channel type OSD, configuration windows organize the OAT and provide an easy method for creating and changing entries.

Each OSA has its own OAT. Each OAT contains one or more *entries*, or collections of parameters that identify one data path through the OSA. The OAT is stored in the OSA in non-volatile storage. There are two methods commonly used for manually creating an OAT using REXX:

- The Get OAT Command
- Sample Templates in IOA.SIOASAMP (OS/390 or z/OS) and on the E (200) minidisk (VM)

There are advantages to both methods. If you already have the OAT completed and installed on the OSA and you want to make a change, use the Get OAT command. If you are creating an OAT for the first time, the templates are easier to use. Instructions for changing the templates are included in the legend appended to each template.

The hardware configuration (IOCDS) has input to the OAT and must be defined before an OSA can transfer data. See "Using HCD for Hardware I/O Configuration" on page 25.

The OAT Format

An OAT entry always contains one image line and one OAT definition line. It may optionally contain additional OAT lines.

Image Line

For all OAT entry types, the first non-comment line in the OAT entry indicates the channel subsystem and image to which the following OAT entry lines refer. It always includes the same parameters, separated by one or more spaces:

Image number *css.i (hostname)*

where

Image number
is a keyword signaling the beginning of all OAT entries associated with the specified image.

css.i
where ***css*** is the 1–digit z990 channel subsystem identifier and ***i*** is a 1-digit hex image number.

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(hostname)
is an optional, descriptive, name ignored by the program.

OAT Definition Line

The content of the OAT definition line differs according to the type of entry. Parameters are separated by one or more spaces.

For TCP/IP

In an OAT entry for TCP/IP, the OAT definition line includes the following:

ua* passthru *port_number default_entry Home_IP Net_mask

where

ua is a 1 or 2–digit unit address number, either alone (0A, for example) or concatenated to a device address, as in 0A(023A). The device address is ignored.

passthru
identifies the type of entry.

port_number
specifies the port number.

default_entry
indicates whether this entry forwards unknown IP addresses, and is set to one of the following:

NO specifies that this is not a default entry.

PRI specifies a primary default entry.

SEC specifies a secondary default entry to be used when the primary is not available.

Home_IP
is the home IP address in standard w.x.y.z format, with values ranging from 0 to 255 in each position. This can be left blank when port sharing is not used, or when you do not want an address assigned to this OAT entry. You cannot have both zero and non-zero addresses in the same OAT.

For SNA

In an OAT entry for SNA, the OAT definition line includes the following:

ua* sna *port_number VTAM_id_num

where

ua is a 1 or 2–digit unit address number, either alone (0A, for example) or concatenated to a device address as in 0A(023A).

sna
identifies the type of entry.

port_number
specifies the port number

VTAM_id_num
is used only for SNA Network Management for OSA-2 FDDI and ENTR features.

For MPC

In an OAT entry for MPC, the OAT definition line includes the following:

ua* mpc *port_number default_entry osa_name (MPC_type)

where

ua is a 1 or 2–digit unit address number, either alone (0A, for example) or concatenated to a device address as in 0A(023A).

mpc
identifies the type of entry.

port_number
specifies the port number. **N/A** is specified for QDIO control.

default_entry
for QDIO data only, indicates whether this entry forwards unknown IP addresses, and is set to one of the following:

NO specifies that this is not a default entry.

PRI specifies the primary default entry.

SEC specifies the secondary default entry to be used when the primary is not available.

osa_name
for HPDT MPC and QDIO entries only. This is a maximum of 8 characters. This parameter must ***not*** begin with 0-9, but can contain the characters a-z, 0-9, @, #, $ in all other positions.

(MPC_type)
is set to one of the following:

(QDIO Data)

(QDIO Control)

To Remove an OAT Entry

Replace the entry type of an existing OAT entry with the keyword **unassigned** or **N/A** to remove it from the OSA configuration.

Additional OAT Lines

When modifying OAT entries returned from the Get OAT command, you may see additional lines for certain TCP/IP and MPC entries. For MPC entries, a home IP address may be shown. This value cannot be set through OSA/SF. If it occurs in the input file, it is ignored.

The Default OAT

The OSA-Express FENET, 1000Base-T, and Token Ring features ship with an IBM-supplied default OAT for use in non-QDIO modes only, that contains one pair of Passthru entries per image for each port through the OSA. These Passthru OAT entries, therefore, allow the OSA to be run in the TCP/IP Passthru mode either with or without the services of OSA/SF. Note the following characteristics on the z990 processor:

- On the z990 processor, you can have 2 channel subsystems or LCSS. The processor can contain up to 15 images, which can be specified on 1 subsystem or spread across both channel subsystems. You can spread the OSA CHPIDs across the images in a subsystem.
- Because the FENET, 1000Base-T, and Token Ring features each have one port per CHPID, the OATs for these features have 128 default Passthru entries.
- No default OATs exist for CHPIDs that run in QDIO mode.

To define a FENET, 1000Base-T, or TR OSA for a default TCP/IP Passthru mode configuration, that is, a configuration in the TCP/IP Passthru mode without customization through OSA/SF, you only have to define the OSA channel path with its pairs of associated device numbers and unit addresses in the system hardware I/O configuration (IOCDS), **but you must specify 00 as the starting unit address**. Use the same commands or programs that you would use for any channel path (CHPID).

There is no default configuration for QDIO mode.You need only define the OSA channel path in the system hardware I/O configuration. The OAT is then automatically built for QDIO architecture.

Although the services of OSA/SF are not required for a default configuration, they are still recommended. Even in a default configuration, OSA/SF can still be used to obtain data that can assist you in determining the cause of OSA-related problems.

If you use SNMP with an OSA-Express OSE CHPID, you must install OSA/SF, and the port name in your configuration must match the port name in the TCP/IP profile. If you are running z/OS V1R4 or Linux kernel 2.4.14 or above with an OSA-Express feature in QDIO mode, the OSA-Express MIB is directly accessible through an OSA-Express SNMP subagent. See “Support for Simple Network Management Protocol” on page 12 for more information.

There are several situations in which you must have an IP address on your passthru entries in order for all the defined modes to operate properly in port sharing mode:

- Different images use the port for TCP/IP traffic
- TCP/IP and SNA traffic share the port
- More than one TCP/IP stack uses the port

If any of these descriptions apply, you cannot use the default OAT. You must use OSA/SF to customize the OAT.

Guidelines for Changing an OAT

An OAT entry defines the data path between a port and and image and unit address.

- Port sharing is defined as:
  - One port enabled for traffic of more than one kind, for example passthru and SNA

  or
  - One type of traffic for more than one image
- Multiple partition/unit address pairs can be associated with a single port only if the IP addresses are unique. If a port is being shared and IP traffic is flowing, each passthru OAT entry must have an IP address assigned to it.
- Any OSA-Express feature can have up to 512 IP addresses specified per port, however, LCS devices are limited to a maximum of 8 IP addresses per OAT entry. (For OSA-2, the same limit of 8 IP addresses per OAT entry exists, but no more than 16 IP addresses per port can be distributed over multiple OAT entries.)
- If the port is not shared between image, all IP addresses should be set to a value of 0.0.0.0.

- When changing an existing entry, any operation currently executing may be interrupted if you use the FORCE option. (The PUT_OAT command does not apply to OSA-Express features.)
- Make sure that an entry for each partition is defined when sharing a specific port.

OAT Examples

TCP/IP with Port Sharing Between Images

This OAT manages TCP/IP traffic through an OSA CHPID communicating with two images.

```
**************************************************************************
* UA(Dev) Mode     Port     Entry specific information      Entry  Valid
**************************************************************************
                               Image 0.1 (HOST1)
00(0400) passthru   00  pri 009.112.018.017                  SIU    ALL
                               Image 0.2 (HOST2)
04(0404) passthru   00  no  009.112.012.016                  SIU    ALL
```

Figure 50. Example of OAT for TCP/IP with Port Sharing

TCP/IP with Multiple IP Addresses

This OAT manages TCP/IP traffic through an OSA CHPID with one image for which three different IP addresses are defined.

```
**************************************************************************
* UA(Dev) Mode     Port     Entry specific information      Entry  Valid
**************************************************************************
                              Image 0.1 (HOST1)
00(0400)  passthru   00  PRI 010.200.035.158                 SIU    ALL
                             002.003.035.158
                             018.019.019.030
```

Figure 51. Example of OAT for TCP/IP with Multiple IP Addresses

SNA

This OAT manages SNA traffic through the OSA CHPID.

```
**************************************************************************
* UA(Dev) Mode     Port     Entry specific information      Entry  Valid
**************************************************************************
                              Image 0.1 (HOST1)
00(0100) sna        0                                        SIU    ALL
```

Figure 52. Example of OAT for One SNA Entry

Chapter 13. OSA/SF Commands for REXX

This section provides information for using a General-use programming interface.

Enter OSA/SF commands from a OS/390, z/OS, or z/OS.e Ready prompt or TSO command line, or from CMS in a VM environment. For VSE, submit an IOACMD job for each command. All OSA/SF commands are also available from the OSA/SF GUI, and from the following menu, displayed when you enter **IOACMD** without parameters:

```
IOACMD:0-End IOACMD
IOACMD:1-Clear Debug
IOACMD:2-Configure OSA CHPID
IOACMD:3-Convert OAT
IOACMD:4-Get Configuration File
IOACMD:5-Get Debug
IOACMD:6-Get OSA Address Table
IOACMD:7-Install
IOACMD:9-Query
IOACMD:10-Set Parameter
IOACMD:11-Shutdown (VM only)
IOACMD:12-Start Managing
IOACMD:13-Stop Managing
```

Attention

Enter **IOACMD.EXEC** (or, for VM, **IOACMD**) with all OSA/SF commands.

- See step 1 on page 68 for the fully-qualified OS/390, z/OS, or z/OS.e data set name that was used to set up IOACMD.EXEC
- "Setting up the REXX Command Interface for z/VM" on page 68 discusses the interfaces in a VM environment.
- "Copy the Skeleton Job for IOACMD" on page 64 describes the JCL used in VSE.

Example:
For OS/390, z/OS, or z/OS.e:

EX 'IOACMD.EXEC' 'CLEAR_DEBUG' EXEC

For VM:

IOACMD CLEAR_DEBUG

For VSE:

// EXEC REXX=IOACMD PARM='PRD2.OSASF CLEAR_DEBUG', SIZE=1100K

To have the EXEC prompt you for the commands, just enter:

EX 'IOACMD.EXEC' EXEC

For VM:

IOACMD

For VSE:

// EXEC REXX=IOACMD PARM='PRD2.OSASF', SIZE=1100K

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How to read syntax diagrams

This section describes how to read syntax diagrams. It defines syntax diagram symbols, items that may be contained within the diagrams (keywords, variables, delimiters, operators, fragment references, operands) and provides syntax examples that contain these items.

Syntax diagrams pictorially display the order and parts (options and arguments) that comprise a command statement. They are read from left to right and from top to bottom, following the main path of the horizontal line.

Symbols

The following symbols may be displayed in syntax diagrams:

Symbol	Definition
▸▸—	Indicates the beginning of the syntax diagram.
—▸	Indicates that the syntax diagram is continued to the next line.
▸—	Indicates that the syntax is continued from the previous line.
—▸◂	Indicates the end of the syntax diagram.

Syntax items

Syntax diagrams contain many different items. Syntax items include:

- Keywords - a command name or any other literal information.
- Variables - variables are italicized, appear in lowercase and represent the name of values you can supply.
- Delimiters - delimiters indicate the start or end of keywords, variables, or operators. For example, a left parenthesis is a delimiter.
- Operators - operators include add (+), subtract (-), multiply (*), divide (/), equal (=), and other mathematical operations that may need to be performed.
- Fragment references - a part of a syntax diagram, separated from the diagram to show greater detail.
- Separators - a separator separates keywords, variables or operators. For example, a comma (,) is a separator.

Keywords, variables, and operators may be displayed as required, optional, or default. Fragments, separators, and delimiters may be displayed as required or optional.

Item type	Definition
Required	Required items are displayed on the main path of the horizontal line.
Optional	Optional items are displayed below the main path of the horizontal line.
Default	Default items are displayed above the main path of the horizontal line.

Syntax examples

The following table provides syntax examples.

Table 10. Syntax examples

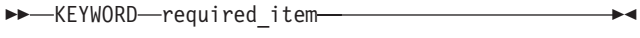
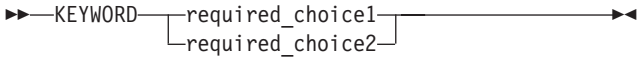
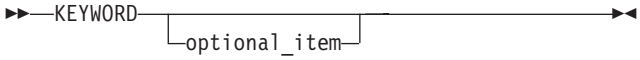
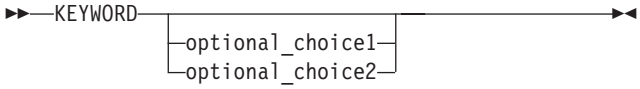
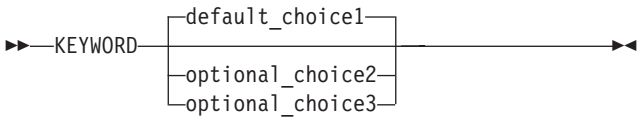
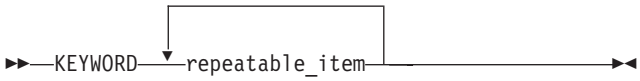
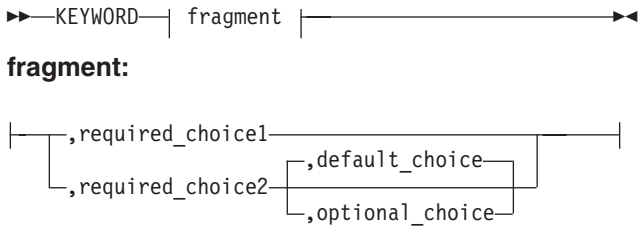
Item	Syntax example
Required item. Required items appear on the main path of the horizontal line. You must specify these items.	
Required choice. A required choice (two or more items) appears in a vertical stack on the main path of the horizontal line. You must choose one of the items in the stack.	
Optional item. Optional items appear below the main path of the horizontal line.	
Optional choice. A optional choice (two or more items) appear in a vertical stack below the main path of the horizontal line. You may choose one of the items in the stack.	
Default. Default items appear above the main path of the horizontal line. The remaining items (required or optional) appear on (required) or below (optional) the main path of the horizontal line. The following example displays a default with optional items.	
Variable. Variables appear in lowercase italics. They represent names or values.	
Repeatable item. An arrow returning to the left above the main path of the horizontal line indicates an item that can be repeated. An arrow returning to the left above a group of repeatable items indicates that one of the items can be selected, or a single item can be repeated.	

Table 10. Syntax examples (continued)

Item	Syntax example
Fragment. The ─┤ fragment ├─ symbol indicates that a labelled group is described below the main syntax diagram. Syntax is occasionally broken into fragments if the inclusion of the fragment would overly complicate the main syntax diagram.	

CLEAR_DEBUG | CLR | CLR_DEBUG | CLEAR

Purpose

The Clear Debug command clears the contents of the current message log maintained by the OSA/SF. The message log contains a history of all commands issued, responses generated, informational messages, and any errors that have occurred since the Clear Debug command was last issued.

Note: IBM Service may require the contents of the message log to perform problem isolation; therefore, do not use this command unless you are sure you want to clear the current contents of the message log.

Syntax

Operands

None
This command requires no parameters.

Results

None
No response is displayed from the command.

Limitations

If RACF is installed, Clear Debug requires a minimum of CONTROL authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 46 for OS/390, and on page 57 for VM.

This command does not require an OSA (CHPID) number to be entered; therefore it does not matter what OSA/SF image is managing the OSAs.

Examples

For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’CLEAR_DEBUG’ EXEC**

For VM: **IOACMD CLEAR_DEBUG**

For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF CLEAR_DEBUG’, SIZE=1100K**

Clears the OSA/SF message log.

CONVERTOAT

Purpose

This command works only for OSA address tables for SNA, passthru, and MPC created in detailed format in OSA/SF releases prior to V2R1. It converts an OAT file created in detailed format to the summary OAT format in the specified output file. The output file can be changed and used as input with the CONFIGURE OSA or PUT OAT command.

Syntax

Operands

input_file_name
Name of a valid detailed OAT file.

output_file_name
Name of the new summary format OAT file.

Results

The detailed OAT file is converted to summary format. The new format can now be used with the PUT OAT or CONFIGURE OSA command.

Limitations

This command is only for use with OSA address tables for SNA, passthru, and MPC created in detailed format in OSA/SF releases prior to V2R1.

Examples

Execute the IOACMD command, select `Convert OAT`, and follow the prompts.

For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'CONVERTOAT osa8.sna osa8.snanew' EXEC**

For VM: **IOACMD CONVERTOAT osa8 sna osa8s snanew**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF CONVERTOAT', SIZE=1100K**

If the IOACMD job was set up as recommended, submit the job, select `Convert OAT`, and follow the prompts.

GET_CONFIG

Purpose

Use the Get Config command to get the configuration file for an OSA-Express feature in a format that can be used as input with the Configure OSA command. This is helpful when you have an existing OSA that you want to modify or copy to a new OSA.

Syntax

Operands

chpid
Value that indicates the hexadecimal OSA number for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'.

This field is required.

dataset_or_file_name
The name of the data set or file used to store the command's results.

Results

The current configuration file for the specified CHPID is stored in the specified data set.

Limitations

If RACF is installed, Get Config requires READ authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in "Controlling Access to OSA/SF" on page 46 for OS/390, and on page 57 for VM.

Examples

Execute the IOACMD command, select `Get Configuration File`, and follow the prompts.

For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'GET_CONFIG 40** dataset1.config' EXEC

For VM: **IOACMD GET_CONFIG 40 dataset1 config**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF GET_CONFIG 44 PRD2.OSASF.CFG.CHP44', SIZE=1100K**

GET_DEBUG

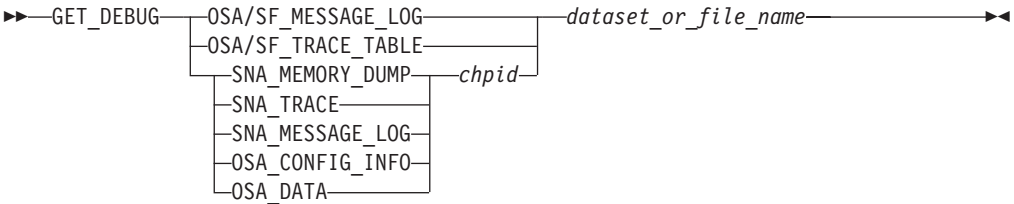
Purpose

Use this command at the direction of IBM support to gather information to debug OSA or OSA/SF problems that are reported. You will be instructed to issue this command by IBM support personnel when appropriate. Most of the information returned is not in a readable format.

A data set or file name must be specified. For OS/390, z/OS, or z/OS.e, only sequential data sets can be used but they need not be pre-allocated.

If an error occurs, no data is returned and a failing message is displayed.

Syntax



Operands

OSA/SF_MESSAGE_LOG
The OSA/SF message log contains information on every command issued, command returned, informational messages, and any errors that occurred since the last Clear Debug command was issued that cleared the message log.

OSA/SF_TRACE_TABLE
The OSA/SF trace table contains up to the last 8000 trace points that the OSA/SF code executed. When the table is full the oldest entries are overwritten.

OSA_CONFIG_INFO
The output will be the entire configuration file read from the OSA. This can be used by IBM for failure analysis.

OSA_DATA
The OAT and port parameters will be read from the OSA. This can be used by IBM for failure analysis.

chpid
Represents the OSA number.

dataset_or_file_name
The name of the data set or file where you want to store the returned data.

Results

The Get Debug command returns either the contents of the OSA/SF message log or trace table or the OSA SNA trace or message log. These commands are also available on the OSA/SF GUI.

On VM, the resulting file is sent to the userid that issued the command.

Limitations

If RACF is installed, Get Debug requires READ authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 46 for OS/390, and on page 57 for VM.

Examples

1. Get the OSA/SF trace table and put it in DATASET1.TRACE (DATASET1 TRACE on VM) (PRD2.OSASF.DATASET1.TRACE on VSE).

   For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’GET_DEBUG OSA/SF_TRACE_TABLE DATASET1.TRACE’ EXEC**

   For VM: **IOACMD GET_DEBUG OSA/SF_TRACE_TABLE DATASET1 TRACE**

   For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF GET_DEBUG OSA/SF_TRACE_TABLE PRD2.OSASF.DATASET1.TRACE’, SIZE=1100K**
2. Get the OSA/SF message log and put it in DATASET2.LOG on OS/390 z/OS, or z/OS.e (DATASET2 LOG on VM) (PRD2.OSASF.MSG.LOG for VSE).

   For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’GET_DEBUG OSA/SF_MESSAGE_LOG DATASET2.LOG’ EXEC**

   Or, for VM: **IOACMD GET_DEBUG OSA/SF_MESSAGE_LOG DATASET2 LOG**

   For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF GET_DEBUG MESSAGE_LOG PRD2.OSASF.MSG.LOG’, SIZE=1100K**
3. Get the OSA Address Table and port parameters for the OSA and put them in DATASET3.PARMS on OS/390 z/OS, or z/OS.e (DATASET3 PARMS on VM) (PRD2.OSASF.DATASET3.PARMS for VSE).

   For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’GET_DEBUG OSA_DATA DATASET3.PARMS’ EXEC**

   Or, for VM: **IOACMD GET_DEBUG OSA_DATA DATASET3 PARMS**

   For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF GET_DEBUG OSA_DATA PRD2.OSASF.DATASET3.PARMS’, SIZE=1100K**

GET_OSA_ADDRESS_TABLE | GET_OAT | GET_OSA | GET_TABLE

Purpose

Use the Get OSA Address Table command to obtain the OSA address table for the specified CHPID (OSA) number. The output returned can be modified and used (for OSA–2 CHPIDs only) as input for the Put OAT Address Table command. See Chapter 12, “About the OSA Address Table (OAT)”, on page 135 for examples of the OAT entries.

Syntax

Operands

chpid
Value that indicates the hexadecimal OSA number for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'.

This field is required.

dataset_or_file_name
This specifies the data set name where the OSA address table is to be stored.

Note: Only sequential data sets can be used but they do not need to be preallocated by the user.

This field is required.

Results

The **GET_OAT** command gets the OSA address table for the CHPID specified. A data set **must** be specified. The address table returned is placed into this data set. The data set created, along with an explanation of all the fields, is shown in Chapter 12, “About the OSA Address Table (OAT)”, on page 135.

Limitations

If RACF is installed, this command requires READ authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 46 for OS/390, and on page 57 for VM.

The copy of OSA/SF issuing this command does NOT need to be managing the CHPID specified.

Examples

For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’GET_OAT 4C CHAN4C.DAT’ EXEC**

Or, on VM: **IOACMD GET_OAT 4C CHAN4C DAT**

For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF GET_OAT 4C PRD2.OSASF.CHAN4C.DAT’, SIZE=1100K**

Gets the OSA address table for CHPID 4C and puts it into CHAN4C.DAT (CHAN4C DAT on VM) (PRD2.OSASF.CHAN4C.DAT on VSE).

INSTALL

Purpose

Use the Install command to load an existing configuration onto an OSA only when replacing the OSA feature, not for initial installation. To perform initial configuration, use the Configure OSA (REXX) or Activate (GUI) command.

The Install command sets up the OAT, OSA mode, and port parameters on the specified OSA (CHPID) depending on the OSA feature type:

- For OSA-Express features defined as OSE (non-QDIO) CHPIDs, the OAT and port configuration are installed on the CHPID.
- For OSA-Express features defined as OSD (QDIO) CHPIDs, only the port configuration is installed on the CHPID.

The Install task is disruptive to all devices using the OSA (CHPID). The names of the files to be installed are contained in the IOACFG data set specified in the STARTUP.PROFILE. See step 41.

Syntax

Operands

chpid
Value that indicates the hexadecimal CHPID for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'. The CHPID ***must*** be online and accessible.

Results

The Install command returns a successful completion status if all the data sets were installed properly, the OAT was successfully set, and the CHPID is operational.

If any configuration data could not be installed properly, or if any of the OAT entries fails, a list of failures is returned.

Limitations

If RACF is installed, this command requires CONTROL authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 46 for OS/390, and on page 57 for VM.

This command must be entered from the OSA/SF image managing the OSA.

Examples

For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’INSTALL 7C’ EXEC**

On VM: **IOACMD INSTALL 7C**

For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF INSTALL 7C’, SIZE=1100K**

Installs the specified files and OSA mode (image) onto CHPID 7C.

QUERY

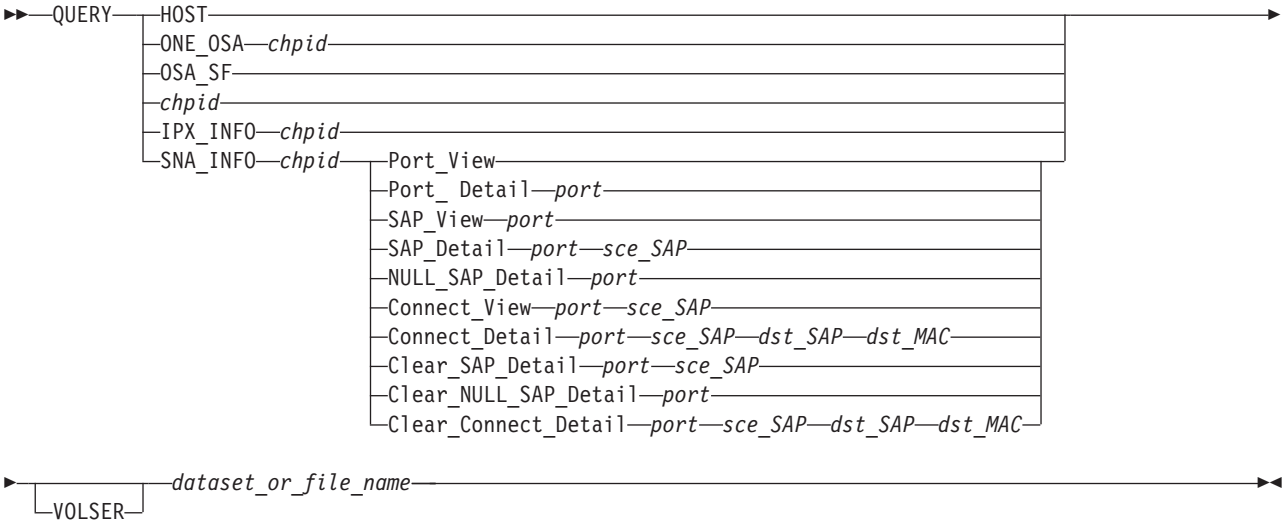
Purpose

Use the Query command to obtain information about all or parts of the OSA, Open Systems Adapter/Support Facility, and OSA modes running on the OSA.

Syntax

Attention: The following abbreviations are used in the syntax diagram:

- port - port number
- sce - source
- dst - destination



Operands

Host
Returns all information about OSA/SF, CHPIDs, ports, OSA modes, and devices.

ONE_OSA
Returns information related to one CHPID (OSA). You must enter **ONE_OSA** with the CHPID number.

OSA_SF
Returns only information related to OSA/SF.

SNA_INFO
Used for SNA network management information. See the examples at the end of this section.

IPX_INFO
Use this option to query the IPX connection data. Specify a CHPID and a data set name with this option.

chpid
This value indicates the hexadecimal CHPID for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'.

VOLSER
You can specify the volume serial number. If nothing is specified, the system default is used. If the data set already exists, the VOLSER is ignored. The format is VOLSER or VOLSER(UNIT).

dataset_or_file_name
The name of the data set or file where the requested information is to be stored. This is required.

Limitations

If RACF is installed, Query requires READ authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 46 for OS/390, and on page 57 for VM.

Examples

1. Query the port view for CHPID 64 and put it in data set ″USER4.QUERY.OUTPUT″ (USER4 QUERY file on VM) (PRD2.USER4.QUERY.OUTPUT on VSE).

   For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’QUERY SNA_INFO 64 PORT_VIEW USER4.QUERY.OUTPUT’ EXEC**

   Or, for VM: **IOACMD QUERY SNA_INFO 64 PORT_VIEW USER4 QUERY**

   For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF QUERY SNA_INFO 64 PORT_VIEW PRD2.OSASF.USER4.QUERY.OUTPUT’, SIZE=1100K**
2. Query the port details for CHPID 7C and show the data on the display.

   For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’QUERY SNA_INFO 7C PORT_DETAIL 0’ EXEC**

   For VM: **IOACMD QUERY SNA_INFO 7C PORT_DETAIL 0**

   For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF QUERY SNA_INFO 7C PORT_DETAIL 0’, SIZE=1100K**
3. Query the SAP view for CHPID 7C, port 1 and put the data set in ″USER4.QUERY.OUTPUT″ (USER4 QUERY file on VM) (PRD2.USER4.QUERY.OUTPUT on VSE).

   For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’QUERY SNA_INFO 7C SAP_VIEW 1 USER4.QUERY.OUTPUT’ EXEC**

   For VM: **IOACMD QUERY SNA_INFO 7C SAP_VIEW 1 USER4 QUERY**

   For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF QUERY SNA_INFO 7C SAP_VIEW PRD2.OSASF.USER4.QUERY.OUTPUT’, SIZE=1100K**
4. Query the SAP details for CHPID 7C, port 1, SAP C and show the data on the display.

   For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’QUERY SNA_INFO 7C SAP_DETAIL 1 C’**

   For VM: **IOACMD QUERY SNA_INFO 7C SAP_DETAIL 1 C**

   For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF QUERY SNA_INFO 7C SAP_DETAIL 1 C’, SIZE=1100K**
5. Query the NULL SAP details for CHPID 38, port 1 and show the data on the display.

   For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’QUERY SNA_INFO 38 NULL_SAP_DETAIL 1’**

   For VM: **IOACMD QUERY SNA_INFO 38 NULL_SAP_DETAIL 1**

   For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF QUERY SNA_INFO 38 NULL_SAP_DETAIL 1’, SIZE=1100K**

6. Query the connection view for CHPID 7C, port 1, SAP 8 and show the data on the display.

   For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'QUERY SNA_INFO 7C CONNECT_VIEW 1 8'**

   For VM: **IOACMD QUERY SNA_INFO 7C CONNECT_VIEW 1 8**

   For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF QUERY SNA_INFO 7C CONNECT_VIEW 1 8', SIZE=1100K**

7. Query the connection details for CHPID 7C, port 1, source SAP 8, destination SAP 14, destination MAC 123456789012 and show the data on the display.

   For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'QUERY SNA_INFO 7C CONNECT_DETAIL 1 8 14 123456789012'**

   For VM: **IOACMD QUERY SNA_INFO 7C CONNECT_DETAIL 1 8 14 123456789012**

   For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF QUERY SNA_INFO 7C CONNECT_DETAIL 1 8 14 123456789012', SIZE=1100K**

8. Clear the SAP details for CHPID 68, port 1, SAP 4.

   For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'QUERY SNA_INFO 68 CLEAR_SAP_DETAIL 1 4'**

   For VM: **IOACMD QUERY SNA_INFO 68 CLEAR_SAP_DETAIL 1 4**

   For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF QUERY SNA_INFO 68 CLEAR_SAP_DETAIL 1 4', SIZE=1100K**

9. Clear the connection details for CHPID 20, port 0, source SAP 4, destination SAP 1C, destination MAC 123456789012 and show the data on the display.

   For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'QUERY SNA_INFO 20 CLEAR_ CONNECT_DETAIL 0 4 1C 123456789012'**

   For VM: **IOACMD QUERY SNA_INFO 20 CLEAR_ CONNECT_DETAIL 0 4 1C 123456789012**

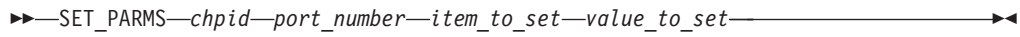
   For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF QUERY SNA_INFO 20 CLEAR_ CONNECT_DETAIL 0 4 1C 123456789012', SIZE=1100K**

SET_PARAMETERS | SET_PARM | SET_PARMS

Purpose

Use the Set Parameters command to set information for one of the ports on an OSA (CHPID). One parameter is set each time the command is entered. Multiple parameters cannot be set with one Set Parameters command.

Syntax



Operands

chpid
Value that indicates the hexadecimal CHPID (OSA) for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'. The CHPID ***must*** be online and accessible.

port_number
Port on the specified OSA (chpid) that is to be changed.

item_to_set
For a list of items that can be specified here, use the HELP command as follows:

For OS/390, z/OS, or z/OS.e:

```
EX 'IOACMD.EXEC' 'HELP SET_PARM' EXEC
```

In VM:

```
IOACMD HELP SET_PARM
```

In VSE:

```
// EXEC REXX=IOACMD PARM='PRD2.OSASF HELP SET_PARM', SIZE=1100K
```

Value_to_set
The value to be set.

Results

The Set Parameter command sets the value for the item specified on the port specified.

Limitations

If RACF is installed, Set Parameter requires CONTROL authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 46 for OS/390, and on page 57 for VM.

You must enter this command from the OSA/SF image managing the OSA.

Examples

For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’SET_PARMS 54 0 fddi_group2_addr 534259474351’ EXEC**

Or, for VM: **IOACMD SET_PARMS 54 0 fddi_group2_addr 534259474351**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF SET_PARMS 54 0 fddi_group2_addr 534259474351', SIZE=1100K**

Sets the parameter second group address on FDDI CHPID 54, Port 0 to "534259474351".

SHUTDOWN

Purpose

The SHUTDOWN command causes the OSA/SF server machine to release all resources and logoff the userid. Once the server is shutdown, commands from the GUI or from CMS will cause the server to logon and start again.

Syntax

Operands

None

Results

The OSASF userid is logged off and the server machine releases all resources.

Limitations

If RACF is installed, Shutdown requires CONTROL authority.

This command is only valid on VM.

Examples

On VM: **IOACMD SHUTDOWN**

START_MANAGING

Purpose

The Start Managing command results in the copy of OSA/SF that runs in the image where the command is issued to take over management of the specified CHPID (OSA). If the CHPID is currently managed by a copy of OSA/SF running in another image, the Force indicator (OS/390, z/OS, z/OS.e, and z/VM only) must be set. When this command completes, another copy of OSA/SF running on another image is limited to executing commands to this CHPID that do not change the CHPID's environment. To determine if a command can be used from another image, see that command's "Limitations" section.

Syntax

Operands

chpid
Value that indicates the hexadecimal CHPID for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'. The CHPID ***must*** be online and accessible.

FORCE
If the channel is being managed by a different copy of OSA/SF on another image, this indicator must be set to "force" this copy of OSA/SF to take over the management of the specified CHPID.

Results

The Start Managing command causes the copy of OSA/SF currently running in this image to take over management of the specified CHPID.

Under certain conditions message IOAK873I displays the image and device number of the channel path that has become the default for the CHPID. This message is only displayed on the image where OSA/SF is running and where the CHPID is managed. The secondary image does not display the message if the primary manages the CHPID and fails, nor does the primary display the message when the secondary, or some other image, manages the CHPID.

Limitations

If RACF is installed, Start Managing requires UPDATE authority. If the Force option is specified, CONTROL authority is required. The RACF authority you specify pertains to the appropriate RACF facility as defined in "Controlling Access to OSA/SF" on page 46 for OS/390, and on page 57 for VM.

Examples

For OS/390, z/OS, or z/OS.e: **EX 'IOACMD.EXEC' 'START_MANAGING 58 FORCE' EXEC**

Or, for VM: **IOACMD START_MANAGING 58 FORCE**

For VSE: **// EXEC REXX=IOACMD PARM='PRD2.OSASF START_MANAGING 58 FORCE', SIZE=1100K**

Starts managing CHPID 58. If another OSA/SF was managing OSA 58, this OSA gets control.

STOP_MANAGING

Purpose

The Stop Managing command stops the copy of OSA/SF that runs in the image where the command is issued from managing the OSA CHPID. The command must be issued from the same image that is currently managing the CHPID. To have another copy of OSA/SF running on another image manage the CHPID, issue the Start Managing command to that copy of OSA/SF, using the force indicator if needed.

Syntax

Operands

chpid
Value that indicates the hexadecimal CHPID for the command. The value is **not** entered with single quotes around it. For example, CHPID 4B should be entered as 4B, not X'4B'. The CHPID ***must*** be online and accessible.

Results

The Stop Managing command stops management of the specified CHPID.

Limitations

If RACF is installed, Stop Managing requires UPDATE authority. The RACF authority you specify pertains to the appropriate RACF facility as defined in “Controlling Access to OSA/SF” on page 46 for OS/390, and on page 57 for VM.

This command must be entered from the OSA/SF image managing the OSA.

Examples

For OS/390, z/OS, or z/OS.e: **EX ’IOACMD.EXEC’ ’STOP_MANAGING 22 EXEC**

Or, for VM: **IOACMD STOP_MANAGING 22**

For VSE: **// EXEC REXX=IOACMD PARM=’PRD2.OSASF STOP_MANAGING 22’, SIZE=1100K**

Stops managing CHPID 22 from this copy of OSA/SF. If an OSA mode is running, it continues to run.

Chapter 14. OSA/SF Messages and Codes

This section lists OSA error messages and provides explanations and corrective actions. This chapter also includes the following information:

- Errors associated with OSA in “OSA Reject Codes” on page 226
- Java errors associated with starting the OSA/SF GUI in “Error Messages for the OSA/SF GUI” on page 228.

OSA/SF Messages

Attention

- Message numbers contain an *x* in this book because the character is a variable that can be A, C, D, I, K, N, or Z. It **cannot** be G. The variable is assigned when a component detects the condition.

  Example:

  ```
  Message number:  IOAA954E
  Documented as:   IOAx954E
  ```

OSA/SF messages have the following format:

Example: **IOA***xnnns*

IOA The first three characters are the product identifier.

If you are looking at the OSA/SF message log, you may see a message without a message ID or with a message ID in the format IOB*xnnns*. Take the action that is stated explicitly or implicitly by the message text. If the severity level of an IOB message is E or S, report the message to IBM.

x Component that detected the condition. In some cases, more than one component can cause OSA/SF to issue the same message; therefore messages are listed in the book with the variable x. If you search for a message and the message is shown with an x, it is the correct description.

nnn 3 digit message sequence number. The messages in this book are listed numerically according to these three digits.

s The message severity, denoted by one of the following characters:

- **I** Informational, no action required
- **W** Warning, action is not required, but an error can occur later
- **A** Action, which is a severity level indicating that some user action may be required
- **E** Error that requires action eventually
- **S** Severe or serious error that requires immediate action

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How to Find a Message

Messages are listed numerically according to the last four characters.

Use LookAt, the online message facility, to look up messages and explanations that appear in this topic. You can access LookAt from the internet at:

`http://www.ibm.com/eserver/zseries/zos/bkserv/lookat/`

OSA/SF Reason Codes:

Reason codes that are issued as part of OSA/SF messages are for IBM use only. It is for this reason that explanations of reason codes are not documented. Reason codes may be encountered in messages found in the OSA/SF message log.

In the event that a message contains a reason code, note the message number, the reason code, refer to "Reporting OSA/SF Problems to IBM" on page 127.

IOAx001E Device *nnnn* incorrectly defined

Explanation: The device number *nnnn* is not defined in the hardware I/O configuration (IODF/IOCDS) with unit type=OSAD.

User Response: Verify the hardware I/O configuration to ensure the unit type of this device number is OSAD.

IOAx002E Device *nnnn* is offline

Explanation: Device *nnnn* is offline to the operating system.

User Response: Vary device *nnnn* online and then retry the task you were performing.

IOAx003E Device *nnnn* incorrectly defined and is offline

Explanation: The OSAD device (UNITADD=FE) is not defined correctly in the hardware I/O configuration (IODF/IOCDS), and the device is offline.

User Response: Check the I/O configuration to ensure device *nnnn* is specified with a unit type = OSAD. Then vary the device online. Retry the task.

IOAx004E Cannot establish non-swappable environment for device *nnnn*

Explanation: An internal OSA/SF error has occurred.

User Response: Check the I/O configuration (IODF/IOCDS) for proper OSA device definitions. Refer to OSA documentation for OSA IODF/IOCDS requirements. If the condition continues, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx005E Unit control block not found for device *nnnn*

Explanation: OSA/SF attempted to find device *nnnn* and could not locate the unit control block (UCB).

User Response: Verify that the device is correctly defined in the hardware I/O configuration (IODF/IOCDS). Refer to OSA documentation for OSA IODF/IOCDS requirements. If the condition continues, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx006E Status Modifier received when accessing device *nnnn*

Explanation: An error occurred while trying to perform an action to the OSA device. This is probably a hardware error.

User Response: Review the console log for hardware related messages. Also check the SYS1.LOGREC (EREP) data set. Attempt a retry of the last task that was being performed. If problems continue, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx007E Unable to pagefix/pagefree storage for device *nnnn*

Explanation: OSA/SF was unable to manage storage for OSA device *nnnn*. This could also be an OSA/SF internal error.

User Response: Verify that the OSA/SF region size is correct. Also check for system storage constraints. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx008E Unable to build CCW chain for device *nnnn*

Explanation: An internal OSA/SF error has occurred.

User Response: Verify that OSA device *nnnn* is properly defined in the hardware I/O configuration (IODF/IOCDS). If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx009E Failed to get the OSA lock for device *nnnn*

Explanation: An internal software lock could not be obtained in order to communicate with OSA device *nnnn*.

User Response: Verify that another copy of OSA/SF, the hardware system console (PCE), or the hardware management console (HMC) is not currently accessing this CHPID, then retry the command. If problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx010E Failed when testing the OSA lock for device *nnnn*

Explanation: While in the process of performing a task on the OSA, changes to the state of the OSA were detected for device number *nnnn*.

User Response: Verify that another copy of OSA/SF, the hardware system console (PCE), or the hardware management console (HMC) is not currently performing a task on this OSA at the same time, then retry the command.

IOAx011E Failed when freeing the OSA lock for device *nnnn*

Explanation: An internal OSA/SF error has occurred.

User Response: Stop OSA/SF. Then vary device *nnnn* offline to and then online. Restart OSA/SF. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx015E Communication with OSA device *nnnn* **failed (cond code=3)**

Explanation: Communication failed with the OSA device.

User Response: Look for I/O errors on the system console. If using the API, check control block definitions for the OAT and the OSA mode. If you are using the OSA/SF GUI, do a Refresh from the OSA Channels Tree view or Details view. Ensure the OAT definitions and OSA mode feature are correctly defined by reviewing the configuration panels. Retry the task. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx016E Communication with OSA device *nn* **timed out**

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx018E Cannot install/initialize the interrupt handler for device *nn*

Explanation: The OSA/SF interrupt handler could not be started.

User Response: Check for I/O errors on the system console. Stop OSA/SF if it is running, and then restart it. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

Common Problems: If this message is accompanied by MSGIOAA090E and IOAA086E, verify that the OSA/SF load library, SYS1.SIOALMOD and the runtime library OSA/SF was linked with, are in the PROGXX member.

IOAx019E Cannot start or stop managing device *nnnn*

Explanation: The OSA CHPID is currently being managed by a different copy of OSA/SF in another image. The action that was requested can not be performed from this image.

User Response: Submit the action from the image running the OSA/SF image that is managing the OSA. If you don’t know what image is managing the OSA, from the GUI double-click on the OSA number from the Channels Tree view and select the Statistics page.

If you want to manage the OSA from this image, from the GUI select Help from the menu bar of any window, select How To, and then double-click on ″Manage OSAs from a different OSA/SF image″. Once this image is managing the OSA, resubmit the action.

IOAx020E Device *nnnn* **is already managed by another image**

Explanation: The OSA device *nnnn* is currently being managed by a different OSA/SF image in another image.

User Response: The OSA/SF image that is managing the OSA must be used to perform the action that received this message. To locate which image is managing the OSA, from the GUI double-click on this OSA number from the Channels Tree view and select the Statistics window.

If you want to manage the OSA from this image, use the Start Managing with Force option.

IOAx022E I/O Error for device *nnnn* with return code *nnnn*

Explanation: OSA/SF issued the EXCP macro to start an I/O operation to the OSA. Communications failed between OSA/SF and the specified device. The return code may be one of the following hexadecimal expressions. The return codes are:

X'0000': The specified device is working correctly but VM is not at the Version 2 Release 4 level (or level 2.2 or 2.3 with APAR VM62184 applied).
X'0000': on VM, VM not at V2R4 or APAR VM62184
X'0041': permanent I/O error
X'0042': extent error (DASD only)
X'0044': an error occurred after the previous I/O request to the device was posted complete
X'0045': program check or machine check occurred in IOS while the I/O request was being processed
X'0048': channel program was purged
X'0051': command reject
X'0052': bus out check
X'0053': equipment check
X'0054': undefined bit on in sense byte 0
X'0061': protection check
X'0062': channel data check
X'0063': channel control check
X'0064': interface control check
X'0065': chaining check
X'0074': simulated error status, which is set for the following conditions:

- A start I/O operation was attempted to a device that is in a permanent error state, boxed, or not connected.
- A missing interrupt was detected and the I/O operation was terminated as a result of recovery operations by the missing interrupt handler.

User Response: Check the console for additional messages pertaining to this failure. For more information, refer to the EXCP macro description in *DFSMS/MVS V1R4 DFSMSdfp Advanced Services,* SC26-4921. Contact IBM Support if a hardware error occurred.

IOAx023E Unit check on device *dddd* with sense byte 10 value *xx*

Explanation: The command that was sent to the OSA returned a unit check.

User Response: Locate the value in the message and follow the instructions.

01 - 16 Internal OSA error occurred. See “Reporting OSA/SF Problems to IBM” on page 127.

17 The OSA mode installed on the OSA is not active. Configure the OSA (CHPID) offline in all images and then back online to activate the OSA mode.

18 The OSA mode loaded on the OSA has ABENDed. Configure the OSA (CHPID) offline in all images and then back online to activate the OSA mode.

19 - 24 Internal OSA error occurred. See “Reporting OSA/SF Problems to IBM” on page 127.

25 The OSA mode installed on the OSA is not active. Configure the OSA (CHPID) in all images and then back online to activate the OSA mode.

26–84 Internal OSA error occurred. Refer to “Reporting OSA/SF Problems to IBM” on page 127, then contact the IBM Support Center.

85 The OSA mode installed on the OSA is not active. Configure the OSA (CHPID) in all images and then back to activate the OSA mode.

86–AF Internal OSA error occurred. Refer to “Reporting OSA/SF Problems to IBM” on page 127, then contact the IBM Support Center.

B0 The drive (A:, B:, SYS:) specified is not valid.

B1 The directory specified does not exist.

B2 An attempt was made to remove the current directory. Switch out of the current directory and reissue the command.

B3 An attempt to remove the specified directory failed. Ensure the directory is empty and retry the command.

B4 An attempt was made to create a directory, and the path does not exist. Check that the drive and sub-directories are correct. Retry the command.

B5 The file name or extension is incorrect. Check the spelling and retry the command.

B7, B8, or B9
The file does not exist on the directory. An internal OSA error occurred. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127, then contact the IBM Support Center.

BB - FF
The file does not exist on the directory. An internal OSA error occurred. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127, then contact the IBM Support Center.

IOAx024E Parameter value is too large for device *nn*

Explanation: An attempt was made to access an OSA device for application area that does not exist.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx025E Missing value in parameter table for device *nn*

Explanation: Internal error

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx026E Requested function is unsupported for device *nn*

Explanation: Internal error

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx027E *sssssssss* **for CHPID** *dddd*

Explanation: The command completed with one of the following messages (*sss...*) for the CHPID in *dddd*.

Application is in initialization state
Retry the command.

A status modifier was received
This is used whenever a status modifier is received for an OSA feature.

Data Port ID is not assigned
This is an OSA/SF internal error. See "Reporting OSA/SF Problems to IBM" on page 127.

Device is in use
Stop the use of this device by the application and then retry the command.

OAT Device Type is incompatible
Native Passthru or native SNA OAT cannot be specified in OSA address table when the specified port is not native Token Ring, Ethernet, FDDI, or an emulated Token Ring or Ethernet. MPC cannot be specified in the OSA address table when the specified port is not an HPDT ATM Native port. Correct the device type and retry the command.

Port cannot be disabled
If it is a physical port, try disabling it from the Hardware Management Console (HMC) and then retry the command. Check configuration parameters. Check physical connections.

Port cannot be enabled
If it is a physical port, try enabling it from the Hardware Management Console (HMC) and then retry the command. Check configuration parameters. Check physical connections.

Port is in definition error state
Check the Hardware Management Console for hardware errors.

Port is in Disabled state
The port must be enabled to complete the command. See "Enabling and Disabling Ports" on page 113.

Port is in disabling state
The port was in the process of being disabled when the command was issued. Retry the command.

Port is in Enabled state
The port must be disabled to complete the command. See "Enabling and Disabling Ports" on page 113.

Port is in enabling state
The port was in the process of being enabled when the command was issued. Retry the command.

Port is in Link Failure state
Check the Hardware Management Console for hardware errors.

Port is in unavailable state
The port was not available when the command was entered. Retry the command.

Port is in undefined state
This port must be configured and activated before use.

Unknown status modifier code
Vary offline the devices associated with the CHPID (except the OSAD device) and reissue command.

User Response: Take steps appropriate to the message generated. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx028E x code = *xx* **for device** *nn*

Explanation: Internal error

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx03nE API failed attempting to make the connection with OSA/SF

Explanation: An APPC connection between the user address space and the OSA/SF address space failed.

User Response: Verify the APPC/MVS and VTAM definitions are correct. Then restart APPC/MVS, followed by the VTAM OSA/SF major nodes. Then restart OSA/SF.

Note: APPC/MVS and VTAM must be started before starting OSA/SF.

Common Problems:

- The APPC LU may not be active or successfully configured. Display the APPC LU (**D APPC,LU,ALL**) and verify the following attributes:

  ```
  LLUN=IOASERV      SCHED=*NONE*    BASE=NO
  STATUS=ACTIVE  PARTNERS=00000  TPLEVEL=SYSTEM
  TPDATA=SYS1.APPCTP
  ```

  This example illustrates the BASE=NO. If this is the only LU defined for APPC, the BASE should then be equal to YES. Only one LU must be the BASE.
- Security violation via RACF or Security product. Verify that the USERID has sufficient authorization to use the APPC facility. If the security product is other than RACF, be certain that APPC is an authorized facility of the host operating system.

IOAx051E Memory allocation error

Explanation: Memory allocation failed in the OSA/SF address space.

System Programmer Response: The request was for storage in the OSA/SF address space. Check the region size allocated for OSA/SF, it may have to be increased. Stop OSA/SF if required, correct the condition, and restart OSA/SF. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx052E Memory free error

Explanation: There has been a FREEMAIN failure in the OSA/SF address space.

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx053E File I/O error

Explanation: The file that was being accessed has encountered an I/O error.

User Response: Verify the file name is correct and that no hardware errors have been encountered. Retry the command. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx054E Command code is unknown or not valid

Explanation: An internal error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx055E Incorrect parameter

Explanation: An incorrect parameter was detected by OSA/SF on the command received.

User Response: If you are not calling OSA/SF at the API and not using your own EXEC, verify that you entered the parameters correctly, if the problem persists, contact the IBM Support Center.

If you are calling the API or using your own EXEC to call IOACMD.EXEC then verify that the command target in the API control block structure is correct and then retry the command.

IOAx056E *ffffff

- Check the system log (probably with the help of the system programmer) for details of what failed.

Hint: Use another method of access for the data set, such as TSO BROWSE, to verify the data set's integrity.

If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx059E File close failed for *ffffff

IOAx084E Unknown op code in caller's request

Explanation: An internal error has occurred in the OSA/SF program.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx085E Incorrect length in caller's request

Explanation: An internal OSA/SF error has occurred.

User Response: Verify that all API control block length fields are valid. If everything is correct and the problem persists, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx086E Initialization of OSA/SF attention handler failed

Explanation: A system level name token created during initialization of the OSA/SF was not found by the attention handler code. The attention handler for this OSA/SF was not started.

User Response: Shut OSA/SF down for this image and restart it. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 127.

Common Problems: If this message is accompanied by MSGIOAA090E, verify that the OSA/SF load library, SYS1.SIOALMOD and the runtime library OSA/SF was linked with, are in the PROGXX member.

IOAx087I Terminating attention handler attached processor.

Explanation: The attention handler code for this OSA/SF is being shut down.

User Response: None. Normal OSA/SF exit processing continues.

IOAx088I Unexpected attention handler postcode of *dddd* received

Explanation: The OSA/SF attention handler code received an unexpected post code. The attention is handled and processing continues.

User Response: None. OSA/SF operation continues. If the problem continues to reoccur, then see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx089I Attention handler attached processor terminated

Explanation: The attention handler code for this OSA/SF has completed its shut down processing.

User Response: None. Normal OSA/SF exit processing continues.

IOAx090W Loading of the OSA/SF attention handler code failed.

Explanation: The attention handler code for this OSA/SF failed to load during initialization of OSA/SF. Attention interrupts from the OSA device will not be processed for this OSA/SF.

User Response: OSA/SF will continue to run, but to display interrupts for an OSA, issue the Start Managing command. To resolve the problem, stop OSA/SF in this image and restart it. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 127.

Common Problems: If this message is accompanied by IOAA086E, verify that the OSA/SF load library, SYS1.SIOALMOD and the runtime library OSA/SF was linked with, are in the PROGXX member.

IOAx100I OSA Support Facility version *xxx*

Explanation: Self-explanatory. *xxx* is the version number with BASE or an APAR number appended.

User Response: None.

IOAx101I OSA Support Facility initialization started *hh:mm:ss*

Explanation: Self-explanatory.

User Response: None. OSA/SF is in the process of starting. Wait for message IOAx102I to be issued.

IOAx102I OSA Support Facility initialization completed *hh:mm:ss*

Explanation: Self-explanatory.

User Response: None. OSA/SF operations and commands can now be processed. The GUI interfaces can now be established.

IOAx103I OSA Support Facility terminated at *hh:mm:ss*

Explanation: The OSA/SF successfully stopped at the specified time. Before you can issue another OSA/SF command, you must re-start OSA/SF.

User Response: None.

IOAx104E OSA/SF internal error. Could not spawn task *ttttttt*

Explanation: An attempt to start the OSA/SF task, *ttttttt*, failed. An internal OSA/SF error has occurred.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx105E *hh:mm:ss* **Unrecognized command** *cc* **was entered by** *uuuu* **on** ***sssss***

Explanation: An unknown command, *cc*, was sent to OSA/SF by the API interface. *uuuu* is the userid issuing the command. ***sssss*** is the system name.

User Response: If you are not calling OSA/SF at the API or using your own EXEC, see “Reporting OSA/SF Problems to IBM” on page 127.

If you are calling the API or using your own EXEC to call IOACMD.EXEC, then verify that the command code in the API control block structure is correct, and then retry the command. If the condition persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx106E Improper syntax was used in command

Explanation: An API interface command, the Put File command, and the Get Debug command are all possible sources of a command that is not in the required format (syntax). The command was not executed.

User Response: The following are some common reasons for this message:

- Verify the command syntax in the API control block if the API interface was used. Especially check the command target and the command identifier.
- If the Put File command was used, check that a data set name was passed as part of the command, that it is valid, and that the data set name is catalogued to the system.
- If the Get Debug command was used, especially for the SNA message file, the SNA trace file, or an SNA member, double check that the data set name was passed as part of the command, that it is valid, and that the data set name is catalogued to the system.

Then retry the command that cause the message to be issued.

IOAx107E Incorrect block length passed on the command

Explanation: The command was issued from the API interface. The command requires more parameters than OSA/SF received.

User Response: Check the amount of data passed on input along with the length indication given. Verify the API command control block structure. (Refer to the control block section for the command control block structure.) Then retry the command that received the message.

IOAx108E *hh:mm:ss userid* **on** *system* **not authorized to use** *command*

Explanation: *userid* has attempted to issue a command (*command*) and does not have the proper user access authority. See ″Planning to Control OSA/SF User Access (RACF)″ in the OSA publication.

User Response: Check with your system administrator to coordinate the user access authority for this *userid* with this command.

IOAx109E File allocation error. Error code *eeee* **info code** *iii*

Explanation: OSA/SF internal code attempted to allocate a data set using the DYNALLOC macro. The allocation failed.

- *eeee* - Error code from the DYNALLOC macro
- *iii* - Information code from the DYNALLOC macro

User Response: For information on the two codes, refer to the DYNALLOC macro in *MVS/ESA Programming: Authorized Assembler Services Guide System Product: JES2 Version 5 JES3 Version 5*, GC28-1467.

IOAx110I Notice - Shut down complete

Explanation: The sub-components of OSA/SF have all successfully ended.

User Response: None.

IOAx111I OSA/SF task *ttttttt* **not terminated**

Explanation: An OSA/SF sub-task (*ttttttt*) has not terminated within the time limit. OSA/SF will still terminate.

User Response: OSA/SF has issued this warning message for self-documentation and an audit trail. No action is required unless other messages indicate that a call to the IBM Support Center is necessary in which case this message should be reported.

IOAx112W OSA/SF is shutting down. You will be disconnected

Explanation: This message is sent to any *user_ID* that is currently waiting for a response while OSA/SF is terminating.

User Response: Check with your system administrator as to why OSA/SF on this host was shut down.

IOAx113I Waiting for *ttttttt* **to terminate**

Explanation: OSA/SF is waiting for internal task *ttttttt* to terminate. This message is part of normal OSA/SF shutdown.

User Response: None. Normal OSA/SF shutdown will resume shortly.

IOAx114I *ttttttt* **has terminated**

Explanation: As part of OSA/SF shutdown, task *ttttttt* has ended. This message is part of a normal OSA/SF shutdown.

User Response: None. Normal OSA/SF shutdown continues.

IOAx115E This OSA/SF level does not support the configuration for CHPID *cc*

Explanation: The installed mode on OSA CHPID *cc* is at a different level than is supported by this version of OSA/SF.

User Response: Ensure that the version of OSA/SF that has been started on this system is at the required level for the mode installed on the OSA. See the OSA publication for detailed information about needed version-release levels for OSA mode support.

IOAx116E A copy of OSA/SF is already running. Start OSA/SF not completed

Explanation: An attempt was made to start a second copy of OSA/SF in this image; a copy of OSA/SF is already running. The second copy of OSA/SF was not started.

User Response: Verify that a copy of OSA/SF is running. Only one copy of OSA/SF can be running on an image at a time. See Chapter 2 for more information on OSA/SF start-up.

IOAx118I Inx Comp Type ID Address Time

Explanation: This is the header information for the OSA/SF trace table dump. The information from the trace table dump is used by IBM for problem determination. The field headings are:

- Inx - The Trace entry number
- Comp - Component that inserted the trace entry
- Type - A reference indicator to point to the location in the source code
- ID - Identifies which task was active when the entry was put into the trace table
- Address - The address in memory where the entry resides
- Time - Time stamp in hours, minutes, and micro-seconds.

User Response: Save the trace table dump output, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx119E No trace table available

Explanation: A Get_Debug operation was attempted and no trace table was found. A trace table should always be available. An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx120I OSA Support Facility terminated

Explanation: OSA/SF has completed its shutdown sequence.

User Response: None. Normal OSA/SF termination is complete.

IOAx121E The Message Log processing has ended due to an error

Explanation: This error indicates that the Message Log function had an error and is no longer active. No message logging is currently being done.

User Response: To reactivate message logging, OSA/SF must be stopped and restarted. Also, check to see if message IOAx143W was displayed. If so, this problem may have occurred due to a user viewing the message log data set while OSA/SF was trying to write to it.

IOAx123E OSA/SF load module is not installed in an APF authorized library

Explanation: In order for OSA/SF to execute, the OSA/SF module must be installed in an authorized partitioned data set (APF authorized). Also, the LE/370 or C/370 run time libraries that are used by the OSA/SF module must also be in APF authorized libraries.

User Response: Ensure that all the libraries used by OSA/SF are APF authorized. This includes the partitioned data set that contains the OSA/SF module, and either the C/370 or LE/370 run time libraries, whichever is being used.

IOAx124I *hh:mm:ss* **domain** *sss* **port** *nn* **internet address** *nn*

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx125I *hh:mm:ss user_ID* **on** *ssssssss* **issued command** *ccc...ccc*

Explanation: The user ID *user_ID* on system *ssssssss* issued the command *ccc...ccc* at time *hh:mm:ss*

User Response: This message is part of OSA/SF’s audit trail. No user action is required.

IOAx126I *hh:mm:ss user_ID* **cmd** *ccccccccccccccccccccccc* **RC=***cc* **Reason=***rrrr*

Explanation: The specified *user_ID* on the system entered the specified command with the resulting return code and reason code.

User Response: Look in the OSA/SF message log for previous messages with additional information regarding this condition.

IOAx127I *hh:mm:ss* **API connection** *x* **number** *y*

Explanation: An APPC connection of type *x* was made to OSA/SF, thus bringing the total of currently active connections to *y.*

User Response: None. Normal APPC operation continues.

IOAx128W *hh:mm:ss* **Reading of OSA device** *nnnn* **information failed with RC=***cc***, reason** *rrr*

Explanation: Device *nnnn* has had changes made since the last command was issued.

User Response: Make sure no other instance of OSA/SF, the hardware system console (PCE), or hardware management console (HMC) is attempting to communicate with this device. Review the message log for additional messages that will accompany this message. Retry the command. If it fails again, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx130E *hh:mm:ss* **APPC call ATBRFA2 RC:** *aaaaaaa* **Reason:***bbbbbbb*

Explanation: An error occurred from APPC for a call to ATBRFA2. See the APPC manuals for more information on the return codes and reason codes.
aaaaaaa = return code
bbbbbbb = reason code

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see "Reporting OSA/SF Problems to IBM" on page 127.

Common Problems: There can be several symptoms associated with this message code. The following represents the most common:

- SOC4 ABEND during startup of OSA/SF. Also the message log contains the following error: `is APPC call ATBRFA2 RC: ATBCTS_REQUEST_UNSUCCESSFUL ATBCTS_INVAL_LOCAL_LU`: Verify the TP profile VSAM dataset has been created and cataloged. Verify that APPC was started prior to starting OSA/SF.
- IOACMD returns:

```
IOACMD: Incorrect command code returned from
        call to OSA/SF
IOACMD: Command issued failed with rc 16
IOACMD: Call to OSA/SF never worked
IOACMD: This usually occurs when the OSA/SF
        code has been
IOACMD: updated, but the copy running has not
        been refreshed
```

  Verify that the load library, SYS1.SIOALMOD and the runtime library that OSA/SF was linked with, are in the User's TSO LOGON PROC.
- `APPC call ATBCTS RC: ATBCTS_REQUEST_UNSUCCESSFUL ATBCTS_NOT_AUTH_TO_LOCAL_LU` From console, issue: **D APPC,LU,ALL** and verify the following:
  1. Do you see any LU defined with "BASE=YES"? The IOASERV LU doesn't have to be the one defined as a BASE but at least one LU must be defined.
  2. Do you see: "LLUN=IOASERV"? If, by convention, you do not use the name IOASERV, there must be a corresponding statement put in the Startup Profile, SET APPC NAME luname. This luname must match the name defined in the ACBNAME for APPC. If so,
     a. Does it show: ″SCHED=*NONE*″?
     b. Does is show: ″STATUS=ACTIVE″?
- APPC is failing, however, all of the above symptoms have been verified. If you are using an OEM security product, verify that APPC is an authorized facility and the USERID has sufficient authorization to use it. Security violations from an OEM product may not be found in the message log.

IOAx131E *hh:mm:ss* **APPC call ATBRAL2 RC=***aaaaaaa* **Reason:***bbbbbbb*

Explanation: This indicates an error from APPC for a call to ATBRAL2. See the APPC manuals for further explanation of the return code and reason code.
aaaaaaa = return code
bbbbbbb = reason code

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx132E *hh:mm:ss* **APPC call ATBRAL2 RC=***aaaaaaa* **Reason:***bbbbbbb*

Explanation: This indicates an error from APPC for a call to ATBRAL2. Look at the APPC manuals for explanation of the return code and reason code.
aaaaaaa = return code
bbbbbbb = reason code

User Response: Refer to *SAA: Common*

Programming, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx133E *hh:mm:ss* **APPC call ATBURA2 RC=***aaaaaaa* **Reason:***bbbbbbb*

Explanation: This indicates an error from APPC for a call to ATBURA2. See the APPC manuals for explanation of the return code and reason code.
aaaaaaa = return code
bbbbbbb = reason code

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx134E *hh:mm:dd* **cmrcv return code error**

Explanation: An APPC **CMRCV** function call error has occurred. The data displayed after this message will show the reason for the failure.

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx135E *hh:mm:ss* **cmsend return code error**

Explanation: An APPC **CMSEND** function call error has occurred. The data displayed after this message will show the reason for the failure.

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx136E *hh:mm:ss* **cmsdt return code error**

Explanation: An APPC **CMSDT** function call error has occurred. The data displayed after this will show the reason for the failure.

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx137E *hh:mm:ss* **cmptr return code error**

Explanation: An APPC **CMPTR** function call error has occurred. The data displayed after this will show the reason for the failure.

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx138I **APPC call to** *aaaaaaaa* **failed with** *sssssssssssssssssssssssssssssssss*

Explanation: This displays the return code text for the failure that occurred in the function indicated.
aaaaaaaa = APPC function
sssssssssssssssssssssssssssssssss = return code text

User Response: Refer to *SAA: Common Programming*, SC26-4399, and *Application Development: Writing Servers for APPC/MVS*, GC28-1070, for return code, reason code, and more information. If the condition can not be corrected after reviewing the APPC manuals, then see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx139E *mm/dd/yy hh:mm:ss* **OSA/SF failed to start due to error** *nn*

Explanation: The OSA Support Facility failed to start for the reason listed below.
- *mm/dd/yy hh:mm:ss* are the date and time stamp
- *nn* is the value that represents what area of OSA/SF had the error.

All Errors after error 4 are also recorded in the message log. Error numbers 6, 8, and 9 have additional information in the message log.

The following is a list of possible error numbers and their meaning:
-1 - SVM error
0 - Reserved
1 - Trace table initialization
2 - File command error
3 - Startup profile parser
4 - Startup profile parser open log file
5 - System console error
6 - SCC error (see message log)
7 - Data manager failure
8 - OSA/SF interrupt handler error (see message log)
9 - APPC error (see message log)
10 - Missing startup profile data sets

11 - Startup profile data set name error
12 - Startup profile data set UNIT/VOLSER error
13 - Missing Message Log data set name
14 - Message Log data set allocation failed

If any of the failures occur before the message log is created, all the messages that were intended for the message log will be displayed on the system console.

User Response: When OSA starts, it attempts to open and use the user-defined message log (IOAMSG.LP*nn* where *nn* is the image number where OSA is being run. If IOAx139E prevents OSA from initializing, the message log used to determine the problem may be shown as IOAMSG without .LP*nn* appended to it. When attempting to look in the message log to determine the cause of the failure, check for both message log filenames.

Use the above list of error numbers to isolate the failure. Correct the problem, if possible.

For error number 2, be sure that the APPC started task is started prior to OSA/SF.

For error number 7, if this is a VM operating system and MVS is running as a guest, verify that VM is authorized to put OSA/SF in the VM guest's directory. Do this by specifying the RMCHINFO option in the OPTION Directory Control statement. Also, if this is not a new installation of OSA/SF, it's possible that the channel files were corrupted. Find the channel files (HLQ.@CECNAME.#CHP.INFO) and delete them. Startup OSA/SF (the channel files will be dynamically created by OSA/SF).

For error number 14, check for the following common problems:

1. IOAMSG (message log) is defined in STARTUP PROFILE with an invalid data set name.
2. IOAMSG should not be cataloged on the system.
3. IOAMSG (message log) is RACF protected and OSA/SF does not have authority. (Check JES job log for violation errors.)
4. OSA/SF was linked with one version of C library and executed under another version because of LNKLST or incorrect STEPLIB.

Stop and restart OSA/SF. If the nature of the problem is unknown or persists, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx140I *hh:mm:ss* **API APPC component ended**

Explanation: Informational message to track that the API of the APPC component terminated.

User Response: None. Normal APPC termination continues.

IOAx141I *hh:mm:ss* **API APPC component started**

Explanation: Informational message to track that the API of the APPC component has activated.

User Response: None. Normal APPC activation continues.

IOAx142E **Message file** *ffffffffffffff* **error** *nn*

Explanation: An error occurred attempting to open the message log data set.
- *ffffffffffffff* - Message log data set name
- *nn* - The value is used by IBM service.

User Response: This message will occur after a predetermined number of opens were attempted. If the value of *nn* is 45 or 61, check to see if this data set is open by a user or another program, including users and programs in other images. If the data set is open, it must be closed before the message log data set can be opened by OSA/SF.

If the value of *nn* is neither 45 nor 61, then see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx143I *hh:mm:ss* **API COMM component ended**

Explanation: The COMM component is the APPC component which handles the individual API connection. This message is issued as part of the normal system shutdown sequence.

User Response: None. The API COMM component has ended normally. The shutdown sequence continues.

IOAx144I *hh:mm:ss* **ALL OSA devices initialized**

Explanation: This is an OSA/SF startup message. OSA/SF has made the internal connection with all OSA CHPIDs and OSAD (X'FE') unit addresses.

User Response: None. Normal OSA/SF initialization continues.

IOAx145W *hh:mm:ss* **Only** *x* **of** *y* **OSA devices initialized**

Explanation: Of the total number of OSAs, *y*, known to the channel subsystem only *x* were successfully initialized.

User Response: Check the preceding entries in the message log to determine why the remaining device numbers could not be initialized.

The following items should be checked:
- Check OSA definitions in the IODF/IOCDS
- Verify channel and diagnostic devices (X'FE') are online.
- Verify that the OSA device addresses are online.

Stop OSA/SF, correct any problems, then restart OSA/SF. If the remaining OSA devices still do not initialize, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx146E *hh:mm:ss* **No OSA devices were initialized**

Explanation: None of the OSA devices found in the channel subsystem could be initialized. Additional messages in the message log explain why the devices were not initialized.

User Response: Check the message log to determine why the OSA devices could not be initialized.

Check the following items:
- Check OSA definitions in the IODF/IOCDS
- Verify channel and diagnostic devices (X'FE') are online.
- Verify that the OSA device addresses are online.

Stop OSA/SF, correct any problems, then restart OSA/SF. If the OSA devices still do not initialize, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx147E **Bind socket error in port** *nn*

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx149I *hh:mm:ss* **Interrupt handler component ended**

Explanation: This message is issued as part of OSA/SF shutdown. The interrupt handler component has ended normally.

User Response: None. Normal OSA/SF shutdown continues.

IOAx150I *hh:mm:ss* **Interrupt handler component started**

Explanation: This message is issued as part of normal OSA/SF initialization. The interrupt handler component has started.

User Response: None. Normal OSA/SF initialization continues.

IOAx151E **SVM return code received was not valid**

Explanation: An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx152I **Finished OSA/SF startup profile processing**

Explanation: This message is a part of normal OSA/SF initialization. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

User Response: None. Normal OSA/SF initialization continues.

IOAx153I **Processing of OSA/SF startup profile started**

Explanation: This message is a part of normal OSA/SF initialization. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

User Response: None. Normal OSA/SF initialization continues.

IOAx154E **STARTUP.PROFILE SET NAME** *ssssss* **has duplicate** *uuuuuu* **parm**

Explanation: A duplicate UNIT or VOLSER keyword was found after the SET NAME command *ssssss* in the OSA/SF startup profile. OSA/SF initialization has terminated.
- *ssssss* - One of the SET NAME entries in the OSA/SF startup profile; for example, IOAINX, IOACFG, IOAMSG, IOADSN, and so on.
- *uuuuuu* - Will be either UNIT or VOLSER

User Response: Delete one of the duplicate UNIT or VOLSER entries in the *ssssss* SET NAME entry.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

IOAx155I *hh:mm:ss* **Startup profile command** *ssss*

Explanation: This message is issued as part of the OSA/SF start-up message series.

ssss = the OSA/SF startup profile command that is going to be processed.

User Response: None. Normal OSA/SF start-up continues.

IOAx156E Unknown command in dataset STARTUP.PROFILE at line *dd*

Explanation: This message is a part of OSA/SF initialization. In the OSA/SF startup profile, a command at line *dd* is not valid. OSA/SF initialization did not complete.

User Response: In the OSA/SF startup profile, a member in the IOAPROF data set of the OSA/SF started procedure, check the specified line and correct it. Refer to Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile and for what commands are valid. Then restart OSA/SF.

IOAx157E Incorrect number of parameters on ’SET’ command in STARTUP.PROFILE

Explanation: The SET command was found in the OSA/SF startup profile but the number of parameters to support the SET command is not correct. OSA/SF initialization did not complete.

User Response: Check the parameters on each of the SET commands in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). Refer to Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile and the SET commands. Correct the OSA/SF startup profile then restart OSA/SF.

IOAx158E Incorrect parameter *ssss* on ’SET’ command in STARTUP.PROFILE

Explanation: Parameter *ssss* on one of the SET commands in the OSA/SF startup profile is not correct. OSA/SF initialization terminates.

- ssss - Parameter keyword in SET command that is not valid

User Response: Locate the incorrect parameter in the OSA/SF startup profile and correct it. Restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

IOAx159E SET ALIAS in STARTUP.PROFILE has incorrect number of parameters

Explanation: In the startup profile for OSA/SF, the SET ALIAS keyword has an incorrect number of parameters. OSA/SF initialization has terminated.

User Response: Check the OSA/SF startup profile and locate the Set Alias command. It must contain 2 parameters. Any other number of parameters will cause this error. For example: ″SET ALIAS CECNAME SYS1″ contains the correct number of parameters; in this example, CECNAME and SYS1. Correct the OSA/SF startup profile and restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

IOAx160E STARTUP.PROFILE requires *cecname/sysname* before SET NAME command

Explanation: In the OSA/SF startup profile, the OSA/SF Set Alias command, either the *cecname* or the *sysname* parameter was missing or was in the wrong location. It must be specified before the OSA/SF Set Name command. OSA/SF initialization has terminated.

User Response: Locate the Set Alias command in the OSA/SF startup profile. Make sure it proceeds all the Set Name commands. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). Refer to Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the startup profile.

Correct the startup profile, then restart OSA/SF.

IOAx161E Incorrect parm *ssss* after SET NAME *IOAxxx* in STARTUP.PROFILE

Explanation: The specified parameter, *ssss*, in the Set Name command of the OSA/SF startup profile, is not valid.

- *ssss* - Parameter that is in error
- *IOAxxx* - The Set Name command containing the incorrect parameter, where *IOAxxx* can be any of the IOA-group sets such as IOAINX, IOADSN, IOACFG, and so on in the OSA/SF startup profile.

User Response: Check the startup profile for OSA/SF. Locate the Set Name command. Make sure all the parameters are correct. Correct the startup profile then restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

IOAx162E IOAPROF incorrect ALIAS in DATASET *ssssssss*

Explanation: The only aliases allowed in the OSA/SF startup profile (IOAPROF) are &CECNAME and &SYSNAME. An unknown alias (a variable beginning with an ampersand) has been found. OSA/SF startup has terminated.

- ssssssss - Startup profile SET NAME qualifier with error

User Response: Locate *ssssssss* in the OSA/SF

startup profile. Ensure that only &CECNAME and &SYSNAME are used in the profile. Correct the OSA/SF startup profile, then restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

IOAx163E STARTUP.PROFILE missing ’&’ in ALIAS name in DATASET *ssssssss*

Explanation: In the startup profile, in the SET NAME command’s DATASET keyword, the value following DATASET is missing either the &CECNAME, the &SYSNAME, or the ’&’. OSA/SF startup has terminated.

- ssssssss - Startup profile SET NAME qualifier with error

User Response: In the OSA/SF startup profile, check the alias name in DATASET *ssssssss* for a correct ’&’. Ensure that only &cecname and &sysname are used in the data set. Correct the startup profile, then restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

IOAx164E Missing quote mark after SET NAME *ssssssss* in STARTUP.PROFILE

Explanation: The name after the DATASET keyword of the SET NAME command is missing a single quote. OSA/SF initialization has terminated.

- ssssssss - Startup profile SET NAME qualifier with error

User Response: In the OSA/SF startup profile, locate the SET NAME command with *ssssssss*. Following the DATASET keyword, add the missing single quote. Then restart OSA/SF.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF Startup Profile.

IOAx165E Incorrect qualifier after SET NAME *ssssssss* in STARTUP.PROFILE

Explanation: A qualifier in the OSA/SF startup profile DATASET value is not valid. OSA/SF startup has terminated.

- ssssssss - Startup profile SET NAME command with error in supplied value

User Response: Locate the data set name specified after the DATASET keyword in the OSA/SF startup profile. Some of the rules for DATASET qualifiers are:

- The first character of any qualifier cannot begin with a numeric character
- All DATASET values can have any number of qualifiers but each qualifier can not exceed 8 characters in length. (The maximum number of characters, however, including periods, can not exceed 44, except in the IOADSN value where the maximum number of characters can not exceed 26, including periods.)
- DATASET values only need one qualifier (but more are permitted)

Make needed corrections, then restart OSA/SF.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF Startup Profile.

IOAx166E STARTUP.PROFILE DSN *ssssssss* has VOLSER but no UNIT

Explanation: When specifying a VOLSER keyword in the SET NAME command in the OSA/SF startup profile, the UNIT keyword must be specified. The UNIT keyword must proceed the VOLSER keyword. OSA/SF startup has terminated.

- ssssssss - Startup profile SET NAME qualifier with error

User Response: In the OSA/SF startup profile, locate the SET NAME command that specified the VOLSER keyword and NOT the UNIT keyword. Correct the condition. Then restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 2 for more information about the OSA/SF startup profile.

IOAx167E Incorrect *ssssss* name *ffffffff* after SET command in STARTUP.PROFILE

Explanation: The OSA/SF startup profile is not valid. The values specified for either the UNIT or VOLSER keywords are not correct.

- ssssss - will be either keyword *UNIT* or *VOLSER*
- ffffffff - the incorrect value that follows the *ssssss* keyword

User Response: Check the OSA/SF startup profile and correct the value after either keyword VOLSER or UNIT. The value must be specified; blanks are not permitted. Then restart OSA/SF. See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more details about the OSA/SF Startup Profile UNIT and VOLSER keywords. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task).

IOAx168E STARTUP.PROFILE command has incorrect length at line *dd*

Explanation: In the OSA/SF startup profile, the maximum length of the command is 64 characters. The command at line *dd* is too long. In this context, the OSA/SF startup profile, a ″command″ is one line in the OSA/SF profile. Only 64 characters are allowed on each line of the OSA/SF startup profile. Blanks do not count in the total character count. Quote marks and periods do count in the total character count per line. OSA/SF initialization has terminated.

User Response: Shorten the command length on line *dd* to 64 or less characters. Then restart OSA/SF.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

IOAx169E STARTUP.PROFILE has same DSN for *ssssssss* **and** *dddddddd*

Explanation: The data set names in two of the SET NAME statements in the OSA/SF startup profile are the same. This is not permitted. OSA/SF initialization is terminated.

- *ssssssss* - The first SET NAME entry
- *dddddddd* - The second SET NAME entry

User Response: Change the two entries in the OSA/SF startup profile so that they no longer match. Then restart OSA/SF.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

IOAx170E SET ALIAS *aaaaaa* **in STARTUP.PROFILE has already been set**

Explanation: The SET ALIAS value for *aaaaaa* has already been declared. Only one SET ALIAS *aaaaaa* value is allowed in the OSA/SF start profile. OSA/SF initialization is terminated.

User Response: In the OSA/SF startup profile, remove one of the SET ALIAS *aaaaaa* entries. Then restart OSA/SF.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

IOAx171E STARTUP.PROFILE DSN for *ssssssss* **is too long**

Explanation: In the OSA/SF startup profile, the data set name following the DATASET keyword for SET NAME entry *ssssssss* contains too many characters. If the data set name is part of the SET NAME IOADSN entry, the maximum number of characters permitted is 26, including periods. For all other entries, the maximum number of characters is 44, including periods. OSA/SF initialization is terminated.

- *ssssssss* - One of the SET NAME entries in the OSA/SF startup profile; for example, IOAINX, IOACFG, IOAMSG, IOADSN, and so on.

User Response: Check the data set name that follows the DATASET keyword in the OSA/SF startup profile for too many characters. Make corrections, then restart OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

IOAx172I OSA Support Facility *mm/dd/yy hh:mm:ss*

Explanation: This message is used as a date and time stamp in the message log. It is automatically written to the message log at midnight every night, as well as whenever the message log is renamed, and whenever the Clear Debug command is issued. The message serves as a delimiter when looking through the message log to see what day entries where placed in the message log.

User Response: None. Normal OSA/SF operation continues.

IOAx173I *mm/dd/yy hh:mm:ss* **AutoLog component ended**

Explanation: This message indicates the AutoLog component has completed. This should only occur when OSA/SF is stopped.

User Response: During normal OSA/SF termination, no user action is required and OSA/SF termination continues. If this message is issued at a time other than normal OSA/SF termination, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx174I *mm/dd/yy hh:mm:ss* **AutoLog component started**

Explanation: When OSA/SF is being initialized, this message indicates that the AutoLog component is running.

User Response: None. Normal OSA/SF initialization continues.

IOAx175I OSA S/F Communication module SOCKET START

Explanation: Internal error

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx176I OSA S/F Communication module SOCKET ENDED

Explanation: Internal error

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx177I Listen socket error

Explanation: Internal error

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx178I Read socket error

Explanation: Internal error

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx179I Select socket error

Explanation: Internal error

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx181E The message log is FULL. A new one will be created

Explanation: The message log has reached its maximum size and a new message log will be created. The log that is full will be named to the name specified in IOAC182I and the new empty message log will be created.

User Response: Decide what to do with the renamed message log.

IOAx182I Backup message log named *ffffffffffffffffffffffff.LPnn.Dyyyyddd*

Explanation: The message log has reached its maximum size and was renamed as follows:

- ffffffffffffffffffffffff — The name specified in IOAMSG NAME in the startup profile.
- LPnn — The image number.
- Dyyyyddd — The 'D' is hardcoded; 'ddd' is today's date; 'yyyy' is the current year.

User Response: Decide what to do with the renamed message log. See Chapter 3, "Setting Up OSA/SF on OS/390, z/OS, and z/OS.e", on page 37 for more information about the OSA/SF startup profile.

IOAx183E Error renaming file *ffffffffffffffffffffffff*

Explanation: A file rename error has occurred for file *ffffffffffffffffffffffff*.

User Response: Check the file name for proper naming convention or see the startup profile for the proper IOAMSG name. See Chapter 3, "Setting Up OSA/SF on OS/390, z/OS, and z/OS.e", on page 37 for more information about the OSA/SF startup profile.

IOAx184E STARTUP.PROFILE error reported at line *dd*

Explanation: You specified an invalid parameter in the set statement in the startup profile at line number *dd*. The previous message for the startup profile will explain the error.

User Response: Check for the message prior to this one for the exact error and fix the problem.

IOAx201I *hh:mm:ss* **CHPID** *cc* **reports a logical port state change**

Explanation: A logical port state has changed other than the OSA/SF host program which triggered an alert to OSA/SF which issued this message. The change could have been from an external network manager, a cable pull, a LAN Emulation Server, etc.

User Response: Refresh the GUI Tree or Detail channel view to reflect the change and view the current state of the logical ports for the given OSA.

IOAx202I *hh:mm:ss* **CHPID** *cc* **reports OSA ready**

Explanation: OSA/SF has been signaled that OSA CHPID *cc* has entered the ″ready″ state. This could occur if the OSA CHPID had been in the ″not ready″ state and the condition was corrected.

User Response: None. Normal OSA/SF operation continues with CHPID *cc*.

IOAx204I *hh:mm:ss* **CHPID** *cc* **reports Application area dump alert**

Explanation: An error has occurred in the application code that was installed on the OSA by OSA/SF. A dump was taken by OSA/SF. The OSA and OSA/SF continue to run. The dump is stored in the data set specified by the SET NAME IOADSN statement in the Startup Profile. See Chapter 3, "Setting Up OSA/SF on OS/390, z/OS, and z/OS.e", on page 37 for the Startup Profile. The sample name was IOA.&CECNAME;OSASF.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx205I *hh:mm:ss* **CHPID** *cc* **reports an undefined register bit (5)**

Explanation: An internal alert has been received from OSA. This is not an error.

User Response: None. Normal OSA/SF operation continues.

IOAx206I *hh:mm:ss* **CHPID** *cc* **reports an undefined register bit (6)**

Explanation: An internal alert has been received from OSA. This is not an error.

User Response: None. Normal OSA/SF operation continues.

IOAx207I *hh:mm:ss* **CHPID** *cc* **reports an undefined register bit (7)**

Explanation: An internal alert has been received from OSA. This is not an error.

User Response: None. Normal OSA/SF operation continues.

IOAx210I *hh:mm:ss* **CHPID** *cc* **reports Error Log Alert**

Explanation: This is a result of an interrupt from the OSA device. This indicates that an unusual condition requiring immediate host attention has occurred. This message is only issued for an OSA running in SNA mode.

As a result of this condition an error event record has been written to an data set constructed from the SET NAME DATASET IOADSN keyword entry in the OSA/SF startup profile. The data set name is constructed using the IOADSN data set suffixed with ″SNA_chpid″ and ″ERRORLOG″.

For example, if the DATASET name for the SET NAME IOADSN was 'IOA.VOL1.OSASF' and the chpid was 2D, the data set would be 'IOA.VOL1.OSASF.SNA2D.ERRORLOG'.

User Response: Save the error log described above, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx211I *hh:mm:ss* **CHPID** *cc* **reports Abend Alert**

Explanation: This indicates that the OSA device reported an alert indicating that a non-recoverable error has occurred within an application running on the OSA device. As a result the application has abended. Message IOAC233E will indicate the application and the error code.

User Response: The CHPID must be reset for the operation to be resumed. To recover operations, configure the CHPID Offline in all images (CF CHP(nn),OFFLINE) and then back ONLINE (CF CHP(nn),ONLINE).

If using TSO, issue the Get Debug command to save the OSA/SF SNA memory dump. From the GUI, using the Command window, get the SNA memory dump. See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx212E hh:mm:ss CHPID cc reports Application Area Startup Failure

Explanation: The OSA mode failed during initialization.
hh:mm:ss = time of entry
cc = CHPID

User Response: From the OSA/SF GUI, do the following to issue the ACTIVATE command.
1. Display the **Configuration** window for the OSA (CHPID).
2. Enter or select the configuration name for the OSA.
3. Select **Configuration** from the menu bar and then select **Activate**.

   Note: After the activate you will have to reset the CHPID.

If the problem persists, contact the IBM support center.

IOAx213I hh:mm:ss CHPID cc reports Application Area Config. Rejection

Explanation: A mismatch exists between the OSA mode files and the OSA/SF GUI on OS/2. Message IOAC234E should also be displayed with more information.
hh:mm:ss = time of entry
cc = CHPID

User Response: Make sure the latest level of the OSA/SF GUI for OS/2 is installed. See Chapter 11, “Servicing OSA-Express and OSA/SF”, on page 129.

IOAx214I hh:mm:ss CHPID cc reports Diagnostic Completion Report

Explanation: A port diagnostic subcommand has completed. This message is only for information. There is not a problem.
hh:mm:ss = time of entry
cc = CHPID

User Response: No response required.

IOAx215I hh:mm:ss OSA mode on CHPID cc is now functional

Explanation: The OSA mode has completed initialization and is ready.
hh:mm:ss = time of entry
cc = CHPID

User Response: No response required. Message is for information only.

IOAx216I hh:mm:ss CHPID cc reports Application Area Config. Mod.

Explanation: The OSA's ATM logical, or LAN emulation client (LEC), parameters for configuration were changed during initialization from the ATM network to allow the OSA mode to run. For example, the LAN Emulation Configuration Server (LECS) could have changed the parameters if **Allow LEC automatic configuration** was specified for the logical port in the configuration.

hh:mm:ss = time of entry
cc = CHPID (OSA)

User Response: This message is for your awareness. If you want to see the OSA's ATM logical port parameters, do the following from the OSA/SF GUI:

1. Refresh the OSA/SF GUI by selecting **View** and then **Refresh now** from an OSA Channels window.
2. Double-click on the port number from the **OSA Channels - Tree View** window.

IOAx217I hh:mm:ss CHPID cc reports Device Offline Alert

Explanation: A device has failed or has been stopped.

hh:mm:ss = time of entry
cc = CHPID

User Response: Display the **OSA Channels - Details View** on the OSA/SF GUI and look at the **Entry state** for the entries to determine what the current values are.

If one of the entries is **Not Started**, this device is the problem. The device will also go offline to the operating system and will no longer be available for use by the host program.

IOAx218I hh:mm:ss CHPID cc reports a Physical port state change

Explanation: The state of the physical port on the OSA has changed.

hh:mm:ss = time of entry
cc = CHPID

User Response: Message IOAC242I will display the state of the physical port.

IOAx219I (timestamp) CHPID *nn* reports an asynchronous event

Explanation: An unexpected event has occurred in the CHPID named in the message. This message is followed by another giving details of the event that occurred.

User Response: See additional messages.

IOAx2yyI *hh:mm:ss* CHPID *cc* reports an Undefined Register Bit *n*

Explanation: *yy*=19 through 32 to indicate messages **IOAC219I** through **IOAC232**. Bit *n* is one digit less than the last two digits (xx) in the message ID. Each of these messages reports this internal OSA/SF error at *hh:mm:ss* time for CHPID *cc*.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx233E CHPID *cc* OSA mode *xxxxxxxx* failed with a code of *xxxxxxxx*

Explanation: After an application area abend alert is posted from the OSA, this message indicates which CHPID *cc*, OSA mode, and failure code *xxxxxxxx* were associated with the application area abend alert. Message IOAC211I should accompany this message.

User Response: The CHPID must be reset for the operation to be resumed. To recover operations, configure the CHPID offline in all images, then back online. See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx234E CHPID *cc sssss* configuration reject code of *xx*

Explanation: The OSA mode configuration created for this OSA was found to be in error.

cc = CHPID
xx = Hex value of the reject code.
sssss = String describing configuration type.

User Response: Try to reactivate the configuration from the Configuration window on the OSA/SF GUI. If the problem persists contact the IBM support center.

IOAx235I Created Dump file *ssssssss*

Explanation: This message is displayed with message 211. When the alert took place the dump area was read and placed into file ssssssss

User Response: OSA/SF automatically gathers problem determination information. In an event of a service need, IBM support will direct you to send this file for detailed analyst.

IOAx236E Dump file *ssssssss* already exists

Explanation: The file that was to be used to read the dump area into already exist and needs to be renamed or deleted so another dump area can be read.

User Response: Rename or erase the filename *ssssssss*.

IOAx237E Empty Appl. Area Dump Alert request code for CHPID *cc*

Explanation: The Alert data for the dump area was empty so no dump could be taken.

User Response: Call the IBM support center.

IOAx238A *hh*:*mm*:*ss* **CHPID** *cc* **reports Logical port n** *sssss*

Explanation: The OSA ATM logical port (LAN Emulation Client) parameter, **Client enabled state** changed. This parameter indicates the condition of the OSA's logical port for LAN emulation.

hh:mm:ss = time of entry
cc = CHPID (OSA)
n = Port number
sssss = Disabled by Internal Failure, Disabled by Physical Port, Disabled by OSA/SF, Disabled Externally, Not Defined, LEC Activating, Enabled, or Unknown.

User Response: Use this status to determine the state of the logical ATM port (LAN Emulation Client). You can display the port's ATM LAN Emulation Settings by double-clicking on the OSA port number from the OSA Channels - Tree view, or issuing the QUERY command from REXX.

Take any corrective action necessary, based on the information provided in the *sssss* portion of the message. In some cases the condition may be desirable, based on action already taken, and no further action will be required.

IOAx239I *hh*:*mm*:*ss* **CHPID** *cc* **reports logical port** *p* **changed, REASON=***rr*

Explanation: This reason code is displayed when the status changes for an OSA ATM port. The state of the port is displayed in message IOAC238I.

hh:mm:ss = time of entry
cc = CHPID
p = Port number
rr = Reason Code

User Response: No response required. The reason code is information for IBM support.

IOAx240I *hh*:*mm*:*ss* **CHPID** *cc* **reports port parameter changed for logical port** *p*

Explanation: An OSA ATM logical port (LAN Emulation Client) parameter changed. This parameter indicates the status of the OSA's logical port for LAN emulation. Message IOAC238I indicates the state of the logical port.

hh:mm:ss = time of entry
cc = CHPID (OSA)
p = Port number

User Response:

To display the parameter from the OSA/SF GUI, do the following:

1. Refresh the OSA/SF GUI by selecting **View** and then **Refresh now** from an OSA Channels window.
2. Double-click on the port number from the **OSA Channels - Tree View** window.
3. Select the **Emulation** notebook tab and look for **Client enabled state**.

You can view the port parameters by double-clicking on the OSA port number from the **OSA Channels - Tree View** window.

IOAx241I *hh*:*mm*:*ss* **CHPID** *cc* **had port value** *v*, **bytes 4/5 as** *y* **are not valid**

Explanation: The OSA ATM port parameters were changed, but the data is not valid.

hh:mm:ss = time of entry
cc = CHPID
v = Port value
y = invalid data

User Response: Record the information in this message and report the problem to the IBM support center.

IOAx242I *hh*:*mm*:*ss* **CHPID** *cc* **reports physical port** *p* **is** *sssss*

Explanation: The state of the physical port has changed to enabled, disabled, or unknown.

hh:mm:ss = time of entry
cc = CHPID
p = Port number
sssss = Enabled, Disabled, or unknown.

User Response: Use the status in the message to determine what to do next. You can display the OSA's physical port parameters by double-clicking on the port number from the **OSA Channels - Tree View** window, and then selecting the Physical notebook tab.

IOAx250I A port parameter was changed for port *nnn* **on CHPID** *nn*

Explanation: A port parameter was changed by a source other than OSA/SF.

User Response: See message IOAC251I to determine what port parameter changed, and if you need to take any action.

See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx251I Port parameter *sssssss* **changed for port** *nn*

Explanation: The port parameter, *sssssss*, was changed by a source other than OSA/SF.

User Response: Determine if any action is necessary based on the parameter that changed.

IOAx252I The state of *ssssss* port *p* changed on CHPID *cc*

Explanation: The state of *physical* or *logical* port p on CHPID cc has changed. Message IOAC253I contains the state of the port if it became disabled. Message IOAC260I contains the state of the port if it became enabled.

User Response: See the user response for either message IOAC253I or IOAC260I, whichever applies.

IOAx253I *ssssss* port *p* is disabled with *sssssss*

Explanation: The state of *physical* or *logical* port p has changed. The state is one of the following:

1. Internal port failure
2. Port temporarily disabled
3. Support element disabled
4. External disabled
5. Host program disabled
6. Configuration change (N/A for OSD)
7. Link failure threshold.

User Response: Do one of the following:

- If the disabled reason is 3, 4 OR 5, enter a command from the SE, with LAN manager, or with OSA/SF, to enable the port. See "Enabling and Disabling Ports" on page 113.
- All other reasons are generated by the CHPID. You can reset the CHPID; this may bring the port online.

IOAx254E CHPID *nn* rejected a configuration file

Explanation: CHPID *nn* rejected the configuration file from either a LAN driver or an SNA application.

User Response: Check the configuration file for the error. Message IOAC255I contains additional information to help pinpoint the error.

IOAx255I *sss* field *sss* is in error.

Explanation: The first value in the message is the configuration file type. This can be:

LAN emulation

Native ATM

Physical ATM

Gigabit Ethernet

Native SNA

The second value (*sss*) tells you what field is in error.

User Response: Check validity of values for the specified field in the configuration file. Make corrections and reissue command.

IOAx256W CHPID *cc* port *pp* reports a configuration change mismatch.

Explanation: The LAN driver has used a different set of parameter values than those specified in the configuration file.

User Response: None required - this is to make you aware of this change. IOAC257I below contains additional information about which field was changed.

IOAx257I *sss* field *sss* has been changed

Explanation: The first value in the message is the configuration file type. This can be:

LAN emulation

Native ATM

Physical ATM

Gigabit Ethernet

Native SNA

The second value (*sss*) tells you what field has been changed.

User Response: None. This message is for your awareness.

IOAx258I CHPID *c* reports a discarded message alert

Explanation: The message buffer for the specified CHPID is full. Some alert conditions may have been lost. This will occur when there is no OSA/SF running and managing the specified CHPID.

User Response: Make sure there is always an OSA/SF on one image running and managing each OSA.

IOAx260I *ssssss* port *p* enabled on CHPID *c*

Explanation: The *physical* or *logical* port is now enabled.

User Response: None.

IOAx261I An alert condition has occurred for CHPID *nn*

Explanation: This message is to inform you that an alert has occurred on the given CHPID.

User Response: Message **IOAC262I** contains the detailed information about this alert.

IOAx262I CHPID *nn* port *pp* error code=*eeee* severity=*ss*

Explanation: This message provides the details of the alert condition that occurred for the CHPID.

User Response: See the following table for a detailed

explanation and to determine the action you should take for the error code and severity.

Error Code	Sev	Explanation	User Response
1144	1	Indicates a port number mismatch between a request that was received from the host and the port number saved in the LSA LAN control block at initialization.	Check for errors in the VTAM configuration file.
1400	2	LLC reported that the LAN header is not valid. Alert Category: 2	Contact IBM Support.
1401	2	Unsupported routing information length received from VTAM. Alert Category: 2	Contact IBM Support.
1402	2	User LLC station or service access point (SAP) undefined. Alert Category: 2	Contact IBM Support.
1403	1	VTAM commands received before initialization. Alert Category: 2	Re-activate the XCA Major node. If the problem persists, contact IBM Support.
1404	1	VTAM commands received before LAN adapter enabled. Alert Category: 2	Contact IBM Support.
1405	2	Unsupported VTAM interface header length. Alert Category: 2	Contact IBM Support.
1406	2	Parameter data length not valid. Alert Category: 2.	Contact IBM Support.
1407	2	Network layer identifier not supported. Alert Category: 2.	Contact IBM Support.
1408	2	Identifier type not valid. Alert Category: 2.	Contact IBM Support.
1409	2	Unsupported VTAM interface version. Alert Category: 2.	Contact IBM Support.
140A	2	Padding length not valid in data from VTAM. Alert Category: 2.	Contact IBM Support.
140C	2	Command or response bits not valid for LAN data. Alert Category: 2.	Contact IBM Support.
140D	1	Unsupported function for network management SAP. Alert Category: 2.	Verify that the host is configured for NetView on the SAP. If the problem persists, contact IBM Support.
140E	1	LLC connection not opened by VTAM. Alert Category: 2.	Contact IBM Support.
140F	2	Unsupported LLC options received from VTAM. Alert Category: 2.	Contact IBM Support.
1410	2	Unsupported LLC flow control options received from VTAM. Alert Category: 2.	Contact IBM Support.
1411	2	Unsupported function request received from VTAM. alert Category: 2.	Contact IBM Support.
1412	1	Received connect request or response before LLC station opened. Alert Category: 2.	Contact IBM Support.
1413	2	Unsupported connection confirmation options received from VTAM. Alert Category: 2.	Contact IBM Support.
1414	1	Received close LLC station response with no request outstanding. Alert Category: 2.	Contact IBM Support.

1803	3	Normal indication if token-ring cable is not connected to access unit or appropriate wall outlet; if token-ring cable is connected, status code might indicate lobe wire fault or defective access unit. Alert Category: 3.	Make sure the Token Ring port is attached to the network. If so, contact IBM Support.
191D	3	An unspecified network error has occurred. Alert Category: 10.	Verify the cable connection to the network. Verify that the correct transceiver type is configured. The adapter device driver will periodically attempt to recover. It will clear the error if recovery is successful. If the problem persists, contact IBM support.

IOAx263I Unknown alert type *sss* was received for CHPID *nn*

Explanation: An alert was received from the OSA feature but it is not an alert that OSA/SF recognizes. Processing is not affected by this alert.

User Response: You can ignore the alert or save the log and contact IBM (see “Reporting OSA/SF Problems to IBM” on page 127) for more information.

IOAx264I The state of port *p* is *ssss*

Explanation: The state of the port specified in the message has changed to a state other than enabled or disabled.

User Response: None.

IOAx265I Port *p* reports a *ssss*

Explanation: An alert has been received. Message IOAC252I, which precedes this message, defines the CHPID for the alert. There are three values for this message: loss of signal, registration failure, or loss of SAAL connection.

User Response: Dependent upon the alert value.

Loss of signal
The most likely cause is an improperly installed or broken cable. Remedy this condition.

Registration failure (ATM only)
The registration was rejected by the ATM switch or the switch is not operational. This is most likely the result of the configuration not matching the configuration of the LES. Fix the configuration and make sure that the required switch is operational. Then enable the port (see “Enabling and Disabling Ports” on page 113).

Loss of SAAL connection (ATM only)
This is set when there is a problem with the communication to the switch. Have your network specialist check the switch connection.

UNKNOWN
This is presented if the LAN driver reports an invalid alert value. Call IBM service if this occurs.

IOAx266I Logical ports associated with physical port *p* have been removed

Explanation: The physical port associated with these logical ports has been disabled for the reason presented in IOAC253I. The logical ports may no longer function when their physical port has been disabled.

User Response: None.

IOAx276E A copy of the attention server already exists

Explanation: A copy of the attention server (IOANMAIN) is already attached.

User Response: Determine if the other attention server (IOANMAIN) is running.

IOAx277E An incorrect command target was entered

Explanation: An internal error has occurred

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx278E SNA image for port *pp* does not support this command.

Explanation: The current level of the SNA mode running on the OSA does not support this command.

User Response: Apply a new version of the SNA image that supports this command. To help you determine which image to install, do one or more of the following:

- Check RETAIN.
- Review applicable PTFs.
- Contact IBM Support Center.

IOAx279E Error opening message log data set

Explanation: An error has occurred while processing the Clear Debug command. The message log data set could not be opened.

User Response: Verify that the message log data set exists, is catalogued in this image, and is not in use in another image. The message log data set is pointed to by the OSA/SF startup profile entry IOAMSG. Retry the Clear Debug command.

The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx280E Error closing file

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx281E File already exists

Explanation: A command has been issued against an OSA/SF data set that requires that the OSA/SF data set be rewritten. The data set already exists but the Replace option was not specified on the command.

User Response: Reissue the command that received this message specifying the Replace option.

IOAx282E OSAD device does not exist for CHPID *cc*

Explanation: The OSAD device with unit address *X'FE'* associated with the specified CHPID (*cc*) has not been defined.

User Response: Perform the following checks and steps:
- Check the I/O definitions in the IODF/IOCDS to ensure an OSAD device (X'FE') has been defined for this CHPID.
- Update and activate the IODF if necessary
- Display the CHPID and unit status information for CHPID *cc*
- Verify the OSAD device is ONLINE
- Then restart operations on CHPID *cc*

IOAx283W ND mismatch occurred on CHPID *cc*

Explanation: A node descriptor (ND) mismatch occurred on the indicated CHPID. This occurs if there has been a change in the hardware associated with the specified CHPID or if the data currently known by OSA/SF has been altered.

User Response: Verify that the system is operating correctly and issue the Synchronize command.

IOAx284W OSA/SF internal data has been updated with new ND value

Explanation: The ND value found on the card has been stored internally.

User Response: None.

IOAx286E Dataset name was not specified

Explanation: A data set name was not included when the command was issued. The command to be executed requires a data set name. The command did not execute.

User Response: Retry the command that received this message specifying a data set name.

IOAx289E CHPID*nn* does not support this command

Explanation: The command you issued to the specified CHPID is not valid for this type of CHPID.

User Response: Check Chapter 13, “OSA/SF Commands for REXX”, on page 141 to make sure this command is valid.

IOAx290E Internal SNA command error for port *pp*

Explanation: Internal processing error occurred during SNA command

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx292E Force indicator is required as one or more devices are in use

Explanation: One or more devices, as described in the OAT, are in use. For the Set Parameter command to complete, the FORCE option must be used, but this option was not specified.

User Response: Use IOACMD or the GUI to invoke the Set Parameter command with the FORCE option. This will stop all traffic on the target port. To use the GUI, go to the Port Settings notebook, choose Set LAN traffic state (Hardware State for OSA-2), followed by Disable and Force.

IOAx294E OSA configuration data has changed

Explanation: Changes have been made to OSA configuration information since the last command was entered. This can be caused by another OSA/SF in another image with controlling access.

User Response: Refresh the GUI or use the Query

command to obtain the new configuration information, then retry the command that received this message.

IOAx295E Cannot complete command since CHPID *cc* is in use

Explanation: Another command is currently being processed by this OSA/SF. The command that received this message could not be executed.

User Response: Wait a short period of time then retry the command that received the message. If contention continues, check OSA/SF status in each image. Stop and restart OSA/SF if necessary.

IOAx296W Unable to start managing CHPID *cc* for this OSA/SF

Explanation: OSA/SF was unable to start managing this OSA CHPID.

User Response: See the command output window, if using the GUI, for more details and additional messages. If using the TSO interface, additional messages will be presented to the TSO screen.

IOAx298W Unable to stop managing CHPID *cc* for this OSA/SF

Explanation: OSA/SF was unable to stop managing this OSA CHPID.

User Response: See the command output window, if using the GUI, for more details and additional messages. If using the TSO interface, additional messages will be presented to the TSO screen.

IOAx299I VTAM is not using port *pp*.

Explanation: There is no VTAM currently using port *pp*.

User Response: Refresh the port view on the GUI.

IOAx301W Unable to synchronize this CHPID for this OSA/SF

Explanation: Synchronization between the OSA/SF internally stored data and OSA device data failed.

User Response: Refer to the message log and the command output window for additional messages. If the cause of the problem can not be located or the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx303E *cccc* is only permitted on a single CHPID

Explanation: The command *cccc* that was issued is restricted to just one channel at a time; that is, multiple channels or ALL are not allowed.

User Response: Specify ONE CHANNEL as the command target and retry the command.

IOAx304E CHPID *cc* is not managed by this copy of OSA/SF

Explanation: An OSA/SF command was entered to a copy of OSA/SF that is not managing the OSA channel that was specified in the command.

User Response: Try this command from the image in which the managing OSA/SF is running, or enter the command after this OSA/SF becomes the managing facility. Refer to the Start Managing command for more information.

IOAx305E Input value for *ssss* is out of range

Explanation: The input value for a load balancing parameter is out of range. *ssss* is one of the following:
- Session Delay (0-375)
- Load Balancing (0-25)
- Load Balancing Enable (0 or 1)

User Response: Enter a value within the specified range.

IOAx306E OSA port type does not match the OSA/SF internal data record

Explanation: Synchronization was attempted to update the card with the OSA/SF internal port data but the port type was not the same as found on the OSA device. This situation can occur if a new OSA was installed that contains different port parameters than the OSA that was originally installed (for example, ports were token ring and are now FDDI).

User Response: Check that the correct OSA device was installed. If so, then issue the Synchronize command to store the OSA data into the OSA/SF internally maintained data records.

If an OSA device with different port parameters has been installed, refer to Chapter 11, “Servicing OSA-Express and OSA/SF”, on page 129. Also, refer to the OSA publication for a description of mode and port parameters.

IOAx307W Channel offline, only data from OSA/SF returned

Explanation: The channel that the command was directed to is offline to the operating system. The only valid information that OSA/SF could determine was from the OSA/SF internally maintained data. No data from the OSA device is available.

User Response: The command requires that the OSA CHPID be online to the operating system. Determine why the channel is offline by issuing the ″D M=CHP(nn)″ command. Remedy the problem and then retry the command.

IOAx308I CHPID *cc* Port *pp ssssssss* has different values

Explanation: For the port on OSA *cc*, a mismatch was detected between the data maintained by OSA/SF on the host system and the value on the OSA device.
- *pp* - Port number
- *cc* - OSA CHPID number
- *ssssssss* - Description of the port parameter that does not match between OSA/SF and OSA device

User Response: Review the message log for additional information regarding the mismatch. If the OSA is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, "Servicing OSA-Express and OSA/SF", on page 129.

Then retry the command that received the message.

IOAx309I CHPID *cc* image*p* UA *uu ssssssss* was found to have different values

Explanation: The item indicated was found to have a mismatch between OSA/SF internally maintained data and the value on the OSA.

cc = OSA CHPID
p = image number
uu = Unit Address
ssssssss = Description of item in conflict

User Response: Review the message log for additional information regarding the mismatch. The data from the message log should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, "Servicing OSA-Express and OSA/SF", on page 129.

Then retry the command that received the message.

IOAx310W Unable to set parameter for a port on this CHPID

Explanation: The Set Parameters command that was issued contained a parameter that is not valid or that was unable to be set.

User Response: See the command output response in the message log for more information.

IOAx312I Station doesn't exist on port *pp*. See message log.

Explanation: A station on port *pp* does not exist. The source SAP *nn*, destination SAP*nn*, and destination MAC address *mmmmmmmmmmmm*, is shown in the message log (IOAMSG).

User Response: Refresh the connection view on the GUI.

IOAx313I SAP *nn* is not open on port *nn*

Explanation: The SAP that was open has changed since the last operation.

User Response: Refresh the SAP view on the GUI.

IOAx314E Incorrect LAN port parameter ID *iiiiiiii*

Explanation: An incorrect LAN port parameter has been specified or the LAN port parameter is not valid for this OSA mode of operation.

iiiiiiii = port parameter ID that is not valid

User Response: Check the Parameter ID specified with the SET PARM command. If using the GUI, verify that the configuration is valid for this OSA mode and OSA device type. Then retry the command that received this message.

IOAx315I OSA/SF internal data has value *dddddddd*

Explanation: This message corresponds to a previous message, IOAK308I, which describes which item OSA/SF found to be mismatched with the channel hardware. A following message, IOAK316I shows the value obtained from the channel.

dddddddd = hexadecimal value OSA/SF has in its internal record

User Response: Using the values from messages IOAx308I, IOAx315I, and IOAx316I, determine which data value is correct. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, "Servicing OSA-Express and OSA/SF", on page 129.

IOAx316I OSA hardware has data value *dddddddd*

Explanation: This message corresponds to a previous message, IOAK308I, which describes which item OSA/SF found to be mismatched with the channel hardware. A previous message, IOAK315I shows the value obtained from the internal OSA/SF data.

dddddddd = hexadecimal value received from the channel

User Response: Using the values from messages IOAx308I, IOAx315I, and IOAx316I, determine which data value is correct. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, "Servicing OSA-Express and OSA/SF", on page 129.

IOAx317E Unable to set the managing image for CHPID *cc*

Explanation: A Start Managing command was issued to OSA/SF. OSA/SF was unable to set the ″managing image″ indicator in the specified OSA CHPID. An internal OSA/SF error has occurred.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx318E Update to OAT failed due to in use OAT entries

Explanation: An attempt to unassign an OAT entry that is associated with the subchannel was attempted. The unassign attempt was not successful.

User Response: OAT entries that are currently in use can not be unassigned. The currently executing applications for those entries that are in use must be UNLOADed from the OSA. Refer to the LANRES mode section for more information. Once the applications have been UNLOADed, then update the OAT.

IOAx319E Update to OAT failed due to in use passthru entries

Explanation: An attempt was made to unassign an OAT entry that is associated with an active device address in the OSA/SF TCP/IP Passthru mode. The device address was in use and cannot be unassigned without the Force parameter.

User Response: Retry this command with the Force parameter. USE CAUTION! This is an active TCP/IP Passthru port. The FORCE option will terminate active connections through the port. An alternative action is to stop the use of entries by terminating devices from TCP/IP at the host.

IOAx320E Prime of database did not complete successfully

Explanation: An operation was attempted to copy database records from the OSA and it failed. This indicates that an OSA channel file data set could not be created.

User Response: The OSA channel file data sets are pointed to by the IOADSN keyword in the OSA/SF startup profile. Ensure that the OSA/SF startup profile IOADSN keyword is correct and that there is sufficient space on the DASD for the OSA channel file data sets. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, "Setting Up OSA/SF on OS/390, z/OS, and z/OS.e", on page 37 for more information about the OSA/SF startup profile. If the condition continues, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx321I OSA/SF internal data has value *dddddddd*

Explanation: This message corresponds to a previous message, IOAK308I, which describes which item OSA/SF found to be mismatched with the channel hardware. A following message, IOAK322I shows the character string value obtained from the OSA.

dddddddd = character string OSA/SF has in its internal record

User Response: Using the values from messages IOAx308I, IOAx321I, and IOAx322I, determine which data value is correct. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, "Servicing OSA-Express and OSA/SF", on page 129.

IOAx322I OSA hardware has data value *dddddddd*

Explanation: This message corresponds to a previous message, IOAK308I, which describes which item OSA/SF found to be mismatched with the channel hardware. A previous message, IOAK321I shows the character string value obtained from the internal OSA/SF data.

dddddddd = character string received from the OSA

User Response: Using the values from messages IOAx308I, IOAx321I, and IOAx322I, determine which data value is correct. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, "Servicing

OSA-Express and OSA/SF", on page 129.

IOAx323W CHPID *cc* OSA OAT and OSA/SF internal OAT data are out of sync

Explanation: The OSA address table (OAT) data and the data maintained by OSA/SF in host data sets for the specified OSA CHPID do not match.
- *cc* - OSA CHPID that is no longer synchronized

User Response: Review the message log for additional information regarding the mismatch. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, "Servicing OSA-Express and OSA/SF", on page 129.

Then retry the command that received the message.

IOAx324W CHPID *cc* OSA PORT OSA/SF internal PORT data are out of sync

Explanation: The port data maintained by the OSA hardware (CHPID *cc*) no longer matches the internal port data maintained by OSA/SF on the host system. This condition can occur, for example, if a network management program that has access to the OSA has altered the PORT data.

User Response: Review the message log for additional information regarding the mismatch. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA.

Then retry the command that received the message.

IOAx325I CHPID *cc* is no longer managed by image*pp*

Explanation: CHPID *cc* is no longer managed by image *pp* because a Stop Managing command was entered from this image.
cc = CHPID
pp = image number

User Response: No action is required. The Stop Managing command has completed successfully.

IOAx326I CHPID *cc* is currently managed by image *pp*

Explanation: This message was issued during initialization or a Start Managing command.
cc = CHPID
pp = image number

User Response: None. Normal OSA/SF initialization or the Start Managing command continue.

IOAx327W ND mismatch occurred on CHPID *cc*

Explanation: An OSA device has been replaced and the physical information from the old card does not match the physical information on the new card. The current and previous physical information are listed in the message log.
cc = CHPID
ND = Node Descriptor

User Response: Review the data in the message log. Refer to Chapter 11, "Servicing OSA-Express and OSA/SF", on page 129 for additional information on OSA device replacement.

IOAx328W No saved configuration file for CHPID *cc*

Explanation: No information about the specified channel was saved while OSA/SF was being refreshed or initialized; that is, the channel file information for CHPID *cc* does not exist or the channel file data set for CHPID *cc* cannot be located.

User Response: The channel file data sets are pointed to by the IOADSN entry of the OSA/SF start-up procedure. Ensure that the pointer has not changed and that the DASD volume, pointed to by the volume keyword, is operational. The channel file data set for CHPID *cc* must also be catalogued on the system.

If the channel file data set does not exist, use the VARY command to vary the OSAD device (X'FE') offline, then vary the OSAD device back online. When the OSAD device is brought back online, the channel file data set will be rebuilt. Then stop and start OSA/SF.

IOAx329W Could not write OSA information to file for CHPID *cc*

Explanation: A write error occurred while trying to save information about the specified channel in an OSA/SF data set.

User Response: Check the system console for error messages. Verify that the OSA/SF startup profile is valid. Check for other users accessing the data set at the same time. The OSA/SF channel information data sets are pointed to by the SET NAME IOADSN entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task).

See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

If problems continue, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx330E Port *pp* on CHPID *cc* is not in the enabled state

Explanation: The specified port must be enabled for LAN traffic (Hardware state for OSA-2) in order for the previous task to complete.

User Response: Change the port to **LAN Traffic Enabled** (enabled Hardware State for OSA-2) and retry the command. See “Enabling and Disabling Ports” on page 113.

IOAx333E Port *pp* does not exist on this CHPID

Explanation: A Set Parameters command has been issued specifying a PORT number as part of the command. The OSA targeted by the command does not contain the specified PORT number.
- *pp* - The port number on the OSA that does not exist

User Response: Check that the OSA targeted by the command is correct. Verify the number of PORTs on the OSA. From the OSA GUI, the PORT information can be checked from the Channel View window. Reissue the Set Parameters command.

IOAx334E Port is in support element control mode. Operation not allowed.

Explanation: An attempt was made to enable or disable LAN traffic on a port on an OSA. The action cannot be completed because the port on the OSA is in hardware support element control mode.

User Response: Using the HMC or the PCE, depending on the hardware configuration, remove support element control mode from the port. Then enable or disable LAN traffic on the port (change Hardware State to enable or disable for OSA-2). See “Enabling and Disabling Ports” on page 113.

IOAx335E Unable to store the current data key in OSA/SF internal data

Explanation: An internal OSA/SF error has occurred during the condition described in the message text.

User Response: Stop and restart OSA/SF. If the condition reoccurs, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx336E Enable of port failed

Explanation: OSA/SF was unable to enable the port specified in the Set Parameters command because the port was disabled externally or the port is not operational.

User Response: Check the hardware master console (HMC) or processor control (PCE) for OSA port status and hardware errors. Re-attempt to enable the port if the port is disabled. Contact IBM Service if required.

IOAx340E Incorrect group size *n* specified

Explanation: An incorrect group size was specified in the OSA/SF Put Table command. Passthru device types should each have a group size of 2. Subchannel and SNA device types should each have a group size of 1.
n = group size that was specified

User Response: Correct the group size and retry the command that received this message.

IOAx341W Not all *sss* entries stored successfully for CHPID *cc*

Explanation: During a Put OSA ADDRESS TABLE or INSTALL operation, some of the OAT/PVC (indicated by *sss*) entries might or might not have been written to the OSA.
cc = OSA CHPID number

User Response: Review the message log for further messages. Each OAT/PVC entry that is not valid should have an explanation. If message IOAx887W is present, that OAT entry was stored to the OSA, but until the same image and UA are defined in the Channel Subsystem, you will not be able to use it for traffic. Issue the Query command to determine which OAT entries were stored on the OSA successfully. If some messages have reason codes associated with them, the codes could be the result of an internal OSA/SF error; reason codes are reserved for IBM use only. For further assistance, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx342E No *sss* entries stored successfully for CHPID *cc*

Explanation: During a Put OAT ADDRESS TABLE or INSTALL operation, none of the OAT/PVC (indicated by *sss*) entries were written to the OSA.
cc = OSA CHPID number

User Response: Review the message log for further messages. Each OAT/PVC entry that is not valid should have an explanation. If some messages have reason codes associated with them, this could be the result of an internal OSA/SF error; reason codes are reserved for IBM use only. For further assistance, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx343E No OAT slot for this group of input is available

Explanation: This group of OAT entries was not written to the card because there are no free slots on the OSA for the entries specified.

User Response: Using the GUI, OSA Configurations, delete some of the defined entries. If using the Put OAT command, delete even-odd pairs of entries that are not in use or set them to UNASSIGNED. Retry the command that resulted in this message.

IOAx345E PVC entry *n* has incorrect format

Explanation: The PVC data entry specified as *n* does not have the correct eye-catcher or the correct control block ID.

User Response: An internal OSA/SF error occurred. Report the problem to the IBM Support Center.

IOAx346E *ffff* for PVC name *nnnn* is out of range

Explanation: One of the following fields as specified by *ffff* has a value that is not within the allowed range.
- Forward Peak Cell Rate (0-353207)
- Backward Peak Cell Rate (0-353207)
- Forward Max PDU size (64-9188)
- Backward Max PDU size (64-9188)

User Response: Enter a value in the range shown for the field in error. The OSA/SF GUI checks these values on input, if you are using the Set Parameters command, correct the value.

IOAx347E Incorrect image *p* with UA *uu*

Explanation: The image number, *p*, for the unit address (UA) *uu* is not valid.

User Response: Check the OSA unit address and image numbers in the IODF (or IOCDS). Correct the image number and retry the command.

IOAx348E Must set image number to zero for this OAT entry

Explanation: This channel is not a shared channel; that is, it is not a EMIF channel. For a channel that is not shared, only image number 0 can be used for this channel in the command.

User Response: Change the image number to 0 and retry the command.

IOAx349E CHPID *cc* is not online

Explanation: The CHPID *cc* was found to be offline.

User Response: Issue the *D M=CHP(cc)* command to verify the status of the CHPID. If the CHPID is offline, issue the *CF CHP(cc),ONLINE* command to configure the OSA channel online and retry the command.

IOAx350E IP Address *iiiiiiiiiiiiiii* already used by image *p* UA *uu*

Explanation: The IP Address (*iiiiiiiiiiiiiii*) specified in a Put OAT operation is already in use by another image.
iiiiiiiiiiiiiii = IP Address
p = image number
uu = Unit address

User Response: If TCP/IP port sharing is desired, the IP addresses must be unique to each image (refer to the OSA publication for more information). Provide a unique IP address for each image and retry the command.

IOAx351W Portions of the Query command failed

Explanation: The Query command completed but not all of the data that was requested was returned.

User Response: Explanations of why portions of the data were not returned are interspersed in the output data set from the Query command. Refer to messages in the command output for further information.

IOAx352E Query command failed, no data was returned

Explanation: The Query command did not complete successfully. No output data from the command was returned.

User Response: If using the GUI, refer to the command output window for additional messages. If using the TSO interface, additional messages will be displayed in the query command output data set specified on the TSO command input. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx353E Incorrect *ccccccc* target *tttt*

Explanation: The command target or port target for a Query command has an incorrect value.
ccccccc = either command or port
tttt = specified target in hexadecimal notation

User Response: This message is issued from the API interface. The target is a field that is passed through the API; that is the target of the command being issued. This field indicates if the command is for: ONE (channel), ALL CHANNELS, or OSA/SF. Refer to the API interface documentation and control block section. Correct the command target or port target and retry the command used with the API interface.

IOAx359E image *p* UA *uu* has a zero IP address for the default OAT entry

Explanation: The OAT entry specified by image *p* and unit address *uu* was specified as either a primary or secondary default entry. The default entry cannot have an IP address of all zeros.
p = image number
uu = unit address (UA)

User Response: A non-zero IP address must be specified. Correct the IP address for the default entry. Reissue the Put OAT or Install command, whichever was used.

IOAx360E *nnn* entries were specified as default OAT entry for port *pp*

Explanation:
nnn number of entries
pp port number

A Put OAT command was issued and more than one OAT entry was specified as the primary or secondary default path for unknown IP packets.

A port can only have one of the following:
- No default entries
- One primary default entry
- Both a primary default entry and a secondary default entry.

User Response: Correct the data being used for the Put OAT command. Reissue the Put OAT or Install command, whichever was used.

IOAx361E Current *ddd* default image (image *p* and UA *uu*) missing from input

Explanation: A Put OAT or Install command was issued to add or change OAT entries. The IOACMD EXEC determined that the primary or secondary default entry was missing on the input.
ddd = primary or secondary
p = image (image) number of default router
uu = unit address (UA) of the default router

A port can have one of the following:
- No default entries
- One primary default entry
- Both a primary default entry and a secondary default entry.

User Response: Do either of the following:
- Include the missing primary or secondary default indicator to the OAT entry and then reissue the Put OAT or Install command.
- If you want to replace all OAT entries, reissue the Put OAT or Install command and answer Yes when asked if all entries should be replaced.

IOAx362E All *nnn* OAT entries for port *pp* must be specified with port sharing

Explanation: To use TCP/IP port sharing mode, all OAT entries with port *pp* must be specified in the OAT, and all entries must have non-zero Internet Protocol (IP) addresses.
nnn = number of entries
pp = port number

User Response: Do the following:

__ 1. Include all the OAT entries associated with this port and verify that all entries are non-zero. Change zero IP addresses to valid non-zero IP addresses or delete the entries that contain zero IP addresses.

__ 2. If you are using the GUI, follow the instructions in Chapter 7 for TCP/IP Passthru mode and sharing OSA Ports.

__ 3. If you are using the REXX interface, issue the Put OAT command to rewrite the OAT.

__ 4. Configure the OSA offline and then online to all images.

IOAx365E Unable to clear the OAT table for CHPID *cc*

Explanation: During an Install command or during a Put Table command with the New Table option, OSA/SF attempted to clear the previous OAT table entries. A problem was encountered during the attempt to clear existing OAT table entries for CHPID *cc*.

User Response: Check the following:

__ 1. Review the OSA GUI message log and command output windows for related messages

__ 2. Review the TSO screen for additional messages if using the TSO interface

__ 3. If using the API interface, examine the reason code data structure from this operation

__ 4. Check the console for error messages.

Retry the command. If the problem continues, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx366I Disk image loaded, config CHPID *cc* off/on before reissuing INSTALL

Explanation: The code image specified in the IOACFG data set was successfully written to the specified CHPID. The message is now prompting that the CHPID be configured online to activate the code image.

User Response: The installation of an OSA mode has successfully progressed to this point. Configure the CHPID offline (CF CHP(nn),OFFLINE) in all images and then back online (CF CHP(nn),ONLINE) to activate the image just written.

IOAx367E *hh:mm:ss uuuuuuuu* **on** *ssssssss* **not authorized to use FORCE option**

Explanation: At the specified time, user ID *uuuuuuuu* on system *ssssssss* entered a command with the Force option, which this user ID is not authorized to use.

User Response: Reissue the command without the Force option or contact your system administrator to obtain authorization to use the Force option.

IOAx372E **Install command failed**

Explanation: The Install command failed, or installation procedure failed during initialization of the OSA mode.

User Response: Check the following:

__ 1. Review the OSA GUI message log and command output windows

__ 2. Review the TSO screen for additional messages if using the TSO interface

__ 3. If using the API interface, examine the reason code data structure from this operation and take the appropriate action.

__ 4. Check the console for error messages.

Retry the command. If the problem continues, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx373E **Trace mask** *tt* **is out of range. Must be less than** *nn*

Explanation: Internal error

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx376W **Unable to allocate file for channel data for CHPID** *cc*

Explanation: An error occurred when OSA/SF attempted to dynamically allocate a data set to store the OSA channel file information for CHPID *cc*.

User Response: The channel file data sets are built on the DASD volume pointed to by the IOADSN entry of the OSA/SF startup procedure. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, "Setting Up OSA/SF on OS/390, z/OS, and z/OS.e", on page 37 for more information about the OSA/SF startup profile. Ensure that the pointer has not changed and that the DASD volume, pointed to by the VOLUME keyword, is operational. The channel file data sets must also be catalogued on the system.

If the channel file data set does not exist, use the VARY command to vary the OSAD device (X'FE') offline, then vary the OSAD device back online. When the OSAD device is brought back online, the channel file data set will be rebuilt. Then stop and start OSA/SF.

IOAx377E **Input Value** *dddd* **for parameter ID** *pppppppp* **is out of range**

Explanation: The decimal input data *dddd* for a Set Parameter command with hexadecimal parameter ID *pppppppp* is not in the valid range.

User Response: Check the parameter and input data and retry this command.

IOAx378I **OSA hardware has data value** *sss...sss*

Explanation: This message is issued with a previous message, **IOAK308I**, that describes which item OSA/SF found to be mismatched with the channel hardware. Another message, **IOAK379I**, shows the value obtained from the internal OSA/SF data.

sss...sss = hexadecimal value received from the channel

User Response: Using the values from messages IOAx308I, IOAx378I, and IOAx379I, determine which data value is correct. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, "Servicing OSA-Express and OSA/SF", on page 129.

IOAx379I **OSA/SF internal data has value** *sss...sss*

Explanation: This message is issued with a previous message, **IOAK308I**, that describes which item OSA/SF found to be mismatched with the internal data. Another message, **IOAK378I**, shows the value obtained from the OSA hardware data.

sss...sss = hexadecimal value received from the channel

User Response: Using the values from messages IOAx308I, IOAx378I, and IOAx379I, determine which data value is correct. The data from the messages should provide help in determining whether the OSA device or the OSA/SF host data sets contain the correct information. If the card is determined to be correct, issue the Synchronize command to realign the OSA/SF data sets. If the OSA/SF data sets are determined to be correct, issue the Install command to put the parameters on the OSA. Refer to the Synchronize and Install commands as well as Chapter 11, "Servicing OSA-Express and OSA/SF", on page 129.

IOAx381I OSA/SF has an OAT entry for CHPID *cc* image *pp* UA *uu*, but not the OSA.

Explanation: The OAT entry exists as specified, but the corresponding OSA hardware is not installed. This message is issued as the result of the synchronize command. As the synchronize command processes the OAT, each time an entry in the OAT does not correspond to the OSA CHPID *cc*, this informational message is issued.
- *cc* - OSA CHPID in OAT
- *pp* - image identified in the OAT
- *uu* - Unit address that does not match the OSA

User Response: The synchronize command continues to re-align the internal files with the OSA hardware information. Normal operation continues.

IOAx382E Port *yy* on CHPID *xx* could not be enabled.

Explanation: The specified port could not be enabled.

User Response: Check the message log for additional information. Verify that the port is not disabled from the Hardware Management Console's Advanced Facilities. Try to enable the port from the hardware management console. If the port cannot be enabled, try unplugging the LAN cable from the OSA port and then enable the port. If you cannot enable the port, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx383E Port *yy* on CHPID *xx* could not be disabled.

Explanation: The specified port could not be disabled.

User Response: Check the message log for additional information. Try to disable the port from the hardware management console. If you still cannot disable the port, unplug the LAN cable from the OSA port and then try to disable it. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx386E Port *yy* on CHPID *xx* was enabled, but the OAT update failed

Explanation: An internal OSA/SF error has occurred.

User Response: Contact the IBM support center. See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx387E Port *yy* on CHPID *xx* was not disabled and the OAT updated failed

Explanation: A failure occurred while updating the OAT for the specified port. The port state (enabled/disabled) is unchanged.

User Response: Check the message log for additional information. If the problem persists, contact the IBM support center. See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx388E Error detected while writing non-volatile storage for CHPID *xx*.

Explanation: An error was detected while updating non-volatile storage for CHPID (OSA) *xx*.

User Response: Check for messages and errors on the hardware management console. If a hardware error is not found, retry the previous task. If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx389E Incorrect buffer number *nn* for GET ATM TRACE

Explanation: You entered an incorrect value for the ATM trace buffer.

User Response: Valid values are 1–16. See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx390E Not a valid command for CHPID *cc*

Explanation: The command issued cannot be issued against this CHPID because the command is not valid for this type of OSA feature.

User Response: Check the command in Chapter 13, "OSA/SF Commands for REXX", on page 141 to see which OSA feature types use this command. Issue the Query command against the OSA if you are uncertain which hardware feature type it is.

IOAx391W Empty trace buffer was found for CHPID *cc*

Explanation: This error occurred because of an OSA SNA image error such that the SNA trace buffer was not created.

User Response: Perform a single reinstall of the SNA image on the OSA. If the problem reoccurs after a reinstall, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx392W Empty message log buffer was found for CHPID *cc*

Explanation: This error occurred because of an OSA SNA image error such that the SNA message log buffer was not created.

User Response: Perform a single reinstall of the SNA image on the OSA. If the problem reoccurs after a reinstall, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx393E OSA CHPID *cc* not set up for SNA

Explanation: A Set Parameter command specifying an SNA option was issued to OSA CHPID *cc* but the licensed internal code installed on this OSA does not support SNA mode.

User Response: Install SNA mode on the OSA or correct the Set Parameter command so that SNA options are not specified.

IOAx394E Unknown device type *dd* found in OAT for CHPID *cc*

Explanation: A control block from an API interface contains an unknown device type.

dd - Unknown device type that was encountered

User Response: Examine the API input control block. Refer to the control block section for information. Correct the device type entry and reissue the API.

IOAx396W Port data is set in OSA hardware but OSA/SF has different port type

Explanation: The port data specified in the **Set Parameter** command is set in the OSA hardware successfully but OSA/SF internal data shows this port has a different port type.

User Response: Issue the Synchronize command to update the OSA/SF internal data. Refer to the Synchronize command for further information. If unable to resolve condition, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx397W Set command completed but LAN port is in disabled state

Explanation: The Set Parameters command completed, but since the LAN port is in the disabled state, no data transfer can be performed.

User Response:

__ 1. Enable the port for LAN traffic. See “Enabling and Disabling Ports” on page 113.

__ 2. Invoke the REXX QUERY command or refresh the GUI for this port.

IOAx398E Input value for group address entry *nn* is incorrect

Explanation: The group address field is not correct for entry *nn*. This message follows a SET PARM command that has submitted data in which the group address is not valid.

User Response: Retry the command specifying the group address according to the following rules.

- For a FDDI LAN attachment, set bits 0 and 1 of each group address to 1.
- For a token-ring LAN and token-ring ATM LAN emulation attachments, set bits 0 and 1 to 1; set bits 2–15 to 0; set bit 16 to 1.
- For an Ethernet LAN and Ethernet ATM LAN emulation attachments, set bits 0–5 to 0; set bits 6 and 7 to 1; set bits 8–15 to 0; set bit 23 to 1.
- For FENET bits 6 and 7 must be 1.

IOAx399I SNA image loaded, config CHPID *cc* off/on to activate loaded image

Explanation: The code image specified in the IOACFG data set was successfully written to the specified CHPID.

cc = CHPID

User Response: Configure the CHPID offline in all images and then online to activate the image just written.

IOAx401E UA *uu* specified for image *p* is out of range

Explanation: The specified UA in the OAT entry is out of range. The valid ranges for LANRES configuration is 0 thru 210(X’00″ - X’DB’). The valid range for HPDT MPC, HPDT ATM native, SNA and TCP/IP Passthru configurations is 0 thru 253(X’00’ - X’FD’) where:

uu = Unit Address

p = image Number

User Response: Correct the unit address in the input data and reissue the command.

IOAx402E Write SNA Control Command failed. Return code *nn*

Explanation: Internal error

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx403E Input value for address *ssss* is incorrect

Explanation: The input data for a Set Parameter command for the address (*ssss*= functional or MAC) specified is not valid.

User Response: Correct the input data and reissue the Set Parameter command. Contact the IBM Support Center for assistance (see “Reporting OSA/SF Problems to IBM” on page 127).

IOAx404E There is no corresponding data found in OSA/SF for this port

Explanation: When executing the Install command, OSA/SF host based data does not have data to correspond to a port on the OSA device. The Install command has found a mismatch between the number of ports on the OSA device and the number of ports for this OSA device as found in the host information data base. The Install command terminates.

User Response: This message can be issued if OSA was replaced and now the Install command is being used to update the information on the new OSA. Refer to Chapter 11, “Servicing OSA-Express and OSA/SF”, on page 129.

If the condition can not be corrected, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx405W CHPID *cc* is shared, but image number is zero

Explanation: In a shared channel (port sharing) EMIF (ESCON Multiple Image Facility) environment, the image number cannot be zero. For OSA CHPID *cc* the image number is zero for one of the port shared entries in the OAT. This message can be issued by either the Put OAT or Install command.
cc = channel path id

User Response: Correct any image values in the OAT that are specified as zero for all devices on shared CHPID *cc*. Reissue the Put OAT or Install command, whichever was used.

IOAx406W CHPID *cc* is dedicated, but image number is not zero

Explanation: If a channel is dedicated to a image, that is, the channel is not shared, then the image number for the devices associated with the channel in the OAT must be specified as zero. This message can be issued by either the Put OAT or Install command.
cc = channel path id

User Response: Specify zero as the image number for all device addresses in the OAT for CHPID *cc*. Reissue the Put OAT or Install command, whichever was used.

IOAx409I OAT updated. Config CHPID *cc* off/on to activate the changes

Explanation: The OAT in the IOACFG data set of the OSA/SF startup profile was successfully written to the OSA located on CHPID *cc*.

User Response: Configure CHPID *cc* offline in all images, then back online to activate the OAT. Refer to Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile and the IOACFG data set.

IOAx410E timerX value(tttt msec specified) must be ccccccc than timerY value (tttt msec specified)

Explanation: When setting the SNA timer values, timerX was found to have an incorrect value because of setting of timerY value.
timerX,timerY = Ti(SNA LLC Inactivity Timer), T1(SNA LLC Response Timer), or T2(SNA LLC Acknowledgment Timer).
ccccccc = greater or less
tttt = time unit in msec

User Response: Correct the timerX value and re-issue the command.

IOAx411E OSA/SF does not support OSA processor code level of CHPID cc

Explanation: The OSA processor for CHPID cc is not at the correct level. OSA/SF will not be able to communicate with the OSA device correctly.
cc = CHPID

User Response: Upgrade the code level for the OSA processor.

IOAx413E CHPID *cc* is not configured as ATM Native mode

Explanation: PVC entries are only for OSAs configured for ATM Native mode. This message should not be displayed if you are using the GUI.

User Response: If you are using the OSA/SF commands, either delete the PVC entries for this OSA using the Set Parameter command or customize the OSA for HPDT ATM Native mode using Put OAT.

IOAx414E No PVC data was found in input for CHPID *cc*

Explanation: You attempted to use the set PVC command without supplying the associated PVC data.

User Response: Retry the command using the appropriate input PVC data. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx415E CHPID *cc* has *n* PVC entries and has reached the limit

Explanation: The maximum number of PVC entries for an OSA is 256.

User Response: Delete PVC entries that are not needed.

IOAx416E image *x* UA *y* is already used by image *x* UA *z* (group of 2)

Explanation: The unit address specified by *y* is already being used. The second image and unit address specified in the message has a group size of 2. This means that it is a TCP/IP Passthru entry which uses an even odd pair.

User Response: Change the UA for one of the OAT entries.

IOAx417E *ssss* completed with reason *rrrrrrrr*

Explanation: In the process of an INSTALL/ACTIVATE command, image file ssss specified in the configuration completed with reason code rrrrrrrr.
ssss = specified image file
rrrrrrrr = reason code

User Response: See the message that follows

immediately for details and action needed.

If you are using the GUI, go to the Command Output Window.

If you are using the TSO REXX interface, go to the message log.

IOAx418E **image *p* UA *uu* completed with reason code *rrrrrrrr***

Explanation: In the process of an INSTALL/ACTIVATE command, an OAT entry specified in the configuration with image p and unit address uu completed with reason code rrrrrrrr.

p = image number
uu = Unit Address
rrrrrrrr = reason code

User Response: See the message that follows immediately for details and action.

If you are using the GUI, go to the Command Output Window.

If you are using the TSO REXX interface, go to the message log.

IOAx419E **Query for CHPID *cc* completed with reason code *rrrrrrrr***

Explanation: In the process of doing the QUERY command for CHPID cc, it completed with reason code rrrrrrrr.

cc = CHPID
rrrrrrrr = reason code

User Response: See the message that follows immediately for details and action.

If you are using the GUI, go to the Command Output Window.

If you are using the TSO REXX interface, go to the message log.

IOAx420E **Query for CHPID *cc* Device dd completed with reason code *rrrrrrrr***

Explanation: In the process of doing the QUERY command for CHPID cc, it completed with reason code rrrrrrrr when trying to obtain device information.

cc = CHPID
dd = Device number
rrrrrrrr = reason code

User Response: See the message that follows immediately for details and action.

IOAx421E **Current image x(LP_NAMEx), managing image y(LP_NAMEy) CHPID *cc rrrrrrrr***

Explanation: In the process of a START/STOP MANAGING command for CHPID cc, it completed with reason code rrrrrrrr.

x = current image number
image_NAMEx = name of current image
y = managing image number
image_NAMEy = name of managing image
cc = CHPID
rrrrrrrr = reason code

User Response: See the message that follows immediately for details and action.

IOAx422E **Operation on port *p* completed with reason code *rrrrrrrr***

Explanation: In the process of a command associated with port p it completed with reason code rrrrrrrr.

p = port number
rrrrrrrr = reason code

User Response: See the message that follows immediately for details and action.

IOAx424E **PVC operation for CHPID *cc* failed with reason code *rrrr***

Explanation: The Add, Modify, or Delete of a PVC entry failed.

User Response: Look in the message log for more information. There should be a message following this one that contains more information. The reason code is for use by IBM in problem determination.

IOAx425E **Specified OSAname and PORTname cannot be accessed**

Explanation: This message is the result of an unsuccessful SNMP query.

An unsuccesful SNMP query is usually caused by mismatched PORTNAMEs which are specified both in the TCPIP profile and OSA/SF configuration.

For OSA Express ATM CHPIDs, the PORTNAME is defined in the DEVICE statement in the TCPIP profile and it has to match the one in the OSA/SF configuration.

```
*-----------------------------------------------*
 * TCP/IP profile sample OSA Express ATM CHPID EC
 *-----------------------------------------------*
 DEVICE DEVEC ATM PORTNAME GANTZ;GANTZ is PORTNAME
 LINK LNKEC ATM DEVEC       ;DEVEC is device name
```

For OSA Direct Express CHPIDs, the device name in the DEVICE statement defined in the TCPIP profile must match the PORTNAME in the TRLE statement in the VTAM definitions.

```
 *-----------------------------------------------*
 * TCP/IP profile sample for CHPID F9
 *-----------------------------------------------*
 DEVICE OSDF9P00 MPCIPA PRIROUTER;OSDF9P00 device
 LINK OSDF9 IPAQGNET OSDF9P00  ;and also PORTNAME

 *-----------------------------------------------*
 * VTAM definition sampel for CHPID F9           *
 *-----------------------------------------------*
 TRL36F9   TRLE  LNCTL=MPC,
```

```
READ=590,
WRITE=591,
DATAPATH=(592),
PORTNAME=OSDF9P00,
MPCLEVEL=QDIO
```

For more about SNMP, see *IP Configuration Guide* (SC31-8513) in your Communication Server library.

User Response: Look in the message log for more information. There should be a message following this one that contains more information. The reason code is for use by IBM in problem determination.

IOAx426E OAT entry *nn* has incorrect format

Explanation: When processing the OAT entries, OAT entry number *nn* has an incorrect format.
nn = OAT entry number

User Response:
- If this failure occurs during a PUT_TABLE command, check the input OAT entry number.
- If this failure occurs during a QUERY or GET_TABLE command, an internal OSA/SF error has occurred. Rename the OSA CHPID command file data set specified in the OSA/SF startup profile IOADSN statement. (Refer to Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information on the OSA/SF startup profile and IOADSN entry.) The IOADSN command file data set will be dynamically rebuilt after it is renamed. Call the IBM Support Center to arrange to send a copy of the renamed IOADSN data set to IBM for analysis.

IOAx427E CHPID *cc* hardware is not OSA-2 ATM

Explanation: The specified CHPID *cc* is not of type OSA-2 ATM.

User Response: The function you requested is only valid on an OSA-2 ATM CHPID.

IOAx428E CHPID cc is not configured as mmm mode

Explanation: The specified CHPID cc is not configured as mmm mode for the SET_PARM command to complete successfully.
cc = CHPID number
mmm = SNA or ATM

User Response: Configure the CHPID with the mmm mode and retry the command.

IOAx430I ATM image loaded, config CHPID cc off/on to activate loaded image

Explanation: The code image specified in the IOACFG data set was successfully written to the specified CHPID.
cc = CHPID

User Response: Configure the CHPID offline in all images and then online to activate the image just written.

IOAx431W image *p* and UA *uu* defines sharing of port *x* without an IP address

Explanation: The OAT entry for image p and unit address uu is specified as a passthru type entry for port x. There is also an SNA type entry that shares the same port. This means that an IP address must be specified with the passthru entry type to allow port sharing.
p = image number
uu = Unit address
x = Port number

User Response: Do the following to specify an IP address from the OSA/SF GUI.
1. Display the Configuration window for the OSA.
2. Select **TCP/IP Passthru** from the **Configured Modes** listbox and then select **Change**.
3. Select the entry you want to change in the listbox and then select **Change**.
4. Enter the IP address for this image and unit address entry.
5. Select **Change** and then select **Set**.
6. Select **Configuration** from the menu bar of the Configuration window and then save the configuration.
7. Select **Configuration** from the menu bar and then select **Activate**.

IOAx432I *ssssss* type image *n* UA *uu* defines sharing of port *n*

Explanation: The entry specified defines port sharing. Another message follows indicating what is the problem. The *ssssss* can be ’Passthru, ’SNA’, or ’MPC’ (for MVS only).

User Response: See the message that follows this one in the message log for more information.

IOAx433W image *p* UA *uu* voids passthru entries for port *x* with no IP address

Explanation: The OAT entry for image p and unit address uu is specified as an SNA type entry for port x. However, there are existing passthru OAT entries with no IP address. By configuring this SNA entry, all the passthru devices that share this port without an IP address will not be functional.
p = image number
uu = unit address
x = port number

User Response: Do the following to specify an IP address from the OSA/SF GUI.
1. Display the Configuration window for the OSA.
2. Select **TCP/IP Passthru** from the **Configured Modes** listbox and then select **Change**.

3. Select the entry you want to change in the listbox and then select **Change**.
4. Enter the IP address for this image and unit address entry. Select **Change** and the select **Set**.
5. Select **Configuration** from the menu bar of the Configuration window and then save the configuration.
6. Select **Configuration**from the menu bar and then select **Activate**.

IOAx434I PT type image *n* UA *xx* defines sharing port *y* without IP address

Explanation: You specified a port for port sharing but the IP address is all zeroes. An IP address of zero indicates no port sharing.

User Response: You cannot share a port without a specific IP address on each OAT entry that wishes to use the port.

IOAx435E VPI *x* and VCI *y* already used by PVC name *ssss*

Explanation: The VPI and VCI combination specified for the PVC is already being used by another PVC. The combination of these two parameters must be unique for each PVC entry.

User Response: Change the VPI or VCI so that it is unique for this PVC.

IOAx436E Invalid *tttt* name *nnnn*

Explanation: *tttt* is either PVC or OSA. *nnnn* is either the PVC name or OSA name. The PVC name or OSA name is not valid.

User Response: Enter a name of 1 through 8 characters in the following format:

First Character - Any capital letter A through Z, @ # $.

Remaining Characters - Capital letters A through Z, 0 through 9, @ # $.

IOAx437E ATM OSA mode *ssssssss* is corrupted. Reason = *nnnnnnnn*

Explanation: The ATM image, *ssssssss* loaded on the card has been corrupted.

User Response: Re-configure the card.

IOAx439E PVC name *ssssssss* not found

Explanation: Specified PVC name *ssssssss* cannot be found on this ATM card.

User Response: Correct the name and retry the command. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx440E image *nn* UA *nn* is already used by *nn* port *nn*

Explanation: The image and UA in the OAT entry in the install process are already used by another port.

User Response: This message is generated when configuring an OSA CHPID that has multiple logical ports. Change the OAT entry and retry the command.

IOAx441E NetMask a.b.c.d for image *x* UA *y* is incorrect

Explanation: The NetMask specified for OAT entry image *x* UA *y* is 255.255.255.255

User Response: Change the NetMask and retry the command. See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx444E Port type *tttttt* not supported on CHPID *cc* port *pp*

Explanation: The port type, *ttttttt*, is not supported on the specified CHPID.

ttttttt can be one of

- Token ring
- FDDI
- Ethernet
- Fast ethernet
- Gigabit ethernet
- ATM Native
- ATM LAN emulation

User Response: None. This is an internal error.

See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx446E Set of LAN port parameter ID pppp is invalid for port *nn*

Explanation: The input parameter is improper for the specified port type.

User Response: Reenter the correct parameter or specify the correct port type. If the error persist, see “Reporting OSA/SF Problems to IBM” on page 127

IOAx448E No OAT entries were specified for port *pp*

Explanation: The OAT file specified in the master index (ioainx) contains no OAT entries for the port the install was directed to, where *pp* is the target port number.

User Response: If OAT entries are necessary to configure this port, use the GUI configuration tool. If problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx449W OSA/SF not able to access channel file information for CHPID *cc*

Explanation: OSA/SF had a channel error during OSA/SF initialization. It is necessary to correct this error in order for OSA/SF to function properly. Messages IOAD499W and IOAD505W detail the error.

User Response: Make sure a 70xx minidisk has been created and is available. If this is not a VM guest, then a channel file is missing or unable to be accessed. Processing can continue, but certain commands will not work.

IOAx450E Task not supported by SNA image level *xx* on CHPID *cc*

Explanation: The SNA firmware level to support the input command is not installed on the specified CHPID.

User Response: Upgrade the SNA firmware level on the specified CHPID. If the error persists, call IBM service.

IOAx451I Indicators have been set in one or more channel blocks

Explanation: One of the following conditions was detected by the OSA/SF:
- Physical card mismatch
- No file information found for card
- The port type has not been set for this card
- Could not write file information for this card

User Response: This is an internal OSA/SF error. See “Reporting OSA/SF Problems to IBM” on page 127. ,*

IOAx455E The specified OSA mode file already known to OSA/SF

Explanation: During a Put File command, the file name specified was already known by OSA/SF and the Replace option was not selected.

User Response: Retry the Put File command and specify the Replace option. If the problem persists, issue the Delete File command to first remove the file and then reissue the Put File command.

IOAx456E The specified OSA mode file not known by this copy of OSA/SF

Explanation: An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx457E The specified CHPID is managed by another image

Explanation: An OSA channel number, which was to be part of a set of OSA channels to be managed by a Start Managing operation, is already managed by another image.

User Response: Either retry the command using the Force option or issue the Stop Managing command from the managing image currently managing the OSA.

IOAx459E The specified CHPID is not known by this copy of OSA/SF

Explanation: The CHPID number specified on the current command is not known by this copy of OSA/SF.

User Response: Verify that the CHPID number specified is defined as an OSA channel in the IODF/IOCDS. Reissue the API or command that resulted in this message.

IOAx460E The specified port is not known by this copy of OSA/SF

Explanation: The port number specified does not match the allowed OSA port number range. For a FDDI port, only port number 00 is valid. On an OSA-1, port numbers 00 through 04 are valid for a token-ring or Ethernet port. On an OSA-2, port numbers 00 and 01 are valid for a token-ring or Ethernet port.

User Response: Verify the OSA type. Check the port number range. Reissue the command. If problems continue, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx464W The system is currently in configuration mode

Explanation: OSA/SF has determined that the system is in configuration mode. The command may not be able to complete, or if OSA/SF was in the process of initializing, it might not be able to initialize successfully. Any data that is returned may not be correct.

User Response: Take the system out of configuration mode. Retry the failing command.

IOAx466E The system is not running in EMIF mode

Explanation: The system on which OSA/SF is to run and on which an OSA is installed must support the ESCON Multiple Image Facility mode (EMIF mode). An attempt has been made to start OSA/SF on a system without EMIF firmware support.

User Response: See the OSA publication for the hardware requirements for OSA. Multiple image facility mode support is a prerequisite requirement for OSA hardware devices and the OSA Support Facility software.

IOAx467E Incorrect code returned to OSA/SF

Explanation: OSA/SF has attempted to communicate with the channel subsystem and the communication has failed. An internal OSA/SF error has occurred.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx468E Service not available for this request

Explanation: OSA/SF has attempted to communicate with the channel subsystem and the communication has failed. An internal OSA/SF error has occurred.

User Response:
- For the OSA CHPID that was the target of the command that received this message, configure the OSA CHPID offline in all images (CF CHP(nn),OFFLINE), then back online (CF CHP(nn),ONLINE).
- Stop and restart OSA/SF

If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx469E The specified CHPID *cc* in use - cannot complete command

Explanation: The OSA CHPID to which the last command was directed is in use either by another user or another image. The command that was issued did not execute.

User Response: Wait a short period of time for the OSA CHPID to complete its current task. Then resubmit the command that received this message. If the condition continues, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx470E Channel is unlocked (query) or it must be locked (set)

Explanation: The OSA CHPID to which the last command was directed is in use either by another user or another image. The command that was issued did not execute.

User Response: Wait a short period of time for the OSA CHPID to complete its current task. Then resubmit the command that received this message. If the condition continues, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx472E Could not access Channel Subsystem information

Explanation: OSA/SF could not access Channel Subsystem information.

User Response: If you are running as a VM guest , you must specify the RMCHINFO in the VM directory entry for this guest. See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx473E A parameter for a internal OSA/SF request is incorrect

Explanation: An internal OSA/SF error has occurred.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx474E The requested Channel Subsystem Command is not supported

Explanation: The Channel Subsystem Command (CHSC) is not supported on this processor. This support is a requirement for OSA and OSA/SF.

User Response: Refer to the OSA publication for information on hardware requirements to attach OSA and to run OSA/SF. If all requirements are met, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx475I No channel sub-system physical information is available

Explanation: The Channel Subsystem Command (CHSC) attempted to obtain information from the channel subsystem and could not.

User Response: Refer to the OSA publication for information on hardware requirements to attach OSA and run OSA/SF. If all requirements are met, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx476I Requested CHPID is not defined in the I/O configuration

Explanation: A command attempted to access a CHPID that is not defined in the IODF/IOCDS.

User Response: Verify that the IODF/IOCDS has an entry for each OSA. Refer to the OSA publication for hardware and IODF/IOCDS requirements. Check that the command was issued to a valid OSA CHPID.

IOAx477I No device information available for this type CHPID

Explanation: An OSA CHPID in the IODF/IOCDS has no device information associated with it. Device and unit address values are required in the IODF/IOCDS for the OSA CHPID.

User Response: Verify that the IODF/IOCDS has CNTLUNIT and IODEVICE information associated with each OSA CHPID. Refer to the OSA publication for hardware and IODF/IOCDS requirements.

IOAx478I No devices associated with this CHPID are applicable

Explanation: An OSA CHPID in the IODF/IOCDS has device information associated with it, but the device information is not valid for an OSA CHPID.

User Response: Verify that the IODF/IOCDS CNTLUNIT and IODEVICE information associated with each OSA CHPID has valid OSA device information. Refer to the OSA publication for hardware and IODF/IOCDS requirements.

IOAx479I The requested image is not described in the I/O configuration

Explanation: The specified image is not defined in your IOCDS.

User Response: Return to HCD and define image to system.

IOAx480W No image reconfig access for the requested CHPID

Explanation: OSA/SF attempted to access the internal image reconfiguration information for an OSA CHPID. The attempt failed.

User Response: Refer to the OSA publication for information on hardware requirements to attach OSA and run OSA/SF. If all requirements are met, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx481E No reconfig access to image processing command

Explanation: OSA/SF attempted to access the internal image reconfiguration information for an OSA CHPID. The attempt failed.

User Response: Refer to the OSA publication for information on hardware requirements to attach OSA and run OSA/SF. If all requirements are met, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx482E image requesting information not authorized to get it

Explanation: OSA/SF attempted to access the internal image reconfiguration information for an OSA CHPID. The attempt failed.

User Response: Refer to the OSA publication for information on hardware requirements to attach OSA and run OSA/SF. If all requirements are met, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx483E The field being set is not known by this copy of OSA/SF

Explanation: A Set Parm command was issued for a field which does not support the set function.

User Response: Check "SET_PARAMETERS | SET_PARM | SET_PARMS" on page 157 for the fields supported by the command.

IOAx484E Lock handles do not match for a set or unlock operation

Explanation: An internal OSA/SF error has occurred.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx485I CHPID *cc* has been replaced. Physical information follows.

Explanation: An OSA device has been removed and a new OSA device has been installed in the same OSA cage card position. Message IOAx486 that follows will detail the current and previous physical information associated with each of the OSA devices. It will be necessary to update the hardware information from the new OSA device to the OSA/SF file information about the OSA installed at this CHPID location.

User Response: An Install sequence should be performed. Refer to Chapter 11, "Servicing OSA-Express and OSA/SF", on page 129 for more information.

If the condition can not be corrected, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx486I *vvvvvvvvvvvvvvvvvvvv*
ddddddddddddddddddddddddd

Explanation: Displays the data in the format below:
vvvvvvvvvvvvvvvvvvvv = replaceable header containing either
Current physical information:
or
Previous physical information:
ddddddddddddddddddddddddd = actual physical information

User Response: This message is paired with message IOAx485I. Refer to message IOAx485I for instructions.

IOAx487E Cannot put file to OSA without the associated host name

Explanation: During a Put File command, the fully qualified input data set name was not specified.

User Response: If this message was issued following a Put File command, then ensure the fully qualified input data set name was specified. If this message is

issued during any other command, then an internal OSA/SF error has occurred; see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx488W File processing error for CHPID *cc* last ID: *aa* current ID: *bb*

Explanation: An internal OSA/SF error has occurred relating to the channel file data sets.

cc = CHPID
aa = last ID
bb = current ID

User Response: The channel file data sets are built on the DASD volume pointed to by the IOADSN entry of the OSA/SF started procedure. (See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37). Ensure that the pointer has not changed and that the DASD volume, pointed to by the VOLUME keyword, is operational. The channel file data sets must also be catalogued on the system.

If the channel file data set does not exist, use the VARY command to vary the OSAD device (X'FE') offline, then vary the OSAD device back online. When the OSAD device is brought back online, the channel file data set will be rebuilt. Then stop and start OSA/SF.

If all OSA channel file data sets appear normal, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx489W Tried to add a duplicate *aaaaaa* to cache

Explanation: OSA/SF tried to add item *aaaaaa* to the OSA/SF internal cache, but the item already exists in cache and it was not added.

aaaaaa = Channel, device, or file

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx490E OSA/SF must be migrated to the current release

Explanation: This message is issued if a newer version of OSA/SF had been executed on the system, the newer version stopped, and now an older, down-level version of OSA/SF has been started.

User Response: Cancel the older version of OSA/SF that was started and resume running with the latest version of OSA/SF.

IOAx491E Cannot access channel file for command. See message log for name

Explanation: The message log will contain message IOAx492E which will specify the channel file data set name that could not be accessed.

User Response: Refer to the message log and locate message IOAx492E. Cross-check the channel file data set name with a VTOC list of the DASD volume. The DASD volume is specified in the IOADSN entry of the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile. Ensure that the pointer has not changed and that the DASD volume, pointed to by the volume keyword, is operational. The channel file data set must also be catalogued on the system. Restart OSA/SF if the channel file data set name is verified.

If the channel file data set does not exist, use the VARY command to vary the OSAD device (X'FE') offline, then vary the OSAD device back online. When the OSAD device is brought back online, the channel file data set will be rebuilt. Then stop and start OSA/SF.

If all OSA channel file data sets appear normal, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx492E Could not access file *ssssssss*

Explanation: This message is in response to message IOAx491E. It indicates which channel file data set could not be accessed.

User Response: Refer to message IOAx491E for further information and corrective action.

IOAx493E Input or output block pointer not correct on command

Explanation: An OSA/SF internal error occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx494E ALL specified for command which is directed to one channel

Explanation: The ″ALL″ option was specified for a command that does not support the ″ALL″ option.

User Response: If this message is issued for a TSO issued command, remove the ″ALL″ option. If the message is issued for another reason, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx495E Unknown field ID used on command. See message log for details

Explanation: An OSA/SF internal error occurred.

User Response: Check the ID listed in message IOAD496E in the message log. If it is not a valid ID, correct it and reenter the command. ID values must be in the form of X'0000nnnn'. If it is a valid ID, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx496E Incorrect ID *xxxxxxxx* is being set for *ssssssss* field

Explanation: *xxxxxxxx* is the ID being set. *ssssssss* is replaced by one of the following: non-port type, FDDI, Token Ring, or Ethernet.

User Response: See message ID IOAx495E for more information and instructions.

IOAx497E File open error *xx* on *sss...sss*

Explanation: The OSA channel file data set *sss...sss* could not be opened because of error *xx*. The value of *xx* could be any of the following:

07 - I/O buffer could not be allocated
08 - LRECL or BLKSIZE exceeds maximum allowable value
40 - Attempt was made to open a non-imageed data set as a PDS
41 - System level open failed
45 - Data set is already open
47 - Invalid input for data set name
49 - Cannot locate data set specified
50 - Cannot catalog new data set name used in rename routine
57 - Open mode string is invalid
61 - Error trying to define data set to system
63 - Error in control block
67 - Trying to open non-existent data set for READ
74 - Open parameters require ″type=record″ specified
79 - Data set was not opened as: ″type=record″
86 - Open mode specified invalid for PDS member
87 - Data set characteristics specified do not match those of the existing data set
88 - Open mode specified invalid for device
91 - Unable to perform function due to failure of a system utility
92 - An I/O abend has been trapped
95 - Requested disk not accessed or data set not found
98 - Invalid RECFM for opening PDS member
113 - Bad data set descriptor
117 - Data set exists
121 - Invalid argument

These error numbers are found in the *IBM C/370 Programming Guide*.

User Response: Because this condition relates to the OSA channel file data set, retry the command one more time. The OSA channel file data sets are pointed to by the IOADSN keyword in the OSA/SF startup profile.

Also, ensure that the OSA/SF startup profile IOADSN keyword is correct and that there is sufficient space on the DASD for the OSA channel file data sets. The channel file data set must also be catalogued on the system.

If the channel file data set does not exist, use the VARY command to vary the OSAD device (X'FE') offline, then vary the OSAD device back online. When the OSAD device is brought back online, the channel file data set will be rebuilt. Then stop and start OSA/SF. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx498W Channel file error. View message log for error

Explanation: An error has occurred during a file operation for a channel file data set. Additional information about the error can be found in the OSA/SF message log.

User Response: Issue the Get Debug command to get a copy of the message log. (Refer to the command section for information about the Get Debug command.) Locate message IOAx498W in the message log. Then look back a few lines in the message log for addition channel file data set error messages. These messages will provide additional information.

IOAx499E Channel File Error. Do get_debug TRACE

Explanation: An internal OSA/SF error has occurred. The error relates to the channel file data sets.

User Response: Do the following:

__ 1. Issue the Get Debug command to obtain a copy of the OSA/SF trace table.
__ 2. Reissue the Get Debug command to get a copy of the OSA/SF message log.
__ 3. See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx500E CHPID in PVC and input block mismatch

Explanation: The CHPID number does not match on the OSA/SF data cache operation.

User Response: Report the problem to the IBM Support Center.

IOAx501E Empty PVC block passed

Explanation: No data is passed to OSA/SF data cache component for the PVC operation.

User Response: Report the problem to the IBM Support Center.

IOAx503E A Data Manager internal block was not found

Explanation: This is an internal error.

User Response: Issue the Get Debug command, specifying Trace Table and send it to IBM. See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx505E Bad return code *nn*. Get debug trace from OSA/SF

Explanation: The return code *nn* was received trying to do the requested function.

User Response: Do the following:

__ 1. Issue the GET_DEBUG command, specifying TRACE_table.

__ 2. Forward this data to IBM service.

__ 3. See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx506I The system channel type does not match the one currently in OSA/SF

Explanation: The current channel type (as determined by the channel subsystem information) is different from the channel type currently in the OSA/SF cache. The old channel file information will be removed from the cache and replaced with information appropriate for the new channel type.

User Response: None. This message is generated if you put in a new channel of a different type. For example, if the old channel type in cache is OSA–2 and the channel type from CHSC is OSA-Express.

IOAx507I Channel saved information not being used due to channel type mismatch

Explanation: The current channel type (as determined by the channel subsystem information) is different from the channel type saved in the channel files. The information from the channel files will not be used.

User Response: None. This message is generated if you put in a new channel of a different type. For example, if the old channel type in cache is OSA–2 and the channel type from CHSC is OSA-Express.

IOAx508E Size mismatch for *ssssss*. ID is *xx*, size is *yy*

Explanation: This is an internal error.

User Response: None

IOAx509E The CHPID type for CHPID *cc* is not valid for this command

Explanation: The command is not allowed for the type of CHPID targeted.

User Response: Reissue the command against the correct type of CHPID.

IOAx510E Parameter length of *pp* not valid for port info structure

Explanation: Internal error. The size of the input structure to set the port type is incorrect.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx511W Number of ports not specified when setting port type

Explanation: Internal OSA/SF component did not set up parameters correctly.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx512I CHPID *cc*, specified in the STARTUP.PROFILE, does not exist

Explanation: You specified the CHPID number in the SYSINFO statement in the STARTUP.PROFILE, but the CHPID does not exist in the current system configuration.

User Response: Check your system configuration to see if you specified an incorrect CHPID number, and make the necessary corrections and restart OSA/SF.

IOAx513I Device *nn* from the STARTUP.PROFILE, does not exist on CHPID *cc*

Explanation: You specified the device number in the SYSINFO statement in the STARTUP.PROFILE but the device is not associated with the listed CHPID in the current system configuration.

User Response: Check your system configuration to see if you specified an incorrect VM guest device number, make the necessary corrections and restart OSA/SF.

IOAx514E Virtual CHPID *nn* has been used multiple times in STARTUP.PROFILE

Explanation: You specified the same virtual CHPID for multiple real CHPIDS in the STARTUP.PROFILE.

User Response: Update the STARTUP.PROFILE and restart OSA/SF.

IOAx515E Multiple real CHPIDs using the same virtual one in STARTUP.PROFILE

Explanation: You specified the same virtual CHPID for multiple real CHPIDS in STARTUP.PROFILE.

User Response: Update the STARTUP.PROFILE and restart OSA/SF. See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37.

IOAx516E Virtual device *nn* has been used multiple times in STARTUP.PROFILE

Explanation: You specified the same virtual device for multiple real devices in the STARTUP.PROFILE.

User Response: Update the STARTUP.PROFILE and restart OSA/SF.

IOAx517E Multiple real device using the same virtual one in STARTUP.PROFILE

Explanation: You specified the same virtual device for multiple real devices in the STARTUP.PROFILE.

User Response: Update the STARTUP.PROFILE and restart OSA/SF.

IOAx518E CHPID *cc* represented multiple times in OSA/SF internal info

Explanation: One of two situations may have occurred:

__ 1. The real CHPID specified in the message text is associated with multiple virtual CHPIDs in STARTUP.PROFILE.

__ 2. The virtual CHPID associated in the STARTUP.PROFILE to the real CHPID specified in the message text already exists as a real CHPID, as determined from CSS information.

User Response: Update STARTUP.PROFILE to correct errors and restart OSA/SF.

IOAx519E Multiple CHPIDs assoc to same real CHPID in OSA/SF internal info

Explanation: One of two situations may have occurred:

__ 1. The real CHPID specified in the message text is associated with multiple virtual CHPIDs in STARTUP.PROFILE.

__ 2. The virtual CHPID associated in the STARTUP.PROFILE to the real CHPID specified in the message text already exists as a real CHPID, as determined from CSS information.

User Response: Update STARTUP.PROFILE to correct errors and restart OSA/SF.

IOAx520E Device *nn* represented multiple times in OSA/SF internal info

Explanation: One of two situations may have occurred:

__ 1. The real device specified in the message text is associated with multiple virtual devices in STARTUP.PROFILE.

__ 2. The virtual device associated in the STARTUP.PROFILE to the real device specified in the message text already exists as a real device, as determined from CSS information.

User Response: Update STARTUP.PROFILE to correct errors and restart OSA/SF.

IOAx521E Multiple devices assoc to the same real device in OSA/SF internal info

Explanation: One of two situations may have occurred:

__ 1. The real device specified in the message text is associated with multiple virtual devices in STARTUP.PROFILE.

__ 2. The virtual device associated in the STARTUP.PROFILE to the real device specified in the message text already exists as a real device, as determined from IOCDS information.

User Response: Update STARTUP.PROFILE to correct errors and restart OSA/SF.

IOAx522E OSA/SF was not able to access channel file information for CHPID *cc*

Explanation: OSA/SF had a channel file error after initialization was completed. Messages IOAD499W and IOAD505W detail the error. You must resolve this error before issuing any other OSA/SF commands.

User Response: Make sure a 70xx minidisk has been created and is available as described in the OSA/SF OSA publication. If this is not a VM guest, then a channel file is missing or unable to be accessed. Processing can continue, but certain commands will not work.

IOAx523E OSA/SF was not able to access channel file information for a CHPID

Explanation: OSA/SF had a channel file error after initialization was completed. Messages IOAD499W and IOAD505W detail the error. The actual CHPID number is in message log in message IOAD522E. You must resolve this error before issuing any other OSA/SF commands.

User Response: Make sure a 70xx minidisk has been created and is available as described in the OSA/SF OSA publication. If this is not a VM guest, then a channel file is missing or unable to be accessed.

Processing can continue, but certain commands will not work.

IOAx524W Virtual CHPID *cc* replaces real CHPID *cc* in OSA/SF internal info

Explanation: In the STARTUP.PROFILE, you specified a virtual CHPID that also exists as a real CHPID. The virtual CHPID is used and the real CHPID is not available.

User Response: If you want to use this particular real CHPID number, change the STARTUP.PROFILE.

IOAx525E Size of *ssss* (*ss*d); constant size is *sss*

Explanation: A control block has changed in the OSA/SF internal data.

User Response: You must upgrade to the most recent copy of OSA/SF.

IOAx526E Data block size mismatch. See message log for details

Explanation: This is an internal error.

User Response: This error occurs when the data manager control blocks are updated incorrectly and are no longer the correct size. The message log contains complete details (IOAD508E/IOAD525E). Collect this information and contact IBM (see “Reporting OSA/SF Problems to IBM” on page 127).

IOAD527E Parameter error eeee when invoking channel subsystem command cc

Explanation: An internal error has occurred whereby invalid command parameters have been passed to the channel subsystem interface.

User Response: Reissue the command you were using. If it still fails, then issue the GetDebug command, specifying to get the Trace information.

See “Reporting OSA/SF Problems to IBM” on page 127.

IOAD529I Some devices will not be shown because RMCHINFO is not specified

Explanation: The RMCHINFO setting allows you to see the actual devices defined on you system. Without this setting, you only see virtually attached devices.

User Response: Add the RMCHINFO to your system set-up operations.

IOAN601E Minidisk I/O problem. DevNum = 70xx, RC = yzzz

Explanation: A problem occurred when you tried to access the z/VM 70xx minidisk. **xx** for the **DevNum** virtual address represents the OSA CHPID.

RC = yzzz is a composite return code that indicates the error, where **y** is the **OSA/SF return code** and **zzz** is the **CP return code**. **y** can be any one of the following values:

RC = 1
Unsuccesful Read/Write (R/W) link of minidisk. The minidisk is in use by another OSA/SF.

RC = 2 Unsuccesful Read/Read (R/R) link of minidisk. Probably the setup or the CHPID number is incorrect.

RC = 3 Incorrect cmd parameter. This is an internal error.

For example, if a minidisk is not properly defined to an existing userid (OSA/SF return code of 2), CP returns a return code of 107. RC=2107 is the return code from the message.

The CP LINK return codes are described in *VM CP Command and Utility Reference*.

User Response: Check the return code (RC=yzzz) to determine the reason for the error, and correct the minidisk error.

IOAN602E Unable to link disk. Check OSA/SF service console for disk holder

Explanation: A userid has attempted to get the lock on the VM version of OSA/SF and another userid has linked in write mode to the disk associated with the CHPID.

User Response: The user needs to check the OSA/SF server console to find the name of the userid that has access to the the disk and remove that disk access.

IOAN620E IOAN620E hh:mm:ss IOASNMP failed to start

Explanation: An error occurred while the IOASNMP load module was attempting to start threads or acquire memory required for proper execution.

User Response: Check to determine if the port defined for the OSA SNMP task is the same port IOASRV is using. If that is not the case, then try to restart the IOASNMP product. If that fails, see See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx638E No SNA connection data available for port *pp*

Explanation: No VTAM is actively using the OSA for Port *pp*.

User Response: None. Check again after VTAM activity has started.

IOAx639W The Netview PPI module could not be loaded into memory

Explanation: The module containing the Netview Program to Program Interface (PPI) function could not be loaded into memory. An alertable condition was detected by OSA hardware. OSA/SF attempted to load the Netview PPI module into memory as part of the processing required to notify Netview of the alertable condition detected by the OSA hardware. The load of the module into memory failed.

User Response: If the Netview product is not installed or Netview is not being used to record alertable conditions detected by OSA hardware, then this message may be ignored.

If the Netview product is installed and Netview is to be used to record alertable conditions detected by OSA hardware, then verify that the library containing the Netview PPI module is in the library search path specified when starting OSA/SF.

- For OS/390, verify that the Netview load module library is included in the list of libraries specified by the STEPLIB DD statement in the JCL procedure used to start OSA/SF.
- For VM, verify that the Netview load module library is included in the list of libraries specified on a GLOBAL LOADLIB command issued before OSA/SF was started.
- For VSE, verify that the Netview load module library.sublibrary is in the startup JCL for the OSA/SF job.

IOAx640E LEC port state is unchanged. Physical port on CHPID *cc* is disabled

Explanation: An attempt was made to enable a logical ATM port, but the associated physical port was disabled for LAN traffic.

User Response: Enable the physical port for LAN traffic, then enable the logical port. See “Enabling and Disabling Ports” on page 113.

IOAx641E Netview PPI failed to send alert, PPI rc=xx.

Explanation: OSA/SF uses the NETVIEW program-to-program (PPI) interface to report alerts (messages describing a problem) to a Netview focal point. An attempt to use PPI failed. Return code xx was issued by the Netview program-to-program interface.

User Response: Refer to the Netview Application Programming Guide to determine the cause of the PPI failure and perform corrective actions as indicated.

IOAx642E The Netview subsystem is not active or available

Explanation: OSA/SF uses the Netview program-to-program (PPI) interface to report alerts (messages describing a problem) to a Netview focal point. The PPI is used to query the program-to-program interface status before attempting to report an alert to Netview. This query indicated that the Netview PPI was not able to receive alerts.

User Response: If the Netview product is not installed or Netview is not being used to record alertable conditions detected by OSA hardware, then this message may be ignored.

If the Netview product is installed and Netview is to be used to record alertable conditions detected by OSA hardware, then verify that the library containing the Netview PPI module is in the library search path specified when starting OSA/SF.

- For MVS, verify that the Netview load module library is included in the list of libraries specified by the STEPLIB DD statement in the JCL procedure used to start OSA/SF.
- For VM, verify that the Netview load module library is included in the list of libraries specified on a GLOBAL LOADLIB command issued before OSA/SF was started.
- For VSE, verify that the Netview load module library.sublibrary is in the startup JCL for the OSA/SF job.

Determine the state of the Netview PPI as described in NetView Operation. Perform the actions necessary to activate the PPI as described in Netview Operation.

IOAx643E Unknown adapter type reported by OSA/SF.

Explanation: OSA/SF identified an unknown adapter. OSA/SF can only forward alerts (messages describing a problem) to Netview for Token Ring, Ethernet, FDDI, and Fast Ethernet.

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx644E OAT entry image *pp* UA *uu* was specified more than once in the input

Explanation: image number and Unit Address number was specified more than once in the Put OAT input data set.

User Response: Correct the input data and reissue the command.

IOAx645E SNA Network Management device was specified more than once in the input

Explanation: For each OSA device operating in SNA mode, there can only be one SNA network management device.

User Response: Correct the input data and reissue the command.

IOAx646I SNA Network Management device image *pp* UA *uu* already exists

Explanation: The existing SNA network management device with image number and Unit Address number is already defined.

User Response: None.

IOAx647W No OAT entries specified in input for CHPID *cc*

Explanation: There are no OAT entries in the input file for Put OAT command. *cc* is the CHPID.

User Response: Specify OAT entries in the input file for Put OAT command.

IOAx648I Command completed successfully. Config CHPID *cc* off/on to activate

Explanation: The requested action completed. A CHPID reset is required to activate the changes.

User Response: Quiesce all traffic on the LAN ports on the associated OSA CHPID. Configure the CHPID offline and then online from all images.

IOAx649E LAN port parameter ID *xx* is not supported by port *nn*

Explanation: The input parameter is not valid for the specified port type.

User Response: Re-enter the correct parameter or specify the correct port type or port number. If the error persists, call IBM service. See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx650E Input not supported by firmware level // of CHPID *cc*

Explanation: The minimum firmware level to support the input is not installed on the specified CHPID.

User Response: Upgrade the firmware level of the specified CHPID. If the error persists, call IBM service. “Reporting OSA/SF Problems to IBM” on page 127.

IOAx652E OSA configuration data has changed

Explanation: Changes have been made to OSA configuration information since the last command was entered. OSA/SF is responding to an alert status from the OSA. A SNMP may have accessed the OSA.

User Response: Use the Query command to obtain the updated information on the OSA. Then resume the command sequence in progress when this message was issued.

IOAx653E Image sssssssss is not compatible with OSA processor code level x

Explanation: A mismatch exists between the OSA mode image and the OSA processor code that is currently on the OSA features.

sssssssss = label of the OSA mode image

x = high-level qualifier of the OSA processor code

User Response: Make sure the machine is at the appropriate MCL level to support the OSA ATM feature.

IOAx654E Specified configuration file is not supported by this hardware type

Explanation: The IOACFG configuration file for this CHPID does not match the hardware definition.

User Response: Create a new configuration that matches the hardware definition for the CHPID.

IOAx655E Specified configuration file is incorrect for this hardware type

Explanation: The configuration file specified in the IOACFG is not the correct one needed for the port type being configured.

User Response: Configure the CHPID using a new configuration as specified in the OSA/SF documentation.

IOAx656E No data in OSA Configuration file for OSxx CHPID *cc*

Explanation: The install command was issued, but IOACFG did not contain any information for the specified CHPID. This may be because the target CHPID type is not the same as the one for which the install was initially issued.

OSxx can be OSA2, OSE, or OSD

cc is the CHPID number

User Response: Set up the configuration and issue the install command.

If you are using the GUI:

1. Highlight the CHPID on the OSA-CHPIDs panel
2. Pull down **Selected** from the menu bar
3. Select **Configuration→Configuration list**

4. Create a new configuration using the **Add** button
5. Save and activate the configuration

If you are using REXX:

1. Copy the sample configuration from the IOA.SIOASAMP
2. Modify the configuration file and set up an OAT file, if applicable
3. Enter Configure OSA command from REXX

See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx657E Configuration file version *x* is not supported

Explanation: OSA/SF and OSA firmware are not compatible.

User Response: Either upgrade OSA/SF or OSA firmware. See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx658E Incorrect configuration file specified for *ssss* port *pp*

Explanation: The specified configuration file for port *pp* is not the correct type for the port type or configuration file type shown in *ssss*.

User Response: Correct the filetype in OSAS.CONFIG or use the GUI to set up the configuration file. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx659E File not installed due to failure on the *ssss* file

Explanation: This configuration file was not written because the associated physical configuration file encountered a failure when writing to the OSA feature. *ssss* is the OSA port type.

User Response: See the error message that is associated with the physical configuration file and take appropriate action. If the problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx660E *ssss* = *xx* and is out of range

Explanation: The specified configuration variable (*ssss*) entered in the configuration file was found to have a value (*xx*) that exceeds the valid range.

User Response: Update the configuration file variable to fall within the valid range. If problem persists, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx661E Unable to open OSA configuration file

Explanation: An error has occurred while trying to open the OSA/SF configuration data set.

User Response: Ensure the OSA configuration data set is cataloged to this image, is not in use by another user or another user in another image, and is properly pointed to by the IOADSN entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

If OSA/SF is still running, it must be stopped. Then restart OSA/SF.

IOAx662E Incorrect parameter pointer passed to Install

Explanation: An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx663E Incorrect operation code passed to install

Explanation: An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx664E Incorrect parameter length passed to Install

Explanation: An internal OSA/SF error has occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx665W Incorrect dataset name found in OSA configuration file

Explanation: A data set name, in a format which is not valid, was found in the OSA configuration data set (IOACFG).

User Response: Examine the list of data set names found in the OSA configuration data set to find the data set name which is not valid. The OSA configuration data set is defined in the IOACFG entry of the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

IOAx666E Install output table overflow

Explanation: An internal OSA/SF error has occurred.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx667E No OSA mode file for CHPID *cc* in the OSA configuration file

Explanation: An Install of an OSA mode to an OSA was attempted. The OSA mode file and/or the OSA image and/or the OAT was (were) not loaded to the OSA device.

User Response: If using the GUI, check the command output window and message log output window for further messages and information. If using the TSO interface, additional information should be displayed on the TSO screen. After corrections, retry the Install command. If problems persist, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx668W Incorrect data set name length

Explanation: A data set specified in the OSA/SF master index data set has an incorrect logical record length (LRECL) or an incorrect block size (BLKSIZE).

User Response: The OSA/SF master index data set contains a list of OSA/SF data set names. One of the data sets in the list has a logical record length (LRECL) or a block size (BLKSIZE) that does not match the data sets in the list ***of the same OSA/SF configuration type***. The OSA/SF master index data set is pointed to by the IOACFG parameter in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, "Setting Up OSA/SF on OS/390, z/OS, and z/OS.e", on page 37 for more information about the OSA/SF startup profile.

IOAx669W Incorrect member name length

Explanation: A member name associated with a data set name in the OSA/SF configuration data set has an incorrect length. Members in the configuration data set are referenced in the format:

MVSDATASETNAME(membername)

One of the member names is less than one character or greater than eight characters in length.

User Response: Examine the OSA configuration data set to locate the member name that has the incorrect length. The incorrect member name can be located by browsing the data set itself. The OSA configuration data set is defined by the IOACFG entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, "Setting Up OSA/SF on OS/390, z/OS, and z/OS.e", on page 37 for more information about the OSA/SF startup profile.

IOAx670W Dynamic allocation failed with RC=*aaaa*, reason=*bbbb*

Explanation: Dynamic allocation failed for a data set specified in the OSA/SF configuration data set (IOACFG).

aaaa = return code from DYNALLOC macro
bbbb = reason code from DYNALLOC macro

User Response: The OSA/SF configuration data set contains a list of data set names used by OSA/SF. These data sets are dynamically allocated. One of the data sets in the list could not be dynamically allocated. The OSA/SF configuration data set is pointed to by the IOACFG entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, "Setting Up OSA/SF on OS/390, z/OS, and z/OS.e", on page 37 for more information about the OSA/SF startup profile.

Check the return code from the DYNALLOC macro and take appropriate action. For return code and reason code information see the DYNALLOC macro in *Programming: Authorized Assembler Services Reference, Volume 1*, GC28-1475.

If problem persists, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx671W GETMAIN failure

Explanation: Unable to allocate storage for an OSA/SF operation. This could be the result of a storage constraint or an OSA/SF region size that is inadequate.

User Response: Free up system storage resources. Also check the system console for error messages. Increase the OSA/SF region size. Stop then restart OSA/SF.

IOAx672W Dynamic de-allocation failed with RC=*aaaa*, reason=*bbbb*

Explanation: Dynamic de-allocation failed for a data set specified in the OSA configuration data set.

aaaa = return code from DYNALLOC macro
bbbb = reason code from DYNALLOC macro

User Response: Check return code from DYNALLOC macro. The DYNALLOC macro documentation can be found in *Programming: Authorized Assembler Services Reference, Volume 1, GC28-1475*. Make corrections. Stop and restart OSA/SF.

IOAx673W Install did not complete successfully

Explanation: Unable to load application and/or OAT and/or image for this OSA CHPID. This message is frequently issued if an Install command is issued without the Force option. The application and/or OAT and/or image already installed on the OSA match what is being Installed.

User Response: Additional messages should be displayed in the command output window if using the GUI or on the TSO screen if using TSO. Check these additional messages for further information and instructions. Reissue the Install command with the Force option if appropriate.

If problems persist, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx674W CHPID number found in OSA configuration data set is not valid

Explanation: A CHPID number in the OSA configuration data set was found to have an incorrect format. The correct format is:

OSAnn ...where ″nn″ is the OSA CHPID number.

User Response: Examine the OSA configuration data set and look for an incorrectly formatted OSAnn CHPID number. The OSA configuration data set is pointed to by the IOACFG entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, "Setting Up OSA/SF on OS/390, z/OS, and z/OS.e", on page 37 for more information about the OSA/SF startup profile.

Make corrections. Then reissue the Install command.

IOAx677E Unable to open Master Index file

Explanation: OSA/SF was unable to open the master index data set specified in the IOAINX entry of the OSA/SF startup profile.

User Response: Check that the data set name specified in the IOAINX entry of the OSA/SF startup profile exists and that it is cataloged to the system in this image. Also ensure that the data set is not in use by another user in this image or in any other image (such as a browse or edit function). Redo the Install procedure for this OSA mode to ensure the Install steps were all performed correctly (such as the copy from IOA.SIOASAMP). Refer to Chapter 3, "Setting Up OSA/SF on OS/390, z/OS, and z/OS.e", on page 37 for more information on the IOAINX data set of the OSA/SF startup profile and the OSA mode install procedures.

IOAx678E OSA status register read failed

Explanation: An OSA/SF internal error occurred.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx679E Download dataset open failed

Explanation: OSA/SF was unable to open one of the data sets listed in the IOACFG or IOAINX data set. Possible causes include:

- MVS has the data set open
- Another user, even in another image, may have the data set open
- The data set has been deleted.

User Response: Check that the data set names specified in the IOACFG and IOAINX entries of the OSA/SF startup profile exist and are all catalogued to the system in this image. Verify the data sets are not currently open by this system or any system in any image. If a data set has been deleted, then an SMP/E reinstall of OSA/SF is required. After the data sets have been replaced, an OSA/SF Install must be performed to the OSAs.

If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx680E OSA/SF release V*x*R*x*M*x* doesn't support hardware level of CHPID *cc*

Explanation: There is a co-dependency between the OSA hardware and the OSA/SF software level. For CHPID *cc* the co-dependency is not met.

User Response: Refer to the OSA publication for a list of OSA device and OSA/SF mode co-dependencies. Obtain the correct level of OSA/SF that supports the OSA CHPID.

IOAx681W Code image *xxxx* wasn't written because it's already loaded on the OSA

Explanation: The code image *xxxx* was not written to the OSA. The name of the image that was requested to be written (installed) matches the name of the OSA mode image that is currently installed on the OSA device.

User Response: To write (re-write) the same named OSA mode image *xxxx*, reissue the OSA/SF Install command with the Force option.

IOAx682E Unable to open data set *fff...fff*

Explanation: The data set could not be opened during the Install process.

fff...fff = name of the data set that could not be opened by OSA/SF

User Response: The data set is either an OSA/SF image data set or a OSA/SF NLM data set. These data sets are restored by SMP/E when OSA/SF is installed. Check that:
- OSA/SF SMP/E installation completed successfully
- The data set exists on the volume where SMP/E installed it
- This image has the data set catalogued
- The data set is not used by another user, including another user in another image

Retry the Install command. If problem cannot be resolved, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx683E Unable to read data set (*fff...fff*)

Explanation: The data set could not be read during the Install process.

fff...fff = name of the data set that could not be read by OSA/SF

User Response: Check that the OSA image data set name or NLM data set name as specified in the list of data set names contained in the IOACFG data set or the IOAINX data set:
- Exists and is catalogued in this image
- Is not currently open by a system task or another user in this or another image

The IOACFG and IOAINX data sets are pointed to by the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 2 for more information about the OSA/SF startup profile.

If the file has been deleted, then an SMP/E reinstall of OSA/SF must be performed to reload the data set.

If the problem persists, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx684E Configuration set up error

Explanation: The file type (image type) specified in the configuration data set (IOACFG entry of OSA/SF startup profile) is not valid for this OSA device.

User Response: Check the configuration for this OSA. Then check the file type (column two) in the configuration data set (IOACFG). The configuration data set is specified by the IOACFG entry in the OSA/SF startup profile. Correct the configuration file, stop OSA/SF if it is still running, then restart OSA/SF. Refer to Chapter 3, "Setting Up OSA/SF on OS/390, z/OS, and z/OS.e", on page 37 for more information regarding the IOACFG data set.

IOAx686W This file not loaded because an Image file is not active

Explanation: Following an Activate or an Install sequence, the OSA must be configured offline in all images then configured back online. This message is issued because the I-files were not found on the OSA or the activation step (configure CHPID offline/online) did not complete. If you are using the GUI, the command output window will contain the name of the data set. If you are using the REXX interface, the data set name will be sent to the TSO screen.

User Response: The Image files (I-files) are installed as part of the OSA/SF SMP/E installation sequence. Ensure that the SMP/E install of OSA/SF completed successfully. Configure the OSA CHPID offline in all images (CF CHP(nn),OFFLINE) and then back online (CF CHP(nn),ONLINE). This loads the configured image file to the OSA. Then rerun the OSA mode Install sequence.

IOAx687E Incorrect Image type is specified for this OSA hardware type

Explanation: The image data set (I-file) that is identified in the configuration data set (pointed to by the IOACFG entry in the OSA/SF startup profile) for this OSA, contains an image that is not valid for this OSA.

User Response: Verify the OSA type installed. Then verify the configuration matches the OSA hardware (for example FDDI, Token Ring, ATM, or Ethernet). See the OSA publication for more information on configurations and OSA hardware types. Double check that the OSA/SF SMP/E install completed successfully. If message issued as the result of using the API, or the configuration data sets have been altered, check the API control blocks and/or correct alterations.

If problem continues, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx688E Specified configuration is not supported by this OSA hardware type

Explanation: The image data set (I-file) that is identified in the OSA/SF configuration data set contains an image that is not valid for this OSA-1 device type.

User Response: Verify the OSA type installed. Then verify the configuration matches the OSA-1 hardware (for example FDDI, Token Ring, or Ethernet). See the OSA publication for more information on configurations and OSA hardware types. Use the Activate sequence to load the configuration to the OSA. The OSA/SF configuration data set is pointed to by the IOACFG entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, "Setting Up OSA/SF on OS/390, z/OS, and z/OS.e", on page 37 for more information about the OSA/SF startup profile.

If problems continue, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx689E Specified configuration is not supported by this OSA hardware type

Explanation: The image data set (I-file) that is identified in the configuration data set (IOACFG) contains an image that is not valid for this OSA-2 hardware type.

User Response: Verify the OSA type installed. Then verify the configuration matches the OSA-2 hardware (for example Token Ring or Ethernet). See the OSA publication for more information on configurations and OSA hardware types. Use the Activate sequence to load the configuration to the OSA. The configuration data set is pointed to by the IOACFG entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

If problems continue, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx690E Specified configuration is not supported by this OSA hardware type

Explanation: The image data set (I-file) that is identified in the configuration data set (IOACFG) contains an image that is not valid for this OSA-2 hardware type.

User Response: Verify the OSA type installed. Then verify the configuration matches the OSA2-ATM hardware (for example Token Ring or Ethernet). See the OSA publication for more information on configurations and OSA hardware types. Use the Activate sequence to load the configuration to the OSA. The configuration data set is pointed to by the IOACFG entry in the OSA/SF startup profile. The OSA/SF Startup Profile is a data set that is pointed to from the DD card IOAPROF within the OSA/SF Started Procedure (task). See Chapter 3, “Setting Up OSA/SF on OS/390, z/OS, and z/OS.e”, on page 37 for more information about the OSA/SF startup profile.

If problems continue, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx691E Unknown hardware model passed to install

Explanation: This is a internal OSA/SF error.

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx692E Unable to read label for ssss

Explanation: In the process of an INSTALL/ACTIVATE command, OSA/SF is unable to read the label for the specified image file ssss. The possible cause could be a corrupted image file.

ssss = specified image file in the IOACFG

User Response: Report to IBM service.

IOAx693E Install for CHPID cc not complete. See message log for details

Explanation: The INSTALL sequence for this CHPID (OSA) did not complete successfully. See the message log for more information.

cc = CHPID

User Response: Read the message log. It may be necessary to do an ACTIVATE or INSTALL again.

IOAx694I Install for CHPID *nn* completed successfully

Explanation: The Install command was issued from either the GUI or REXX interface or from the operator Modify command. The installation operation was successful for OSA CHPID *nn*.

User Response: Continue with the installation process.

IOAx695I Install for CHPID *nn* started

Explanation: An install operation was issued from the operator Modify command. The installation process has successfully started.

User Response: Monitor the system and message log for additional messages that will state the success or failure of the installation. Processing continues.

IOAx696E Install for CHPID cc not complete. See command output for details

Explanation: The INSTALL sequence for this CHPID (OSA) did not complete successfully. See the command output window for more information if using GUI. If REXX, messages should be in user console that issued command.

cc = CHPID

User Response: Read the command output window. It may be necessary to do an ACTIVATE or INSTALL again.

IOAx697E Incorrect CHPID cc was specified

Explanation: Incorrect CHPID (OSA) was specified with modify command.

cc = CHPID - must be alphanumeric from 00 through FF

User Response: Correct the CHPID and retry the command

IOAx698E Busy installing CHPID cc. Retry command later

Explanation: OSA/SF is busy trying to install CHPID cc. This could be because OSA/SF is currently doing an install to another CHPID.

cc = CHPID - must be alphanumeric ranged from 00 through FF

User Response: Retry the command when the INSTALL for CHPID cc is complete.

IOAx699E Incorrect option specified for CHPID cc

Explanation: An incorrect option was entered with the modify command for an OSA install. Valid options are FORCE and NOFORCE. The default is NOFORCE.

NOFORCE installs the OSA mode only when an image does not already exist, or when the images are different.

FORCE installs the OSA mode regardless of any image already on the OSA feature.

Command Syntax: **F OSASF,INSTALL cc,FORCE** or **NOFORCE**

User Response: Retry the command with the correct option.

IOAx700E Incorrect parameter ssssss specified

Explanation: An incorrect parameter was specified with the modify command for an OSA install. The only valid command is INSTALL. The only required parameter is the CHPID number. Optional parameters are FORCE or NOFORCE. The default is NOFORCE.

The syntax is **F OSASF,INSTALL cc,FORCE**; where OSASF is the started task name, and cc is the CHPID (OSA).

User Response: Retry the command with the correct parameter or syntax.

IOAx701E An attempt was made to free a not valid internal region

Explanation: This is a internal OSA/SF error.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx702I Delete of unknown region at line *d* of *s*

Explanation: This is an internal OSA/SF error. OSA/SF will continue to run. An OSA/SF component attempted to free an internal storage area that was already free.

User Response: OSA/SF will continue to run, but please contact IBM service if this message is displayed.

IOAx751E START not entered as the first operator command

Explanation: The OSA/SF task was not started by a Start command. OSA/SF can not be started though JCL submission. OSA/SF initialization has terminated.

User Response: Start OSA/SF with a Start command. Batch job JCL submission or the use of the TSO SUBMIT command can not be used to start OSA/SF. OSA/SF must run as a started task.

IOAx752W ESTAE macro load failed with rc=*rrrrrrrr*

Explanation: Unable to execute ESTAE macro successfully. No OSA/SF recovery action will be taken upon any exception.

rrrrrrrr = return code from the ESTAE macro

User Response: Investigate the return code from the ESTAE macro found in *Programming: Authorized Assembler Services Reference, Volume 2, GC28-1476*. Make corrections. Then stop and restart OSA/SF. If unable to correct condition, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx756W IOASTADM load failed with rc=*rrrrrrrr*

Explanation: OSA/SF uses a recovery routine, IOASTADM, to handle errors. The recovery routine is LOADed when OSA/SF is started. OSA/SF was unable to load the OSA/SF recovery routine successfully. Therefore, no OSA/SF recovery action will take place for any exception conditions.

rrrrrrrr = return code from LOAD macro.

User Response: Investigate the return code from the LOAD macro found in *Programming: Authorized Assembler Services Reference, Volume 3, GC28-1477*. Make corrections. Then stop and restart OSA/SF. If unable to correct condition, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx776E OSA/SF Abend =*xxxx*/*yyyy*. Failing PSW=*pppp pppp*

Explanation: Host application OSA/SF has abended.

xxxx = abend code
yyyy = reason code
pppp pppp = PSW content at time of abend

User Response: Collect the dump dataset and restart OSA/SF. See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx801E Region service failed with RC=*rrrrrrrr*

Explanation: An internal error has occurred in an OSA/SF memory allocation service routine.

rrrrrrrr = return code for IBM diagnostic use

User Response: Additional storage resources are needed by OSA/SF. Check the OSA/SF region size and increase if required. Also check the system console for addition storage resource constraint messages. Free up system storage resource and retry the command that received this message.

If allocating additional storage for OSA/SF does not correct the situation, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx802E SCC name/token create failed with RC=*rrrrrrrr*

Explanation: Unable to create a Name/Token pair for an OSA/SF component. This is probably the result of an internal or OSA/SF error.

rrrrrrrr = return code from IEANTCR

User Response: Check the IEANTCR return code in *Programming: Authorized Assembler Services Reference, Volume 2, form number GC28-1476* for possible actions. If the condition can not be corrected, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx803E SCC name/token retrieve failed with RC=*rrrrrrrr*

Explanation: Unable to retrieve a Name/Token pair for an OSA/SF component. This is probably the result of an internal or OSA/SF error.

rrrrrrrr = return code from IEANTRT

User Response: Check the IEANTRT return code in *Programming: Authorized Assembler Services Reference, Volume 2, form number GC28-1476* for possible actions. If the condition can not be corrected, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx804I SCC name/token delete failed with rc=*rrrrrrrr*

Explanation: Unable to delete a Name/Token pair for an OSA/SF component. This is probably the result of an internal or OSA/SF error.

rrrrrrrr = return code from IEANTDL

User Response: Check the IEANTDL return code in *Programming: Authorized Assembler Services Reference, Volume 2, form number GC28-1476* for possible actions. If the condition can not be corrected, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx805E Register for ENF online event failed with rc=*rrrrrrrr*

Explanation: OSA/SF attempted to register with the Event Notification Facility for an online event. The register attempt failed.

rrrrrrrr = return code from ENF register attempt

User Response: Ensure that the Event Notification Facility for the operating system is at the current maintenance level. If problems continue, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx806E Register for ENF offline event failed with RC=*rrrrrrrr*

Explanation: OSA/SF attempted to register with the Event Notification Facility for an offline event. The register attempt failed.

rrrrrrrr = return code from ENF register attempt

User Response: Ensure that the Event Notification Facility for the operating system is at the current maintenance level. If problems continue, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx807I Delete of ENF online event failed with RC=*rrrrrrrr*

Explanation: OSA/SF attempted to delete (unregister) with the Event Notification Facility for an online event. The delete attempt failed.

rrrrrrrr = return code from ENF delete attempt

User Response: Ensure that the Event Notification Facility for the operating system is at the current maintenance level. If problems continue, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx808I Delete of ENF offline event failed with RC=*rrrrrrrr*

Explanation: OSA/SF attempted to delete (unregister) with the Event Notification Facility for an offline event. The delete attempt failed.

rrrrrrrr = return code from ENF delete attempt

User Response: Ensure that the Event Notification Facility for the operating system is at the current maintenance level. If problems continue, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx809E Load of ENF listen module failed with RC=*rrrrrrrr*

Explanation: Unable to load the ENF (Event Notification Facility) event handler.

rrrrrrrr = return code from LOAD macro

User Response: Investigate the return code from the LOAD macro found in *Programming: Authorized Assembler Services Reference, Volume 3, GC28-1477*. Make corrections. Then stop and restart OSA/SF. If unable to correct condition, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx820I CHPID *cc* is no longer managed by this image

Explanation: The OSAD device number with unit address X'FE' was varied offline, so OSA CHPID *cc* cannot be managed by OSA/SF in this image.

cc = CHPID

User Response: No user action is needed if the OSAD device was knowingly varied offline to the system. Vary the OSAD device back online to the system. Message IOAx821I should then follow.

IOAx821I CHPID *cc* is now managed by this image

Explanation: The OSAD device for the CHPID was varied online and is now being managed by the OSA/SF in this image.
cc = CHPID

User Response: When an OSAD device comes online to the system, OSA/SF will assume management control of the CHPID (if no other OSA/SF is currently managing the OSA). This informational message notifies the user; no user action is required.

IOAx822E ENF exit routine initialization failed with RC=*x*

Explanation: The Event Notification Facility routine for OSA/SF has failed to initialize. OSA/SF will continue to start up but there will be no automatic CHPID online notification.

User Response: See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx823E GETMAIN failed with rc = *dddd.*

Explanation: Unable to allocate storage successfully. Failing return code is indicated by *dddd.*
dddd = GETMAIN return code

User Response: Investigate the return code from the GETMAIN macro found in *Programming: Authorized Assembler Services Reference, Volume 2, GC28-1476*. Make corrections. Then stop and restart OSA/SF. If unable to correct condition, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx824E BLDL macro failed with rc = *dddd*.

Explanation: Unable to execute BLDL macro successfully. Failing return code is indicated by *dddd*.
dddd = BLDL return code

User Response: Investigate the return code from the BLDL macro found in *Programming: Authorized Assembler Services Reference, Volume 1, number GC28-1475*. Make corrections. Then stop and restart OSA/SF. If unable to correct condition, see "Reporting OSA/SF Problems to IBM" on page 127.

IOAx861E Specified PVC name *ssssssss* is not valid for ATM IP forwarding mode

Explanation: When running in ATM IP Forwarding mode, only PVC name WANPVC00 is allowed.

User Response: Correct the PVC name in the input and retry the command.

IOAx862E Only one PVC is allowed when configuring ATM IP forwarding mode

Explanation: You specified more than one (1) PVC entry while configuring ATM IP forwarding.

User Response: Fix the input file (GUI or REXX) and retry command.

IOAx863E More than *n* passthru entries with IP addresses specified for port *p*

Explanation: There are more than *n* TCP/IP entries with IP addresses defined in the OAT, where *n* is the limit for the CHPID type. You can only define a maximum of *n* IP addresses per port.

User Response: Define only a maximum of *n* OAT entries with IP addresses for the specified port. See "Guidelines for Changing an OAT" on page 138 for information on limitations.

IOAx864E Primary default entry not removed; secondary (image *p* UA *uu*) exists

Explanation: A port can have one of the following:
- No default entries
- One primary default entry
- Both a primary default entry and a secondary default entry

This OAT entry was previously defined as the primary default entry for the associated port. Replacing this entry would cause the port to have a secondary default entry without a primary default entry. This is not valid. The secondary default entry currently defined has unit address *uu* for image *p*.
p = image number
uu = unit address

User Response: Specify a replacement primary default entry or remove both the primary and secondary default entry.

IOAx865E Multi IP addresses not supported by OSA processor code level *x.yy*

Explanation: The multiple IP addresses protocol is not supported by the OSA processor code level *x.yy*. The minimum OSA processor code that supports this enhancement is as follows:
OSA2–6.2x
OSA2–ATM–5.9

OSA2–FENET–1.3

User Response: Obtain the specified or higher level of OSA processor code and reissue the Put OAT command.

IOAx866E Secondary default entry (image *p* UA *uu*) specified without a primary

Explanation: A secondary default entry was specified without a primary default entry being on the port.

User Response: Add a primary default entry to the input and reissue the Put OAT command.

IOAx867E Get configuration command not valid for new ATM CHPID *cc*

Explanation: A new ATM CHPID does not contain a configuration. This command will therefore not work correctly until the CHPID has been configured once.

User Response: Use either the GUI configuration panels or the IOAATM2 SAMPLE file to configure this CHPID. Once you have configured the ATM CHPID using either of these methods, this command will return valid data.

IOAx868E Duplicate IP addresses found for image *n* UA *uu*

Explanation: The specified OAT entry for image *p* unit address *uu* has multiple IP addresses and more than one IP address was found to have the same value.

User Response: Fix the data being used for the PUT OAT command. Reissue the PUT OAT or Install command, whichever was used.

IOAx869E Data not consistent for image *p* UA *uu* & image *p* UA *vv* (Group of 2)

Explanation: OAT entries image *p* UA *uu* and image *p* UA *vv* combine to make one valid OAT entry with a group size of 2. The settable data for both entries (if specified in the input) must match.

p = image number
uu = unit address(even)
vv = unit address(odd)

For Passthru Type, check
port number
IP address(es)
NetMask(s) if applicable

For HPDT MPC Type
port number
OSA name

User Response: Fix the data being used for the OAT input. Reissue the Put OAT or Install command, whichever was used.

IOAx870E Entry type *dd* is not supported for CHPID *cc*

Explanation: The specified device type *dd* is not supported on this OSA platform/configuration.

Where *dd* can be:
MPC
Passthru
SNA
SNA Network Management

User Response: Fix the data being used for the OAT input. Reissue the Put OAT or Install command, whichever was used.

IOAx871E PVC name *ssss* already used by another PVC entry in the input

Explanation: The PVC name specified *ssss* is already used by another PVC entry in the input.

User Response: Choose another PVC name for this entry or remove this PVC entry.

IOAx872E Entry type *dd* is not supported in *ssss* mode for CHPID *cc*

Explanation: The specified entry type ssss is not supported when the OSA is configured in mmmm mode.

Where *ssss* can be:
Passthru
SNA
SNA Network Management

Where *mmmm* can be:
HPDT Native
ATM(LE)

User Response: Fix the data being used for the Put OAT command. Only MPC entry types are valid when the OSA is in HPDT Native mode. Only passthru and SNA entry types are valid in ATM (LE) mode.

IOAx873I CHPID *cc* port *pp* default entry is image *nn* UA *uu*

Explanation: All unknown IP packets received by port *pp* in CHPID (OSA) *cc* will be forwarded to image *nn* UA *uu* per default OAT entry (or TCP/IP definitions for Gigabit Ethernet). This situation can occur under these conditions:

You reset the specified CHPID, and either the primary or secondary default OAT entry is now active.
No primary or secondary default OAT entry was originally defined, but now you have defined one and activated the new configuration.
Both primary and secondary default OAT entries were defined. Because of either an overt action on your part or because of an error on the primary,

unknown packets are now being forwarded to image n UA uu as defined for the secondary default.

Where
cc = CHPID number
pp = port number
nn = image number
uu = unit address number

The specified port on the CHPID (OSA) was previously identified as the default entry for forwarding IP packets and is no longer forwarding the packets.

This message is only displayed on the image where OSA/SF is running and where the CHPID is managed. The secondary image does not display the message if the primary manages the CHPID and fails, nor does the primary display the message when the secondary, or some other image, manages the CHPID.

User Response: No action is necessary if you want unknown IP packets to be forwarded to the image/UA specified in the message text. If you do not want unknown packets forwarded to this image/UA combination, do the following:

- Check that the OAT entries you specified as being the primary or secondary default OAT entries are on the CHPID.
- After this check, if you determine it is not what you want, remove the default OAT entry indicator from this image/UA OAT entry.
- After this check, if the image/UA specified is for the secondary default OAT entry and you want unknown packets going to the primary default OAT entry, then verify that TCP/IP is active on this combination. This may require problem determination as to why the primary default originally failed.

IOAx874W CHPID *cc* port *pp* is no longer forwarding unknown packets

Explanation: The specified port on the CHPID (OSA) was previously identified as the default entry for forwarding IP packets and is no longer forwarding the packets.

Where
cc = CHPID number
pp = port number

User Response: This message may require you to take action.

If there was a primary or secondary default OAT entry on the specified CHPID/port forwarding unknown packets, one or both of these entries are no longer available.

Check that TCP/IP is active on the specified image/UA designated as the primary and/or secondary default OAT entry.

This message is only displayed on the image where OSA/SF is running and where the CHPID is managed. The secondary image does not display the message if the primary manages the CHPID and fails, nor does the primary display the message when the secondary, or some other image, manages the CHPID.

IOAx875E Empty Application Dump area for CHPID *cc*

Explanation: The CHPID you issued the GET_DEBUG command to does not have an active SNA application. For OSA2-ATM, there can be two application segments, one for the SNA application and one for the ATM application.

This message can be issued if:
The OSA2-ATM CHPID is not configured for any mode.
The OSA2-ATM CHPID is configured in HPDT ATM Native or IP forwarding mode. In either of these modes, the SNA application is not active.

User Response: To configure the OSA mode, refer to Chapter 8, “Configuring OSA-Express Modes”, on page 97.

IOAx876E Incorrect data returned from CHPID *cc*

Explanation: The data returned from CHPID cc is not valid. This is an internal error probably in the OSA firmware.

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx877E An internal OSA/SF error occurred. Reason code *cccc*

Explanation: An internal OSA/SF error occurred. The reason code is used by IBM to determine where the failure occurred.

User Response: See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx878E Port state on CHPID *c* Port *p* is not valid

Explanation: The specified port has indicated an unarchitected state to OSA/SF.

User Response: Change the LAN Traffic state to disabled and back to enabled (for OSA-2, disable and enable the Hardware State). See “Enabling and Disabling Ports” on page 113.

See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx879E Unable to enable physical port associated with port *pppp*

Explanation: This message is generated when you attempt to enable a physical port and an error occurs enabling the associated physical port.

User Response: Follow local procedures for enabling port.

IOAx880E Target port *pp* **is not in current configuration for CHPID** *cc***.**

Explanation: This message is returned whenever you issue a command against a specific port type that is not configured on the OSA feature.

User Response: Determine desired action (either reconfigure the card or issue the correct parm ID for the currently configured type) and reissue command.

IOAx881E image *n* **UA** *nnn* **had an OSA OAT reject code of** *xxxx*

Explanation: The image/UA combination indicated had an error described by the reject code *xxxx*. See "OSA Reject Codes" on page 226 for an explanation of the reject codes.

User Response: Fix the problem as described in "OSA Reject Codes" on page 226 and try again.

IOAx882I Action complete. Configure CHPID *cc* **off/on to activate the changes**

Explanation: The action you started is complete. Configure the CHPID offline in all images and then online to activate the change.

User Response: None.

IOAx883E *"***SSAP** *nn***, DSAP** *nn***, DMAC** *nn"*

Explanation: This message contains the information that could not fit into message IOAx312I.

User Response: Same as IOAx312I.

IOAx884E *ttttttt sssssss* **alert received for CHPID** *cc* **port** *p*

Explanation: An ATM alert was received from the CHPID and port referenced in the message. The alert can be one of the following:

Mismatched frame size

Operation and Maintenance (OAM) loopback timeout

Mismatched ELAN type

Message IOAC885I contains more information on this alert.

User Response: Fix the cause of the problem and continue.

See "Reporting OSA/SF Problems to IBM" on page 127.

IOAx885I Expected *ssssssss* **was** *rrrrrrrr*

Explanation: This is information assocated with message IOAC884E. *ssssssss* will be one of the following:

Frame size

LAN emulation type

The information in *rrrrrrrr* depends on which of the above appears in the message.

For frame size it can be one of:

1516

4544

9234

18190

For LAN emulation type it can be:

Ethernet

Token Ring

User Response: Make the necessary changes and rerun the operation.

IOAx886I *ttttttt sssssss* **alert received for CHPID** *cc* **port** *p*

Explanation: An ATM alert indicating OAM loopback established has been received from the OSA. This is an informational message only.

User Response: None.

IOAx887W image *x* **UA** *y* **is not defined in the Channel Subsystem**

Explanation: The specified OAT entry is defined in the OSA address table but not defined in the Channel Subsystem. The OSA can only flow traffic if the image/UA combination is defined in both the Channel Subsystem and in the OAT.

User Response: Define the devices in the Channel Subsystem and retry the process. If you are installing OAT entries for a Channel Subsystem other than on the one you are currently running OSA/SF, you need to make that Channel subsystem active in order to make traffic flow.

IOAx888I *sssssssss* **for CHPID** *dddd*

Explanation: The command completed before the port completely entered the enabled or disabled state.

sssssssss = Port is in enabling state or Port is in disabling state

dddd = OSAD CHPID

User Response: Issue the Query command from

IOACMD or refresh the GUI and check the LAN traffic enabled field to determine the state of the port.

IOAx889E Logical port *pp* is in use by image *nn* UA *xxxx*

Explanation: A command was issued to disable the port, but one or more devices associated with this port are in use.

pp = Port ID

nn = image

aaaa = Unit Address

User Response: Stop the programs that are using the devices. Retry the command.

IOAx890E Configuration parameter *aaaa* not supported for CHPID *cc*

Explanation: The parameter specified in the message is not valid for this hardware model.

User Response: Correct your configuration file and reissue the command.

IOAx891W Port type *pppp* not supported on OSD CHPID *cccc* port *nn*

Explanation: This message is presented when the port type received from the OSA is not supported on this CHPID type. This situation will occur if the target OSA CHPID was dynamically changed from one CHPID type to another and the CHPID has not been reconfigured.

Message variables are:

pppp is port type of **HPDT ATM Native** or **Emulated Token Ring**

cccc is target CHPID number

nn is target port number

User Response: Issue the REXX Configure OSA CHPID or the GUI activate command for the target CHPID.

IOAx892W The port type of CHPID *cccc* is not supported by this version of OSA/SF

Explanation: OSA/SF detected an OSA CHPID whose port type could not be determined. This is probably due to a newly available CHPID type, which your version of OSA/SF does not support.

User Response: Upgrade to the latest level of OSA/SF.

IOAx893E CHPID *cc* port *pp* reports excessive port state changes

Explanation: CHPID *cccc* has most likely experienced a hardware error which is causing port *pp*to move repeatedly from the enabled state to the disabled state. After this error is reported, all other port state change messages will be suppressed for 30 minutes. At that time, if the condition still persists, additional port state change messages will be presented, followed again by this message. This pattern will continue until the port is disabled externally or the hardware condition is corrected.

User Response: Disable the port or find the cause of the hardware error.

IOAK894E Data length mismatch on CHPID xx. Please retry command.

Explanation: This error will occur if two users issue the command to query extended multicast or IP address information at the same instant. Retrying the command should clear up the problem.

User Response: Retry the command and verify that this correctly completes.

IOAK895E Port type does not support specified configuration file type\n

Explanation: There is an entry in the OSAS.CONFIG file which indicates a port type which is not the port type specified for the current command. If the user has modified the OSAS.CONFIG file, check to make sure that an error has not been introduced. If not, then this is most likely an internal error.

User Response: Check the OSAS.CONFIG file for errors.

See “Reporting OSA/SF Problems to IBM” on page 127.

IOAx951W Not valid or closed pipe

Explanation: This is an internal OSA/SF error.

User Response: Stop and restart OSA/SF to attempt a recovery. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx952W Failed to open pipe communications

Explanation: This is an internal OSA/SF error.

User Response: Stop and restart OSA/SF to attempt a recovery. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx953E Failed to drain pipe

Explanation: This is an internal OSA/SF error.

User Response: Stop and restart OSA/SF to attempt a recovery. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAx954E Pipe full

Explanation: This is an internal OSA/SF error.

User Response: Stop and restart OSA/SF to attempt a recovery. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAC955W Unknown error while writing to pipe

Explanation: This is an internal OSA/SF error.

User Response: Stop and restart OSA/SF to attempt a recovery. If the condition continues, see “Reporting OSA/SF Problems to IBM” on page 127.

IOAC956E Pipe communication error *dd*

Explanation: An internal communication error occurred within OSA/SF.

User Response: Stop and restart the Attention Server (IOANMAIN). If the problem persists, contact the IBM support center.

IOAx998I *sssssssssssssss*

Explanation: This message is presented when OSA/SF has system error information to communicate. The message is only presented in the OSA/SF message log.

sssssssssssssss is the text of the message.

User Response: Take appropriate steps based on the text of the message..

IOAx999I Configuration mode for CHPID*cc* **is** *mmmmmmmm*

Explanation: This is an informational message to indicate what configuration mode the specified CHPID is running with.

mmmmmmmm is one of the following or a valid combination of the following.

HPDT MPC
HPDT ATM
ATM(LE)
TCP/IP Passthru
SNA
LANRES

User Response: None.

IOB000I Starting OSA SNMP subagent

Explanation: The OSA Direct SNMP subagent has been started and is going through initialization

User Response: None.

IOB001I OSA Subagent: Using loopback to connect to agent

Explanation: The OSA subagent is using the local address LOOPBACK to connect to. This was done since a host address was not supplied on the invocation.

User Response: None

IOB002I Could not obtain handle from agent. Retrying

Explanation: During initialization, the subagent needs to connect to the SNMP agent to process any commands. The connection could not be established.

User Response: Check the following:

1. The SNMP agent (normally OSNMPD) is running
2. The correct port is being specified on invocation
3. The correct stack is being specified on invocation

IOB003E Need community name

Explanation: The OSA subagent was started without a valid community name.

User Response: When the OSA subagent was started, the -c option was used, but there was no corresponding name specified, -OR- the parameter specified was not valid.

IOB004E Need stack name

Explanation: The OSA subagent was started with the -s option, but no stack name was supplied.

User Response: Specify a valid stack name when starting the OSA subagent with the -s parameter.

IOB005E Need port number

Explanation: The OSA subagent was started with the -p option but a valid port number was not specified.

User Response: Provide a valid port number when starting the OSA subagent if you specify the -p option.

IOB006E Need debug level

Explanation: The OSA subagent was started with the -d option, but a valid value was not entered

User Response: Enter a valid debug level (0 or higher) when starting the OSA subagent with the -d option

IOB007E DPI rc received from Agent --> n. Exiting

Explanation: The OSA Subagent received the indicated rc from the SNMP agent. This rc was not expected and indicates that the subagent cannot continue processing.

User Response: Check the output job to see if any errors that can be corrected are noted. If not, check the SNMP agent, normally started as OSNMPD, which may indicate the cause of the unexpected rc.

See “Reporting OSA/SF Problems to IBM” on page 127.

IOB008E Received NULL hdr from Agent. Exiting

Explanation: The OSA subagent received a NULL response from the SNMP Agent. It was expecting a command or response.

User Response: Re-start the OSA subagent and retry the command.

See “Reporting OSA/SF Problems to IBM” on page 127.

IOB009E Unexpected DPI packet type nn

Explanation: The OSA subagent received a request from the Agent that it did not understand. The value received was ’n’.

User Response: Re-start the OSA subagent and retry the command.

See “Reporting OSA/SF Problems to IBM” on page 127.

IOB010E Bad RC X received from OSA on ssss

Explanation: The OSA returned a request with a non-zero return code of X. The OSA in question is device ssss.

User Response: None.

See “Reporting OSA/SF Problems to IBM” on page 127.

IOB011E The input OID matches one already in the list

Explanation: The OID received from an OSA init request is already in the list maintained by the OSA subagent.

User Response: Re-start the OSA subagent.

IOB012E Could not allocate storage for interface nn

Explanation: The OSA subagent attempted to allocate memory to communicate with interface nn and it could not be obtained.

User Response: Check your system resources to make sure there is enough free memory for the OSA subagent job. Re-starting the subagent may alleviate the problem.

See “Reporting OSA/SF Problems to IBM” on page 127.

IOB014E hdr_p->error_code not DPI_noError for unregister

Explanation: The OSA subagent did not receive a successful return code when it attempted to unregister an OID with the SNMP Agent.

User Response: Re-start the OSA subagent

IOB015E Could not open connection to agent

Explanation: The OSA subagent attempted to start communications with the SNMP agent and it failed.

User Response: Check that the SNMP agent is running and is not issuing error messages. Check that the SNMP Agent and the OSA subagent are being started with the same port number if you are using the -p option.

IOB016E Could not send open packet to agent

Explanation: The OSA subagent was not able to send an open packet request to the SNMP Agent.

User Response: Make sure the SNMP Agent is running and has not indicated any errors. Make sure the port used for the SNMP Agent and the OSA subagent are the same if using the -p option.

IOB017E Did not receive answer from agent

Explanation: The OSA subagent expected a response from the SNMP Agent and it never arrived.

User Response: Check that the SNMP Agent is still running and has not reported any errors. Re-start the OSA subagent.

IOB018E Received NULL hdr from Agent. Exiting

Explanation: The OSA subagent received a NULL response from the SNMP Agent. It was expecting a command or response.

User Response: Re-start the OSA subagent and retry the command.

See “Reporting OSA/SF Problems to IBM” on page 127.

IOB019E Did not receive SNMP response from agent

Explanation: The OSA subagent expected a response from the SNMP Agent and it never arrived.

User Response: Make sure the SNMP Agent is up and running and has not reported any errors. Re-start the OSA subagent.

IOB020E OSA SNMP Subagent: Internal error XX

Explanation: The OSA SNMP subagent had an internal error that prevents it from functioning.

User Response: Re-start OSA subagent.

IOB021I OSA SNMP Subagent initialization complete

Explanation: The OSA SNMP subagent is now ready to accept requests from the SNMP Agent.

User Response: None

IOB022E OSA SNMP Subagent: duplicate subagent identifier error

Explanation: The OSA Subagent attempted to connect to the SNMP Agent. It got back an error indicating a duplicate subagent identifier. Check for errors from the SNMP Agent

User Response: Try re-starting the SNMP Agent, then re-starting the OSA subagent.

IOB023I Using default stack name ssss in INET environment

Explanation: The OSA subagent was able to connect to stack ssss in an INET environment.

User Response: None

IOB024E Could not establish affinity with ssss

Explanation: The OSA subagent attempted to establish affinity to stack ssss and it could not be completed successfully.

User Response: Make sure the stack name specified is correct. Make sure the stack is up and functioning.

IOB025E Exiting due to bad RC from last function

Explanation: The OSA subagent tried to send a message to the SNMP Agent and got back a return code it did not understand or expect.

User Response: None.

See “Reporting OSA/SF Problems to IBM” on page 127.

IOB026E Could not initialize list

Explanation: The OSA Subagent could not initialize its internal lists.

User Response: Check that there is enough memory available for the OSA subagent. Make sure there are no system problems preventing storage allocation.

See “Reporting OSA/SF Problems to IBM” on page 127.

IOB027E Debug level specified must be greater than 0

Explanation: The -d option was entered when the OSA subagent was invoked, but the value received was less than 0. Valid values are 0 or higher.

User Response: Re-start the OSA subagent with a proper debug value.

IOB028E Using stack name ssss

Explanation: The OSA subagent is connected to stack ssss.

User Response: None. If you are having trouble getting data from the OSA subagent, check this stack name vs. the one you are trying to get data for and make sure they are the same.

IOB029E Could not obtain memory

Explanation: The OSA subagent attempted to allocate memory and there was none available.

User Response: Check that there are enough resources available for the OSA subagent to allocate memory.

See “Reporting OSA/SF Problems to IBM” on page 127.

OSA Reject Codes

Any of the following OSA return codes can be included in a message displayed by host programs other than OSA/SF. The message description for the other application directs you to this section.

E003 An invalid LAN type was detected. Ensure that the LAN type defined in your configuration matches the actual LAN type being used.

E004 An invalid LAN number was detected. Check the LAN port number specified in your setup.

E005 An IP address was received by the OSA port that duplicates an IP address

already in use by another MPC (HPDT MPC mode) or LCS (TCP/IP Passthru mode) session attached to the port.

Change one of the IP addresses.

Refer to the issuing message documentation for information on any other appropriate action to take.

E006 The IP address table is full. Remove some of your TCP/IP addresses.

E010 The primary default image has already been defined.

E00A An IP address was received by the OSA port that duplicates an IP address being used by another IP connection in the IP network. Change one of the IP addresses in the network.

E00B Invalid frame type detected. Check that the frame type specified in your setup is correct.

E00C Unsupported LAN type.

E080 A LAN connection could not be made, possibly for one of the following reasons:

- The cable may not be present
- The LAN may not be functioning
- The port may have been disabled from the Support Element (SE) of the server

Fix the error as explained above. Then, depending on the error, restart the device or restart TCP/IP.

The following return codes indicate internal errors and should be reported to IBM:

E001 or E100

The communication to the OSA port cannot be successfully started. This is most likely due to an error in the LINK statement defined in TCP/IP (for example, the port number or the LAN type specified is not correct) or the state of the OSA port cannot support traffic at this time.

If the failure is due to a misconfiguration in the LINK statement, correct the error and start the device again. If the error is due to something else, investigate the state of the specific port to make sure that it is enabled and operational, and then reissue the command. If neither of these options resolves the problem, report the problem to IBM.

E002 Invalid MTU size was detected.

E007 A LAN port state error was detected.

E008 A start LAN command was not received.

E009 The Set IP command was already received.

E012 Invalid Set Routing indicator.

E00D Invalid IP version specified.

E00E Unsupported ARP assist command received.

The following return codes are provided by OSA/SF:

0 Indicates that the command completed successfully.

4 Indicates the command completed and any data that is returned is valid. However, a warning message is issued.

8 The command failed. Any data that is returned is not valid. A message with an E-severity level is issued.

12 The command failed. No data is returned. A message with an S-severity level is issued.

Error Messages for the OSA/SF GUI

The following Java and OSA/SF error messages might occur when you start the OSA/SF GUI. Corrective actions for each error message are listed.

Note: These messages are not enabled for LookAt.

The name specified is not recognized as an internal or external command, operable program or batch file.

Java is not installed on the user's system, or the PATH environment variable is not properly set. Ensure that the correct level of Java is installed or that the PATH variable specifies the correct Java runtime files.

Exception in thread ″main″ java.lang.UnsupportedClassVersionError: ioajava (Unsupported major.minor version xx.x)

Java has encountered a Java version error (`java.lang.UnsupportedClassVersionError`). Either you have the wrong version of Java installed, or you have more than one version of Java installed and the wrong version is the first version that is specified in the system PATH statement. From a DOS prompt, enter the following command to determine the version of Java that is on the system:

```
java -fullversion
```

The following messages display the version of Java returned when you enter the command. The first two messages indicate Java versions that are at levels lower than Java 1.4, which is required to run the OSA/SF GUI:

```
java full version "J2RE 1.2.2 IBM build cn122-20001026"


java full version "J2RE 1.3.0 IBM build cn130-20010609"


java full version "1.4.1-b21"
```

Exception in thread ″main″ java.lang.NoClassDefFoundError: ioajava

The user's CLASSPATH environment variable is not set for `ioajava.jar` that the OSA/SF GUI requires. Ensure that you have defined `ioajava.jar` for CLASSPATH. Specify the correct CLASSPATH environment variable for `ioajava.jar`. See "Defining the CLASSPATH environment variable" on page 76.

IOAG001E Graphics are not available on this system. OSA/SF interface is ending.

OSA/SF is not able to create a graphic window on the user's system. Either the system does not support graphics or the user is connected to the system in a way that does not support graphics (for example, through a TELNET to a Linux system). Ensure that the user system supports Java-based graphics at the appropriate Java version.

IOAG002E Could not load JH.JAR. The JavaHelp system may not be properly installed. OSA/SF interface is ending.

The user's CLASSPATH environment variable is not set for the JavaHelp

file jh.jar that the OSA/SF GUI requires. Specify the correct CLASSPATH environment variable for jh.jar. See “Defining the CLASSPATH environment variable” on page 76.

IOAX021E Connection refused. Most likely causes are that you either specified the wrong port number, IOAXTSRV is no longer running on the host, or the loss of network connectivity.

The IP address is not correct or does not exist. Use ping to verify the host system connection. If ping returns a valid address, check that IOAXTSRV is actually running on the host port that is specified:

1. TELNET to the host using port 2000. If TELNET fails, IOAXTSRV is not listening to port 2000.
2. If TELNET succeeds, stop IOAXTSRV at the host and retry TELNET.
3. If TELNET succeeds again, IOAXTSRV is not on port 2000, and you must specify the correct port number on the **Host-Open** window.
4. If TELNET does not succeed, restart IOAXTSRV to detemine if the connection is working.

IOAX024E Password identification check has failed. Verify that value specified is correct.

The password that is specified on the **Host-Open** window is not recognized. Specify a valid password.

IOAX025E User identification check has failed. Verify that the user identificaton value is correct.

The user ID that is specified on the **Host-Open** window is not recognized. Specify a valid user ID.

IOAX027E The local system could not resolve hostname/IP Address value. Verify that TCP/IP has been started at this workstation, and that your hostname/IP Address values are correct.

The user has specified an incorrect hostname or IP address on the **Host-Open** window, or the user cannot connect to the DNS server to translate the host name. Use ping to verify the host system connection, and specify the correct hostname or IP address.

IOAX040E The communication attempt has exceeded the specified timeout value. You must end this session to recover.

The timeout value that is specified has expired. Either the timeout value is set too low for the command to finish, or the host is not responding to the command. For a timeout problem, you might be able to continue the session by waiting for the previous command to finish, but for either case, it is recommended that you shut down the interface, specify a higher valuer than the previous threshold value, and restart the interface.

Part 3. Appendixes

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Appendix A. Physical Connection Information

Physical Ports and LEDs

Each OSA-Express feature has two physical ports for cable connection. The cable type varies with the feature type.There are two sets of LEDs for each physical port. One set indicates OSA status, the other indicates status of the PCI bus, through which the OSA communicates with the network. The number of PCI LEDs depends on the OSA-Express feature type. Figure 53 shows the relative positions of the physical ports and LEDs on the OSA-Express features. Table 11 on page 234 and Table 12 on page 234 explain how to read the LEDs.

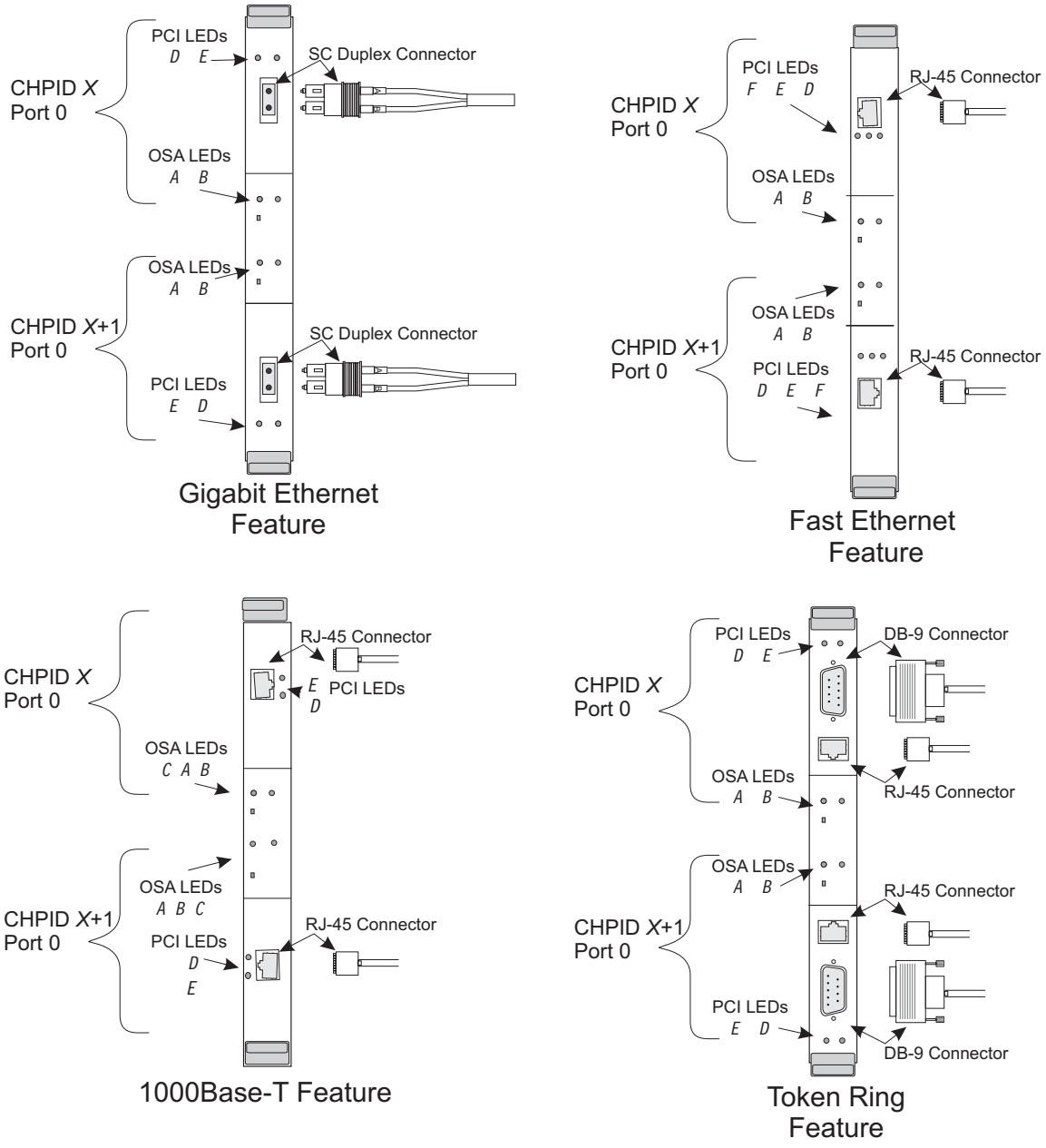

Figure 53. OSA-Express Connections and LEDs

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When determining status from the PCI LEDs it is important to note that the port 1 (bottom) set of LEDs (labeled D through G) is reversed due to the way the PCI card is mounted on the OSA-Express feature. The OSA LEDs (A and B) are read the same way for both ports.

Each physical port has two OSA LEDs, one green and one amber, indicating status as follows:

Table 11. OSA LEDs

LED A Test Complete (Green)	**LED B Not Operational (Amber)**	**OSA Status**
Off	Off	No power to the OSA feature, or processor is in a loop
Off	Blinking	Power-on self tests running
Blinking	Off	Tests complete, CHPID online
Blinking	On	Hardware error detected
On	Blinking	Invalid indication

Any LED combination in which neither A nor B is flashing (both on, both off, or one on and one off) indicates that the OSA-Express feature is powered off or that the processor on the feature is in a loop.

Depending on which OSA-Express feature is installed, up to four additional LEDs may be found for each physical port on the bezel. These indicate PCI bus status.

Table 12. PCI LEDs - Number of LEDs differs by OSA-Express Feature (Gbe and FENET)

Feature	D (Amber)	E (Green)	F (Amber)	G (Amber or Green)
GbE	ON = Transmitting or receiving	ON=Port Active	Unused	Unused
FENET	ON = Transmitting or receiving	ON = 100Mb/ps OFF = 10Mb/ps	ON=Full duplex OFF=half duplex	Unused

Table 13. PCI LEDs - Number of LEDs differs by OSA-Express Feature (1000Base T)

Feature	D (Amber or Green)	E (Green)
1000Base-T	AMBER ON = 1000Mb/ps Full duplex only	ON=1000Mb/ps Full duplex only
	GREEN ON = 100Mb/ps OFF = 10Mb/ps	ON=Full duplex OFF=half duplex

Table 14. PCI LEDs on Token Ring Feature

D (Amber)	E (Green)	Meaning
On	On	Adapter reset — only on until microcode runs
Off	On	Diagnostics failed; adapter check; fatal error
On	Off	Adapter open; adapter OK
Off	Off	No power, initilaization in progress

Table 14. PCI LEDs on Token Ring Feature (continued)

Blinking	On	Not used
Blinking	Off	Awaiting open; adapter OK
On	Blinking	Beaconing; hard error
Off	Blinking	Wire fault; auto removal; open failed
Blinking	Blinking	Awaiting initialization; Diagnostics not yet started

Fiber Optic Cabling

OSA-Express cabling must follow the standards for the LAN type being installed and must have physical connections as follows:

Gigabit Ethernet (1Gbps) SX
uses duplex SC connector for multimode fiber

Gigabit Ethernet (1Gbps) LX
uses duplex SC connector for MM or SM fiber

Fiber Optic Attachment Options For Gigabit Ethernet

The following table lists maximum unrepeated distance and link budget for Gigabit Ethernet fiber links. Longer distances are possible using repeaters, switches, or channel extenders.

Note: The OSA-Express Gigabit SX and LX features cannot communicate directly, regardless of mode conditioning or cable length, because their receivers are tuned for different wavelengths.

Fiber	Connector	Bit Rate	Fiber Bandwidth	Maximum Distance	Link Loss
MM* 62.5 micron 1000BaseSX	SC duplex	1.25 Gb/s	160 MHz-km 200 MHz-km	220 meters 275 meters	2.6dB*
MM* 50.0 micron 1000BaseSX	SC duplex	1.25 Gb/s	500 MHz-km*	550 meters	3.6 dB*
SM 1000BaseLX	SC Duplex	1.25 Gb/s	N/A	5 Km	4.6dB
MM w/MCP ** 62.5 micron 1000BaseLX	SC duplex	1.25 Gb/s	500 MHz-km	550 meters	2.4dB
MM w/MCP ** 50.0 micron 1000BaseLX	SC duplex	1.25 Gb/s	500 MHz-km	550 meters	2.4dB

Notes:

1. Minimum fiber bandwidth requirement to achieve the distances listed is applicable for multimode (MM) fiber only. There is no minimum bandwidth requirement for single mode (SM) fiber.
2. Bit rates given below may not correspond to effective channel data rate in a given application due to protocol overheads and other factors.

3. SC duplex connectors are keyed per the NCITS Fiber Channel Standard specifications.
4. MCP denotes mode conditioning patch cable, which is required to operate some links over MM fiber.
5. As light signals traverse a fiber optic cable, the signal loses some of its strength (decibels (dB) is the metric used to measure light loss). The significant factors that contribute to light loss are: the length of the fiber, the number of splices, and the number of connections. All links are rated for a maximum light loss budget (i.e., the sum of the applicable light loss budget factors must be less than the maximum light loss budget) and a maximum distance (i.e., exceeding the maximum distance will cause undetectable data integrity exposures). Another factor that limits distance is jitter, but this is typically not a problem at these distances.
6. Unless noted, all links are long wavelength (1300 nm) and the link loss budgets and fiber bandwidths should be measured at this wavelength. For planning purposes, the following worst-case values can be used to estimate the total fiber link loss. Refer to the references listed and contact the fiber vendor, if possible, for specific values that may be different for your configuration:

   Link loss at 1300 nm
   = 0.50 db/Km

   Link loss per splice
   = 0.15 db/splice (not dependent on wavelength)

   Link loss per connection
   = 0.50 db/connection (not dependent on wavelength)
7. Deviations from these specifications (longer distances or link budgets) may be possible. They are evaluated on an individual basis by submitting a Request for Price Quote (RPQ) to IBM.
8. * Indicates channels which use short wavelength (850 nm) optics; all link budgets and fiber bandwidths should be measured at this wavelength.
9. ** A Mode Conditioning Patch cable is required for an LX card in a multimode fiber environment.

Connecting a Singlemode OSA-Express Gigabit Ethernet Feature to a Multimode Cable

This section contains instructions for the following IBM Mode Conditioning Patch Cable (MCP) kits:

- 50 micron: PN 21L4172, PN 21L4174
- 62.5 micron: PN21L4173, 21L4175

DO NOT MIX DIFFERENT TYPES OF MULTIMODE FIBER IN THE SAME LINK.

These adapter kits allow the interconnection of a single adapter card used on FICON, Gigabit Ethernet, and other channel types with multimode fiber optic cable. The purpose of these kits is to allow customers to continue using their existing 50 micron or 62.5 micron multimode fiber optic cable at reduced distances with singlemode link adapter cards. There are four versions of these kits; all of the kits are terminated with an SC Duplex connector which plugs into the adapter card, and different female adapter types which attach to the cable plant:

- 50 Micron:
  - PN 21L4172: Terminated with an SC duplex coupler

  - PN 21L4174: Terminated with an ESCON coupler
- 62.5 micron:
  - PN 21L4173: Terminated with an SC duplex coupler
  - PN 21L4175: Terminated with an ESCON coupler

The kits contain the following assembled parts ready to use, plus this instruction page:

- PN 21L4172 MCP kit for attachment to 50 micron SC Duplex cables
  - PN 21L4169 2 meter mode conditioning patch cable
  - PN 54G3381 IBM multimode duplex ST to SC adapter
- PN 21L4174 MCP kit for attachment to 50 micron ESCON cables
  - PN 21L4169 2 meter mode conditioning patch cable
  - PN 73F5419 IBM multimode duplex ST to ESCON adapter
- PN 21L4173 MCP kit for attachment to 62.5 micron SC Duplex cables
  - PN 21L4168 2 meter mode conditioning patch cable
  - PN 54G3381 IBM multimode duplex ST to SC adapter
- PN 21L4175 MCP kit for attachment to 62.5 micron ESCON cables
  - PN 21L4168 2 meter mode conditioning patch cable
  - PN 73F5419 IBM multimode duplex ST to ESCON adapter

The mode conditioning patch cable assembly contains a combination of singlemode and multimode fiber, signified by the yellow and orange cable jackets respectively, and a small box located just behind the SC duplex connector which contains the mode conditioning apparatus. The ST connectors on the mode conditioning patch cables (21L4169) are assembled to the corresponding ″A″ and ″B″ ST ports on the ST-ESCON adapter (73F5419) or the ST-SC adapter (54G3381). **IT IS NOT NECESSARY TO SEPARATE THESE TWO CONNECTIONS IN ORDER TO USE THE ADAPTER KIT.**

To use the adapter kit simply insert the kit between a singlemode optical transceiver receptacle and a multimode cable on both ends of a link. Two kits are required for each duplex link, one at either end. When these kits are used with multimode fiber, the maximum available link distance and link budget will be less than if singlemode fiber had been used. For example, a singlemode FICON link supports a maximum distance of 10 km with a 7 dB link budget; a multimode FICON link using these kits supports a maximum distance of 550 meters with a 5 dB link loss. Be sure to verify that the application you are using supports MCPs at the appropriate distance and link budgets. Maintenance and optical power measurement on links using this adapter kit are described in *Maintenance Information for S/390 Fiber Optic Links*, SY27-2597.

Cabling for Fast Ethernet (FENET) and 1000Base-T Ethernet

You can use the RJ-45 Cabling cabling for (FENET) and 1000Base-T.

FENET: The OSA-Express FENET attaches to the zSeries through the appropriate Ethernet networking equipment to either a 100 Mbps or 10 Mbps Ethernet LAN and operates in either half- or full-duplex mode. A FENET OSA-Express supports auto-negotiation.

Attach an OSA-Express FENET feature using an EIA/TIA category 5 unshielded twisted pair (UTP) cable that does not exceed 100 m (328 ft). Attach the FENET OSA-Express RJ-45 connector to networking equipment that is appropriate for the LAN speed.

1000Base-T: The OSA–Express 1000Base-T Ethernet CHPID must be connected to a compatible link partner, preferably set to auto-negotiate speed and duplex. This CHPID automatically accommodates either MDI or MDI-X connections, which allow you to directly connect two CHPIDs together without using a cross-over cable.

Use twisted pair, RJ-45 network cable type as follows:

- For 1000Base-T (1000 Mbps), use Category 5 or better (must be 4-pair wiring). Make sure you use Category 5 cable that complies with the TIA-568 wiring specification. For more information on this specification, see the Telecommunications Industry Association's web site:

  `www.tiaonline.org`
- For 100Base-TX (100 Mbps), use Category 5 wiring or better.
- For 10Base-T (10 Mbps), use Category 3 wiring or better.

If you use less than 4-pair cabling, you must manually configure the speed and duplex setting of the adapter and the link partner. In addition, with 2- and 3-pair cabling, the adapter can only achieve speeds of up to 100Mbps. If you want to use this adapter in a residential environment at any speed, use Category 5 or better wiring.

If the cable runs between rooms or through walls and ceilings, it should be plenum-rated for fire safety. In all cases the length is limited to 100 meters.

Cabling for Token Ring

Attach the OSA-Express Token Ring (TR) feature using an EIA/TIA category 5 unshielded twisted pair (UTP) cable that does not exceed 100 m (328 ft), or a shielded twisted pair (STP) cable with DB-9 D Shell connector. Attach the OSA-Express to a Token Ring Multistation Access Unit (MAU or MSAU) router or switch that is appropriate for the LAN speed.

Autosensing the LAN speed: At initialization, the OSA-Express Token Ring feature autosenses and conforms to the speed of the token ring (4 Mbps, 16 Mbps, or 100 Mbps) and whether communications are in full- or half-duplex. If no carrier is sensed on the ring, the OSA enters the ring at the speed of its last successful entry.

For half-duplex communications:

- Attach the port to a half duplex 4 Mbps, 16 Mbps, or 100Mbps token ring LAN that conforms to the IEEE 802.5 (ISO/IEC 8802.5) standard.
- Between images (image-to-image data transfer) on the same CPC, either attach this connector to a LAN or cover it with a wrap plug.

  For image-to-image communications, the port must be defined to both images. Port-sharing must be defined for the OSA mode, which is to say access to the port must be defined through OSA/SF to be shared between the two images in this mode.

For full-duplex communications:

- Attach the port via a full-duplex switch, such as the 8270 NWays Token Ring switch, to a 4 Mbps, 16 Mbps, or 100Mbps token ring LAN that conforms to the IEEE 802.5 (ISO/IEC 8802.5) standard.
- image-to-image communications are not supported.
- Set the switch for full duplex communications.

Cabling: Installation-dependent factors determine the cabling requirements for the Token Ring RJ-45 connector to the customer's token ring Multistation Access Unit (MAU or MSAU). The RJ-45 connector supports either a standard shielded twisted pair (STP) cable or an unshielded twisted pair (UTP) cable. For more information on these cables, refer to *Token Ring Network Introduction and Planning Guide,* which is listed in the bibliography (page xiii).

To attach the RJ-45 connector to an alternate connector type, you can use:

- IBM P/N 60G1063 (RJ-45 to ICS data connector)
- IBM P/N 60G1066 (RJ-45 8-pin to a 9-pin subminiature "D" shell receptacle)

Wrap plug: Token Ring wrap plug, P/N 08J5792, is provided.

Appendix B. Examples and Notes from Our Test Team

Although we designed OSA-Express to be as easy to set up as possible, today's information service environments are varied and complex. Because OSA-Express and OSA/SF depend on the correct settings in a number of other software products, we have provided the following descriptions of how we set up certain areas in our test environment in order to get OSA-Express up and running.

The following test subjects are discussed:

- "Primary and Secondary Routing"
- "Multiple Secondary Routes with Dynamic Routing" on page 247
- OSA-Express Fast Ethernet Test Examples
  - "FENET Example 1: Multiple IP Passthru Entries per OAT" on page 251
- OSA-Express Gigabit Ethernet Test Examples
  - "Gigabit Ethernet Example 1: Two TCP/IP Stacks" on page 253
  - "Gigabit Ethernet Example 2: Two images" on page 253
- OSA-Express Token Ring Example
  - "OSA-Express Token Ring Example: QDIO Mode with VIPA and Enterprise Extender" on page 254
- "Priority Queuing" on page 256
- "Sample TCP/IP Profile (IPv4 and IPv6)" on page 261, shows the definitions that are used to test IPv6.

Primary and Secondary Routing

When planning for network availability in a TCP/IP-based network environment, it is important to consider failure at the TCP/IP stack. One safeguard against such failure is the use of primary and secondary routing. You can define your OSA-Express adapters to be primary and secondary routers, thereby ensuring continued data flow and routing of unknown IP data packets.

If an incoming IP address does not match any of the OSA adapter port addresses, the IP data will be sent to the primary network routing path. If the primary path is not functioning, the IP data will be sent to the secondary network routing path. For an OSA-Express adapter, you must use the primary/secondary function to get to an IP address on another LAN.

Note: Although the ability of a defined secondary path to *takeover* and handle IP data is dynamic, any TCP/IP applications running on your workstations or RS/6000s may have to be restarted on these devices, even though the secondary path (route) is automatically enabled and ready to handle the IP traffic.

In our test environment, we set up a simple, basic configuration with static routing to prove the primary/secondary (PRI/SEC) concept. We began with two images in our sysplex, two OSA-Express GbE adapters with shared ports and two RS/6000s (Figure 54 on page 243).

Our test included the following variations on attempted pings between the RS/6000 and the workstation:

- Both images NONRouter (no PRIRouter, no SECRouter)

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- Only PRIRouter S39 (image4) is defined for CHPID F4, while CHPID FC remains NONRouter and S35 (image5) is NONRouter for both CHPIDs
- PRIRouter (S39) is defined for CHPIDs F4 and FC, while S35 is NONRouter for both CHPIDs
- SECRouter (S35) is defined for CHPIDs F4 and FC while PRIRouter (S39) is still defined for both CHPIDs. Bring up TCP/IP on S35 SECRouter and take down TCP/IP on S39 PRI
- Take down the stacks in both images to ensure the two RS/6000s cannot ping to each other

CHPID F4 was on the 7.1 network and CHPID FC was on the 8.1 network. Since the two RS/6000s were not on the same LAN, the only way these two devices could communicate was through the use of PRI/SEC routing on the OSA-Express features.

TCP/IP Profile Statements

We used the following key statements for our test series. Any necessary changes we made are noted for each variation in the test.

S39 Profile – S39PRI

IPCONFIG statement:

```
DATAGRAMFWD
```

ASSORTEDPARMS statement

```
; NOFWD
```

For PRIMARY/SECONDARY to work, you **must** specify DATAGRAMFWD under IPCONFIG **and** you **must not** specify NOFWD under ASSORTEDPARMS. If **both** of these conditions are not met, IP packets will not be forwarded between different networks.

DEVICE and LINK statements:

```
; OSA-Express CHPID F4
  DEVICE GIGPF4 MPCIPA NONRouter
  LINK GIGF4 IPAQGNET GIGPF4

; OSA-Express CHPID FC
  DEVICE GIGPFC MPCIPA NONRouter
  LINK GIGFC IPAQGNET GIGPFC
```

HOME statements:

```
7.1.145.22      GIGF4
8.1.145.26      GIGFC
```

GATEWAY statements:

```
; Network     First hop     Driver     Packet size     Subnet mask     Subnet value

  7.1.1.107   =           GIGFC      1492            host
  8.1.1.108   =           GIGF4      9000            host
```

S35 Profile – S35SEC

IPCONFIG statement:

```
DATAGRAMFWD
```

ASSORTEDPARMS statement

```
; NOFWD
```

DEVICE and LINK statements:

```
; OSA-Express CHPID F4
  DEVICE GIGPF4 MPCIPA NONRouter
  LINK GIGF4 IPAQGNET GIGPF4

; OSA-Express CHPID FC
  DEVICE GIGPFC MPCIPA NONRouter
  LINK GIGFC IPAQGNET GIGPFC
```

HOME statements:

```
7.1.125.22      GIGF4
8.1.125.26     GIGFC
```

GATEWAY statements:

```
; Network     First hop     Driver     Packet size     Subnet mask     Subnet value

  7.1.1.107   =           GIGFC      1492            host
  8.1.1.108   =           GIGF4      9000            host
```

RS/6000 Configurations

RS/6000–1 is configured on the 7.1 network with a static route through 7.1.145.22 (CHPID F4). RS/6000–2 is configured on the 8.1 network with a static route through 8.1.145.26 (CHPID FC).

Table 15. RS/6000s Configured with Static Routing

	RS/6000–1	**RS/6000–2**
IP Address	7.1.1.107	8.1.1.108
Destination	8.1.0.0	7.1.0.0
Gateway	7.1.145.22	8.1.145.26
Network Mask	255.255.0.0	255.255.0.0

Test 1 – No Primary/Secondary Routing

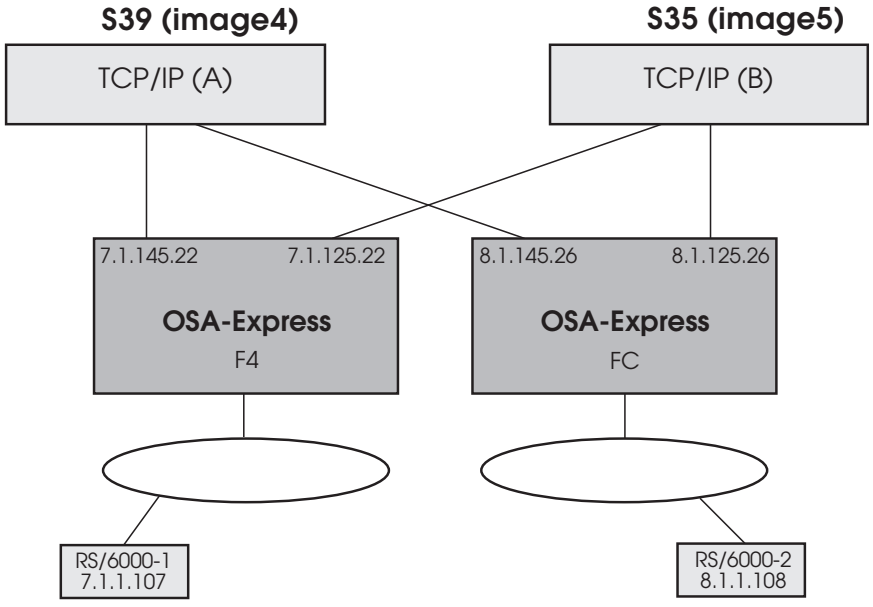

Figure 54. Test Configuration 1 – No Primary/Secondary Routing

From RS/6000–1 at 7.1.1.107, ping RS/6000–2 at 8.1.1.108
This fails because OSA-Express CHPID F4 only knows how to get to its own network, as defined in the S39PRI and S35SEC TCP/IP profiles. F4 does not recognize any 8.1 addresses. Traffic stops at the OSA level (at F4) because there is no path to which unknown IP addresses can be routed.

From RS/6000–2 at 8.1.1.108, ping RS/6000–1 at 7.1.1.107
This fails for the same reason except that it is OSA CHPID FC's inability to recognize any address other than those on its own network. Again, there is no path defined for routing unknown IP addresses.

Test 2 – One CHPID Primary on One image

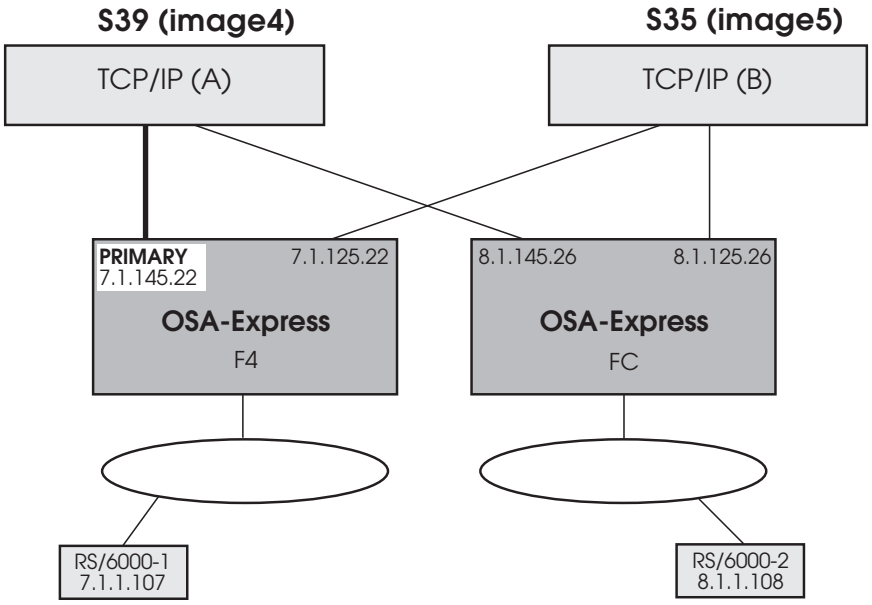

Figure 55. Test Configuration 1 – F4 Primary on S39

We changed the DEVICE and LINK statements for F4 in the TCP/IP profile for S39:

```
; OSA-Express CHPID F4
  DEVICE GIGPF4 MPCIPA PRIRouter
  LINK GIGF4 IPAQGNET GIGPF4
```

S39 (image4) is now managing both CHPIDs F4 and FC. Also, S39 and S35 can see each other's messages on the operator console.

Note: When TCP/IP is started on S39 with OSA/SF running, we saw the following message on our S39 z/OS operator console:

```
IOAK873I CHPID F4 port 0 default entry is image 4 UA C2
```

This message confirms that the (primary) path to image 4 is now the default for CHPID F4. Unit address C2 corresponds to the device number for this datapath in the OSA address table. This message is only displayed on the image where OSA/SF is running and where the CHPID is managed. The secondary image does not display the message if the primary manages the CHPID and fails, nor does the primary display the message when the secondary, or some other image, manages the CHPID.

From RS/6000–1 at 7.1.1.107, ping RS/6000–2 at 8.1.1.108
In this case, we can get to RS/6000–2, but the ping has no path back for the return acknowledgment and FC filters it out. Therefore, the ping fails.

From RS/6000–2 at 8.1.1.108, ping RS/6000–1 at 7.1.1.107
This fails for the same reason described in “Test 1 – No Primary/Secondary Routing” on page 243. OSA CHPID FC knows only the addresses on its own network, and no other path is defined for routing unknown IP addresses.

Test 3 – Two CHPIDs Primary on One image

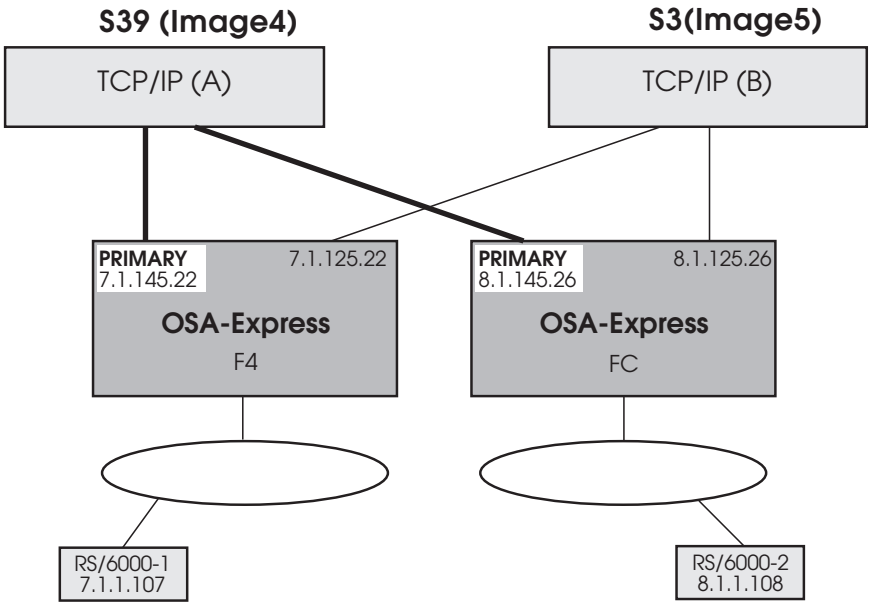

Figure 56. Test Configuration 3 – F4 and FC Primary on S39

We changed the DEVICE and LINK statements for FC in the TCP/IP profile for S39:

```
; OSA-Express CHPID FC
  DEVICE GIGPFC MPCIPA PRIRouter
  LINK GIGFC IPAQGNET GIGPFC
```

Both F4 and FC have PRIRouter in their DEVICE statements in the same S39PRI TCP/IP profile at this point.

Note: When TCP/IP was started on S39 with OSA/SF running, we saw the IOAK873I message on our S39 z/OS operator console for both F4 and FC.

From RS/6000–1 at 7.1.1.107, ping RS/6000–2 at 8.1.1.108
This variation works. Because a primary routing path is defined on both OSAs in the S39 TCP/IP profile, the network now has the ability to route unknown IP addresses. There is now a path to RS/6000–2 and a return path to RS/6000–1 for the acknowledgment.

From RS/6000–2 at 8.1.1.108, ping RS/6000–1 at 7.1.1.107
This now works for the same reason.

Test 4 – Two CHPIDs Primary on One image, Two CHPIDs Secondary on Another image, Fail TCP/IP on One image

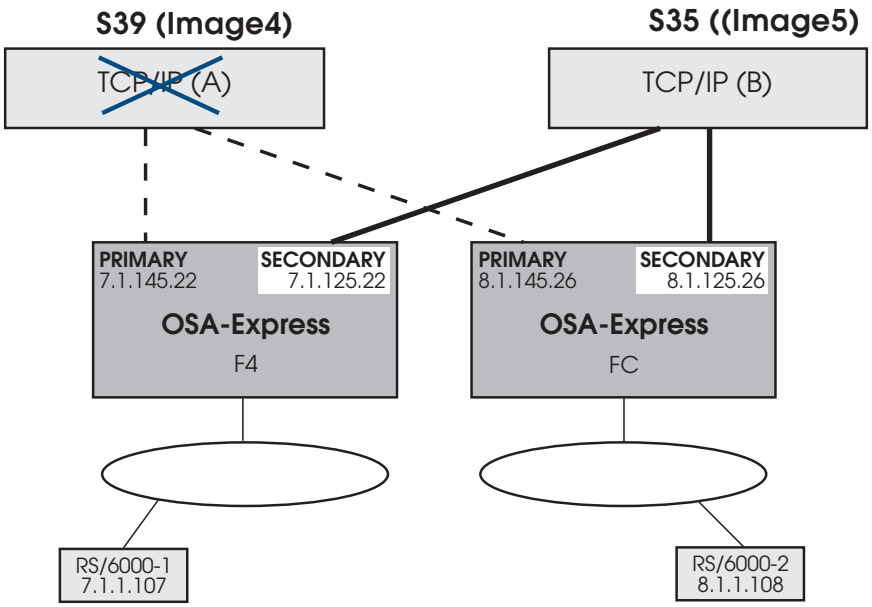

Figure 57. Test Configuration 4 – F4 and FC PRI on S39, F4 and FC SEC on S35, Fail TCP/IP on S39

We changed the DEVICE and LINK statements for F4 and FC in the TCP/IP profiles for S35:

```
; OSA-Express CHPID F4
  DEVICE GIGPF4 MPCIPA SECRouter
  LINK GIGF4 IPAQGNET GIGPF4
; OSA-Express CHPID FC
  DEVICE GIGPFC MPCIPA SECRouter
  LINK GIGFC IPAQGNET GIGPFC
```

Both F4 and FC keep PRIRouter in their DEVICE statements in the S39PRI TCP/IP profile from the previous test. Now we have added SECRouter to their device statements in the S35SEC TCP/IP profile.

Because we used static routing, we had to modify both RS/6000's GATEWAY statements to reflect the SECRouter IP addresses in order to ping. Referring to Table 15 on page 243, RS/6000–1's GATEWAY became 7.1.125.22 and RS/6000–2's became 8.1.125.26.

Notes:

1. After we failed TCP/IP on S39 with TCP/IP started on S35 and OSA/SF running, we saw these IOAK873I messages on our S39 operator console for both F4 and FC.

   ```
   IOAK873I CHPID F4 port 0 default entry is image 5 UA C2
   IOAK873I CHPID FC port 0 default entry is image 5 UA A2
   ```

   Notice the image is now image5 (S35) instead of image4.
2. We also received these IOAK874W messages on S35 because we failed TCP/IP on that image:

   ```
   IOAK874W CHPID F4 port 0 is no longer forwarding unknown packets
   IOAK874W CHPID FC port 0 is no longer forwarding unknown packets
   ```

From RS/6000–1 at 7.1.1.107, ping RS/6000–2 at 8.1.1.108
This works for the same reasons described in “Test 3 – Two CHPIDs Primary on One image” on page 245 with one difference—there is no longer a primary path. Although the primary path has disappeared, the secondary path takes over and routes the IP data, including unknown IP addresses. There is still a complete path available for the acknowledgment from RS/6000–2 back to RS/6000–1.

From RS/6000–2 at 8.1.1.108, ping RS/6000–1 at 7.1.1.107
This works for the same reason.

Test 5 – Two CHPIDs Primary on One Image, Two CHPIDs Secondary on Another Image, Fail TCP/IP on Both Images

We failed TCP/IP on both images and then tried to ping between the two RS/6000s. The pings failed, which is what we expected. We wanted to ensure these two devices could not communicate and that there was no *backdoor* path between them.

Multiple Secondary Routes with Dynamic Routing

The basic test has four unique networks. Our goal is to be able to establish communication between the two workstations on the ″outside″ network. The two routers have no physical connections between them. The routers are running OSPF with two interfaces defined to each. One interface is attached to the OSA-Express CHPID and the other is connected to the ″outside″ network. In our case, this is a Linux workstation.

The workstations have a static route pointing to the router. Once OSPF is running on both routers and all TCP/IP stacks, routing information is exchanged. The z/OS images will contain routing information identifying the ″outside″ networks. A route will be created to the 192.168.105.0 network through the router interface 192.168.103.1. Another route is created to the 192.168.108.0 network through the router interface 192.168.102.3. With the OSA devices defined as primary router all unknown packets will be forwarded up to that TCP/IP stack.

Since OSPF has established routes to the other network , the stack will forward those packets through the other OSA interface to the appropriate router. We now have established connectivity between the two ″outside″ networks. Workstation 192.168.108.180 can ping workstation 192.168.105.106.

Next, we simply take down the primary TCP/IP stack. OSA moves the forwarding of unknown packets to one of the secondary stacks. Those stacks now have the same OSPF routes as the primary. OSPF running on the 2 routers detects the loss of the primary stack and adjusts the routes accordingly. Since we are taking advantage of dynamic routing the workstations do not need to make any route adjustments. Connectivity is reestablished through the secondary stack.

In this case we have two secondary stacks defined. After a secondary stack picks up the routing function, we take that stack down as well. Now another secondary picks up the routing function just as when the primary was taken down.

When the primary stack is made active again, OSA returns the function to that router.

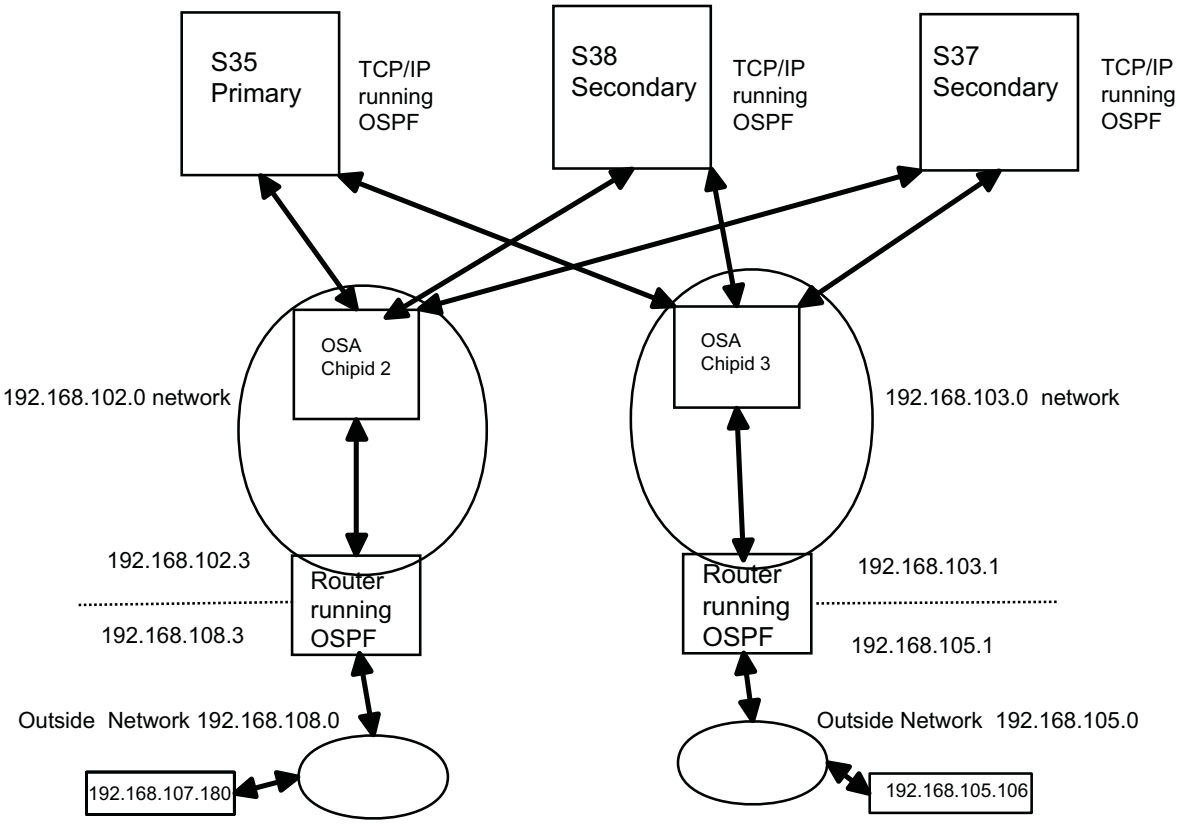

Figure 58. Multiple Secondary Routers

OSPF Configuration

```
; OMPROUTE Configuration file for OSPF
;
;
;  Rules - all parms must end in a semi-colon
;        - mixed case is ok
;
; AREA
;    Sets the OSPF AREA.  If no areas are defined, the router software
;    assumes that all the router's directly attached networks belong to
;    the backbone area (area ID 0.0.0.0)
;
;           Stub Area Definition
; For Totally Stubby Areas, set the following:
;     Area_Number=n.n.n.n
;     Stub_area=YES
;     Import_Summaries=No;
 AREA
   Area_Number=1.1.1.1
   Authentication_Type=None
   Stub_area=YES
   Stub_Default_Cost=5
   Import_Summaries=No;
;
 Comparison=Type2;
;
;OSPF_INTERFACE
;
; s35  OSA chipid 3 interface
```

```
;
OSPF_INTERFACE
   IP_address=192.168.103.235       ; must match tcpip profile
   Name=LNK03                       ; must match tcpip profile
   Subnet_mask=255.255.255.0
   Demand_Circuit=no
   Attaches_To_Area=1.1.1.1
   MTU=1500
   Retransmission_Interval=5
   Transmission_Delay=1
   Router_Priority=1
   Hello_Interval=3                 ; Must be consistent with other
   Dead_Router_Interval=9           ;   routes in the area
   Cost0=3
;
; s35  OSA chipid 2 interface
;
OSPF_INTERFACE
   IP_address=192.168.102.235       ; must match tcpip profile
   Name=LNK02                       ; must match tcpip profile
   Subnet_mask=255.255.255.0
   Demand_Circuit=no
   Attaches_To_Area=1.1.1.1
   MTU=1500
   Retransmission_Interval=5
   Transmission_Delay=1
   Router_Priority=1
   Hello_Interval=3                 ; Must be consistent with other
   Dead_Router_Interval=9           ;   routes in the area
   Cost0=3
;
;    ROUTERID -
;
 RouterID=192.168.102.235
;
 AS_BOUNDARY_ROUTING
    Import_RIP_Routes=No
    Import_Static_Routes=YES
    Import_Direct_Routes=YES
    Import_Subnet_Routes=Yes
    Originate_Default_Route=No
    Originate_as_Type=2
    Default_Route_Cost=1
;
```

Display Routes

```
  MVS TCP/IP onetstat  CS V1R4       TCPIP Name: TCPIP5
  IPv4 Destinations
  Destination          Gateway          Flags     Refcnt   Interface
  -----------          -------          -----     ------   ---------
* Default              192.168.102.3    UGO       000000   LNK02
  127.0.0.1/32         0.0.0.0          UH        000004   LOOPBACK
  192.168.102.0/24     0.0.0.0          UO        000000   LNK02
  192.168.102.235/32   0.0.0.0          UH        000000   LNK02
  192.168.103.0/24     0.0.0.0          UO        000000   LNK03
  192.168.103.235/32   0.0.0.0          UH        000001   LNK03
* 192.168.105.0/24     192.168.103.1    UGO       000000   LNK03
* 192.168.108.0/24     192.168.102.3    UGO       000000   LNK02

These are routes created by OSPF that allow us to complete the
 communication path.
```

TCP/IP Profile

```
* tcpip profile statements for the primary router.

IPCONFIG
  DATAGRAMFWD

ASSORTEDPARMS       ; comment out NOFWD
; NOFWD

Autolog
  opmroute          ; start omproute to run OSPF

; ---------------------------------------------------------------------
;
; Device definitions:
;
; IPv4
;-------------------------------------------
  DEVICE DEV02 MPCIPA PRIRouter ;OSD FEN
  LINK LNK02 IPAQGNET DEV02

  DEVICE DEV03 MPCIPA PRIRouter ;OSD FEN
  LINK LNK03 IPAQGNET DEV03
;
  HOME
  192.168.103.235 LNK03             ;OSD FEN
  192.168.102.235 LNK02             ;OSD FEN
; ---------------------------------------------------------------------

 - no gateway or begingroutes statement needed since OSPF will be
   generating routes


=============================================================================

** tcpip profile statements for one of the secondary primary routers.
   All the other will look the same except the home IP address will be different

IPCONFIG
  DATAGRAMFWD

ASSORTEDPARMS       ; comment out NOFWD
; NOFWD

Autolog
  opmroute          ; start omproute to run OSPF

; ---------------------------------------------------------------------
;
; Device definitions:
;
; IPv4
;-------------------------------------------
  DEVICE DEV02 MPCIPA SecRouter ;OSD FEN
  LINK LNK02 IPAQGNET DEV02

  DEVICE DEV03 MPCIPA SecRouter ;OSD FEN
  LINK LNK03 IPAQGNET DEV03
;
  HOME
  192.168.103.238 LNK03             ;OSD FEN
  192.168.102.238 LNK02             ;OSD FEN
```

```
; -------------------------------------------------------------------

 - no gateway or begingroutes statement needed since OSPF will be
   generating routes
```

OSA-Express Fast Ethernet Examples

FENET Example 1: Multiple IP Passthru Entries per OAT

Defining multiple IP passthru entries for a given OAT is another way of enhancing network availability. We wanted to ensure that a TCP/IP packet could be successfully routed through an alternate IP address in the event of a device failure. Pings were used to determine whether the packets were routed successfully.

For our test we used a simple configuration consisting of:

One image (S30, image17)

Two OSA-Express Fast Ethernet CHPIDs, D8 and EC

One RS/6000 workstation as a client

We configured the environment as shown in Figure 59.

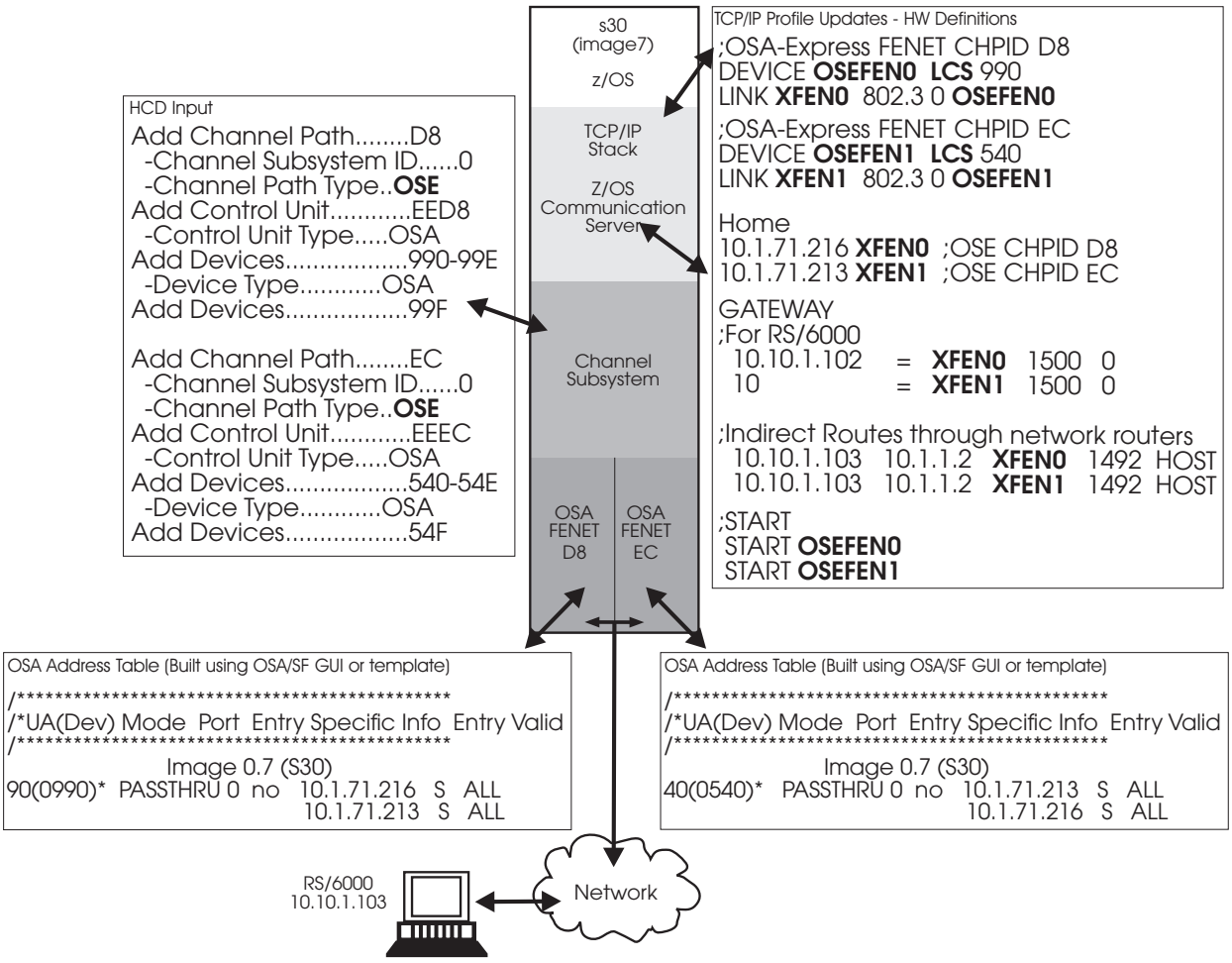

Figure 59. Multiple IP Passthru Entries

We ran this test case two ways:

- We stopped the device with the `vary tcpip,tcpip,stop,xxxxxx` command and then started it again (`vary tcpip,tcpip,start,xxxxxx`). (*xxxxxx* is the DEVICE name as specified in the TCP/IP profile.)
- We pulled the CHPID cable and then reinserted the cable to force the recovery action.

We followed these steps to ensure that the alternate path was used and that TCP/IP ARP takeover occurred.

Note: We used the **arp -a** command to display the arp table on the workstation.

1. We started TCP/IP on S30, using the profile in Figure 59 on page 251.
2. From the workstation, we cleared the arp table to get rid of any residual entries left over from previous testing.
3. We pinged both CHPIDs D8 and EC to verify that the packets were successfully routed. The arp table showed that 10.1.71.216 was associated with D8's MAC, and 10.1.71.213 was associated with EC's MAC address.
4. We issued **v tcpip,tcpip,stop,osefen0** to stop D8. These messages were sent to the operator console and SYSLOG:

   ```
   EZZ0053I COMMAND VARY STOP COMPLETED SUCCESSFULLY
   EZZ4329I LINK XFEN1 HAS TAKEN OVER ARP RESPONSIBILITY FOR INACTIVE LINK XFEN0
   EZZ4315I DEACTIVATION COMPLETE FOR DEVICE XFEN0
   ```

5. We pinged both CHPIDs D8 and EC. The arp table showed that 10.1.71.216 and 10.1.71.213 were both associated with EC's MAC address.
6. We issued **v tcpip,tcpip,start,osefen0** to restart D8. Then we pinged both CHPIDs D8 and EC. The arp table now showed that 10.1.71.216 was associated with D8's MAC address, and 10.1.71.213 was associated with EC's MAC address. These messages were sent to the operator console and SYSLOG:

   ```
   EZZ0053I COMMAND VARY START COMPLETED SUCCESSFULLY
   EZZ4313I INITIALIZATION COMPLETE FOR DEVICE XFEN0
   ```

7. We issued **v tcpip,tcpip,stop,osefen1** to stop EC.
8. We pinged both CHPIDs D8 and EC. The arp table showed both 10.1.71.216 and 10.1.71.213 associated with D8's MAC address.
9. We issued **v tcpip,tcpip,start,osefen1** to restart EC.
10. Now the arp table showed that 10.1.71.216 was associated with D8's MAC address, and 10.1.71.213 was associated with EC's MAC address.

When we pulled the cable, these messages were sent to the operator console and SYSLOG:

```
EZZ4311I LINK XFED8 HAS FAILED ON DEVICE OSEFED8
EZZ4329I LINK XFEN1 HAS TAKEN OVER ARP RESPONSIBILITY FOR INACTIVE LINK XFEN0
EZZ4315I DEACTIVATION COMPLETE FOR DEVICE XFEN0
```

Since we were managing CHPID D8, we also received two additional OSA/SF port alert messages at the operator console, the SYSLOG, and the OSA/SF message log:

```
IOAC252I hh:mm:ss The state of physical port 0 changed on CHPID D8
IOAC260I Physical port 0 reports a loss of signal
```

When we reinserted the cable, these additional port messages were sent to the operator console, the SYSLOG, and the OSA/SF message log:

```
IOAC252I hh:mm:ss The state of physical port 0 changed on CHPID D8
IOAC260I Physical port 0 enabled on CHPID D8
```

Gigabit Ethernet Configuration Examples

Gigabit Ethernet Example 1: Two TCP/IP Stacks

In order to add a second TCP/IP stack, an additional DATAPATH device must be added to the TRLE statement and defined to HCD. Figure 60 shows these additions, including a second TCP/IP Profile update for the new link name and IP address used by the second stack.

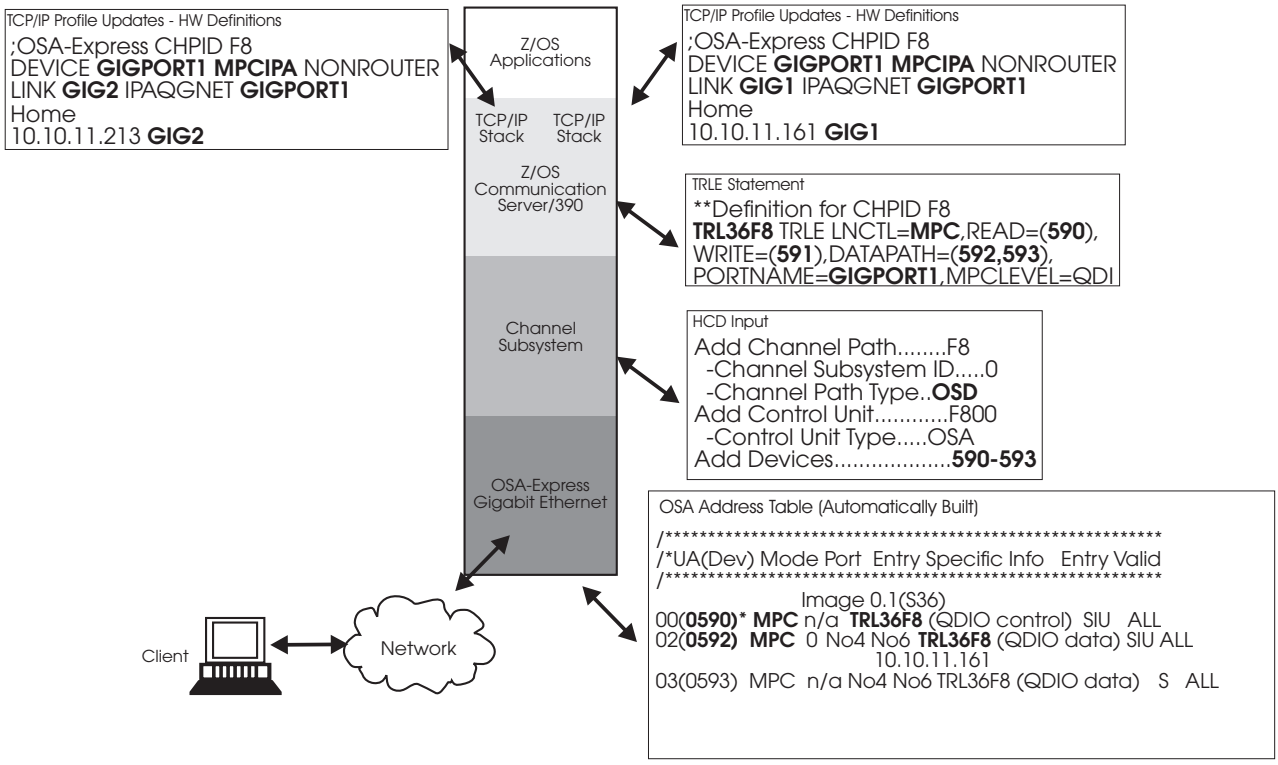

Figure 60. OSA-Express GbE Definitions with Two TCP/IP Stacks

Gigabit Ethernet Example 2: Two images

Figure 61 on page 254 shows an example of the definitions required in the TRLE, TCP/IP Profile, and HCD for an OSA-Express shared between two images.

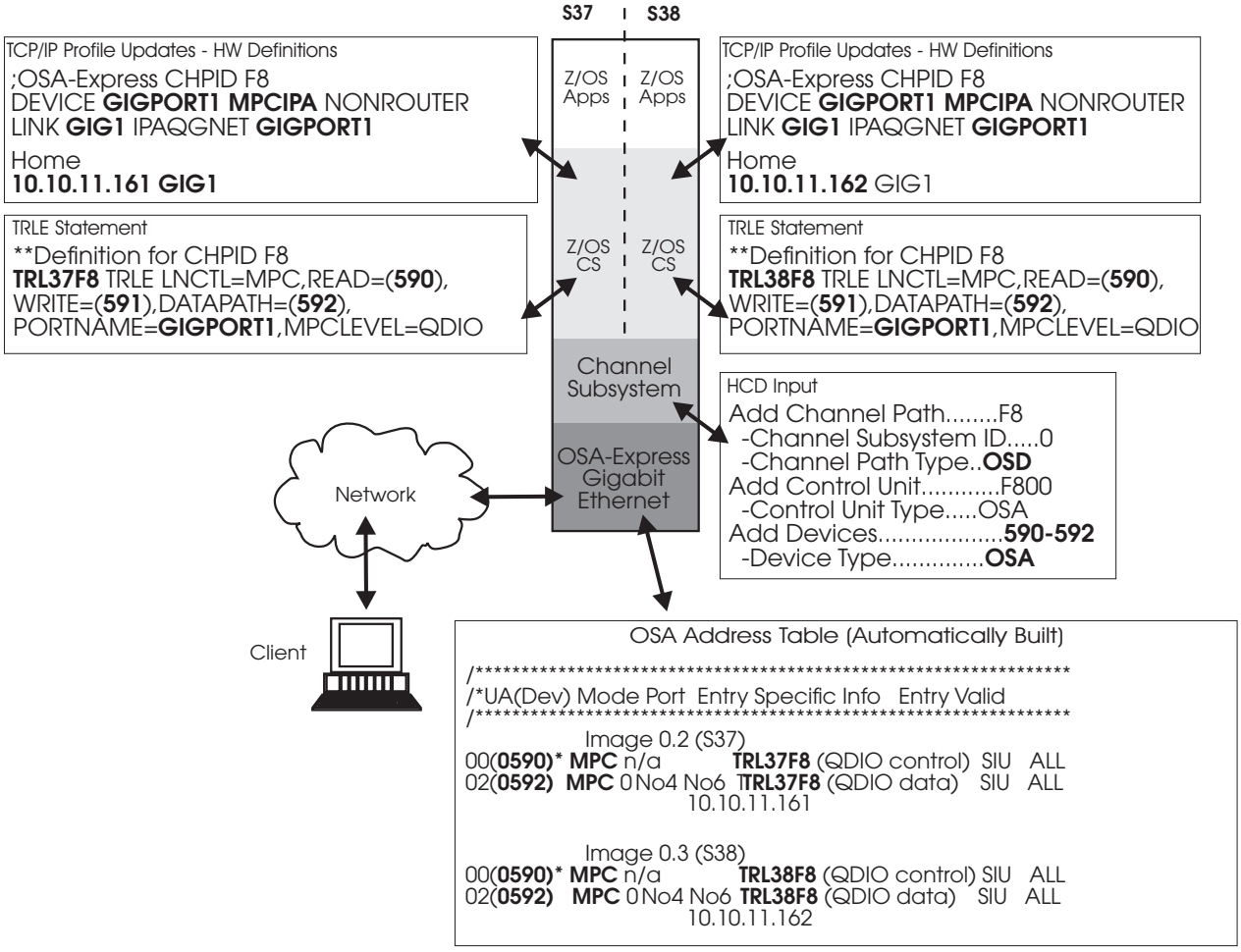

Figure 61. OSA-Express GbE Definitions in LPAR Mode with Two images

In Figure 61, two different home IP addresses are specified in the TCP/IP profile, and two different TRLE statements are defined. Because the operation mode for the OSA channel path is specified as **SHR** in the HCD, both images have access to the READ, WRITE, and DATAPATH devices.

Note that two different OATs are generated, both of which would be returned from a QUERY or a GET OAT command issued from either image.

OSA-Express Token Ring Example: QDIO Mode with VIPA and Enterprise Extender

Enterprise extender allows us to run SNA traffic on the IP network. Using VIPA, we eliminate hardware and transmission media as a single point of failure by configuring the stack to a virtual IP address rather than to the OSA-Express CHPID. Both of these Communications Server functions are defined in the DEVICE, LINK, and HOME statements in the TCP/IP profile. Extra devices must be defined in the TRLE statement as well.

See “Enterprise Extender” on page 17 and “Virtual IP Addressing” on page 16 for brief descriptions. <!--SC31-8775 z/OS Communications Server: IP Configuration Guide-->*z/OS Communications Server: IP Configuration Guide* contains a thorough description and detailed examples of VIPA configuration.<!--SC31-8777 z/OS

Communications Server: SNA Network Implementation Guide-->*z/OS Communications Server: SNA Network Implementation Guide* contains detailed instructions for Enterprise Extender configuration.

We configured the OSA-Express Token Ring feature as shown in Figure 62.

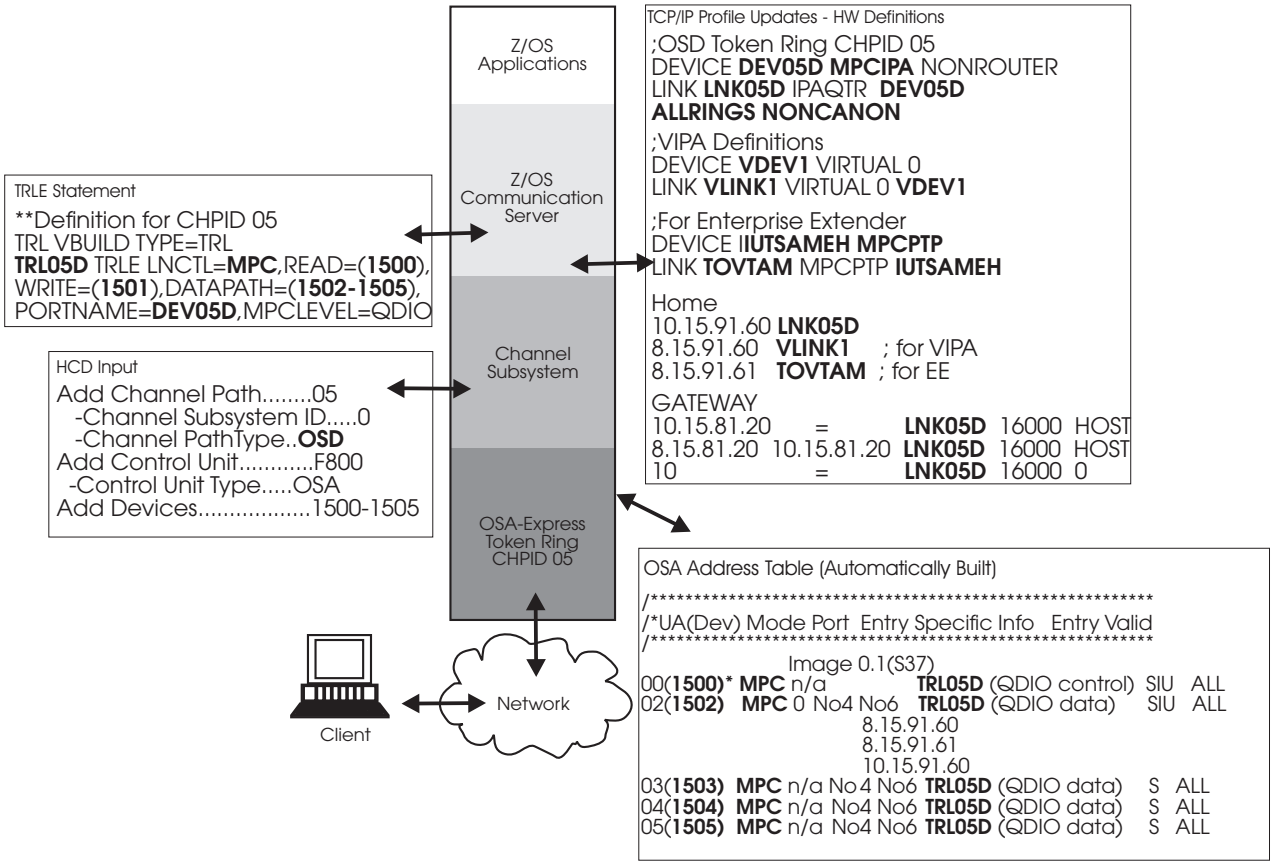

Figure 62. Token Ring QDIO with VIPA and EE

Note that for an OSD (QDIO) OSA-Express Token Ring CHPID, the DEVICE type is **MPCIPA** and the LINK type is **IPAQTR**. To configure an OSE (non-QDIO) OSA-Express Token Ring CHPID, the DEVICE type would be LCS and the LINK type would be IBMTR. For OSE, the OAT would not be automatically built but would require input to the mode configuration procedure described in Chapter 8, “Configuring OSA-Express Modes”, on page 97.

The LINK statement for the IPAQTR link type includes two unique parameters: **ALLRINGsbcast** and **NONCANONical**. These are defaults and need not be explicitly specified. If these defaults are not wanted, you must specify the alternative values: **LOCALBcast** and **CANONical**. “Updating the TCP/IP Profile for QDIO” on page 86 describes these parameters.

The Switched Major Node includes the following definitions with an IP address that corresponds to the GATEWAY statement in the TCP/IP profile.

```
SWTRS36  VBUILD TYPE=SWNET
*          - TO USE THIS SWITCHED MAJOR NODE FOR ANY CHPID, JUST CHANGE
*            THE IP ADDRESS AND THE CPNAME TO MATCH THE IP ADDRESS AND
*            CPNAME USED ON THE image BEING DIALED.
```

```
************************************************************************
*
TOIPS31  PU    ADDR=01,                                                X
               CPCP=YES,                                               X
               HPR=YES,                                                X
               CAPACITY=16M,                                           X
               CPNAME=VTAM31,                                          X
               MAXDATA=256,                                            X
               PUTYPE=2
PTHIPS31 PATH  GRPNM=GPIP,                                             X
               IPADDR=8.15.81.20,                                      X
               SAPADDR=4
```

The image being dialed would have a similar TCPIP Profile and Switched Major node pointing to this image.

The following XCA Major Node is also required for Enterprise Extender (MEDIUM=HPRIP):

```
*  NAME:  XCAIP (XCA MAJOR NODE FOR HPR OVER UDP--ENTERPRISE EXTENDER)
XCAIP    VBUILD TYPE=XCA
PORTIP   PORT  MEDIUM=HPRIP,SAPADDR=4
GPIP     GROUP DIAL=YES,ANSWER=ON,ISTATUS=ACTIVE,CALL=INOUT
LNIP1    LINE
PIP1     PU
          |
          |
LNIPx    LINE
PIPx      PU
```

Priority Queuing

z/OS Communication Server and OSA-Express provide a function for QDIO devices that assigns a priority value to each outbound datagram and attempts to provide preferential service to the higher priority data. CS for z/OS supports four priority values (1-4) for outbound QDIO traffic (with 1 being the highest priority). TCP/IP uses the first three bits of the type-of-service (TOS) byte in the IP header to determine the outbound priority value for a given datagram. The default mapping of TOS values to priorities is:

TOS Setting	Priority
111	1
110	1
101	1
100	1
011	2
010	3
001	4
000	4

As the following discussion shows, you can use the z/OS UNIX Service Policy Agent to override the default mapping of TOS values to priorities.

To set up a TCP/IP Service Policy for Service Differentiation functions, we first ensured that the correct file system was available. Having determined that the HFS was mounted, we were now able to run PAGENT, the z/OS UNIX System Services Policy Agent. But activating the Policy Agent without setting any priorities makes no

sense, so we had to find out how priorities are set. We turned to *z/OS Communications Server: IP Configuration* for information. That publication contains an entire chapter devoted to configuring Service Policy.

An initial policy configuration file is required to start PAGENT. Although a sample is provided, the default settings are of no use, so we built an initial configuration file by copying the sample file located at **/usr/lpp/tcpip/samples/pagent.conf** to location **/tmp/pagent.conf**. Since this configuration file was copied to a subdirectory of root, it may be lost if the z/OS driver is changed. You may wish to store your configuration file in a directory that will not be lost should the driver change, or in a partitioned data set from which they can be restored.

Customize the configuration file to suit your environment. For our test runs, we modified the file in the following ways.

SetSubnetPrioTosMask Statement

This statement defines the TOS/priority field in the IP header type of service byte. It is used by the TCP/IP stack to read the TOS value and assign appropriate service to the corresponding IP packets. If this statement is not specified, TCP/IP will use the system default TOS mask and priority levels for all interfaces currently defined for IPv4.

```
SetSubnetPrioTosMask
{
   SubnetAddr         10.10.11.161  # CHPID F0
   SubnetTosMask      11100000
   PriorityTosMapping 1 11100000
   PriorityTosMapping 1 11000000
   PriorityTosMapping 2 10100000
   PriorityTosMapping 2 10000000
   PriorityTosMapping 3 01100000
   PriorityTosMapping 3 01000000
   PriorityTosMapping 4 00100000
   PriorityTosMapping 4 00000000
}
```

As you can see, the sample configuration file allows eight separate TOS setting identifiers, with the user controlling the assignment of priority level. We used only five TOS settings, two for priority 1 and the first one for each subsequent priority: 11100000, 11000000, 10100000, 01100000, and 00100000.

ServiceCategories Statements

This statement specifies the type of service that a flow of IP packets (for example, from a TCP connection, or UDP data) should receive end-to-end as it traverses the network. ServiceCategories can be repeated with each having a different name so that they can be referenced later.

```
ServiceCategories   inter1
{
             PolicyScope    DataTraffic
             Priority       1
             Interface      10.10.11.161

             OutgoingTOS    11100000
}

 ServiceCategories   inter2
{            PolicyScope    DataTraffic
             Priority       1
             Interface      10.10.11.161

             OutgoingTOS    11000000
}

ServiceCategories   ftp1
{
             PolicyScope    DataTraffic
             MaxRate        100000

             MinRate        10000
             MaxTokenBucket 10000
             Priority       2
             Interface      10.10.11.161

             OutgoingTOS    10100000

}

ServiceCategories   stream1
```

```
{                          #
             PolicyScope    DataTraffic
             MaxRate        100000

             MinRate        10000
             MaxTokenBucket 10000
             Priority       1
             Interface      10.10.11.161

             OutgoingTOS    01100000

}

ServiceCategories   batch1
{
             PolicyScope    DataTraffic
             Priority       4
             Interface      10.10.11.161

             OutgoingTOS    00100000

}
```

We included one ServiceCategories statement for each TOS setting we planned to use in this configuration. Although we left them in the configuration file, the default service categories for the three TOS settings we didn't use are not shown.

ServicePolicyRules Statements

This statement specifies the characteristics of IP packets that are used to match to a corresponding service category. In other words, it defines a set of IP datagrams that should receive a particular service.

```
ServicePolicyRules  netrule1
{
     PolicyScope        DataTraffic
     Direction          Both
     Permission         Allowed
     ProtocolNumber     6         # tcp
     SourcePortRange    2121 2140
     ServiceReference   inter1
}

ServicePolicyRules  netrule2
{
     PolicyScope        DataTraffic
     Direction          Both
     Permission         Allowed
     ProtocolNumber     6         # tcp
     SourcePortRange    2141 2160
     ServiceReference   ftp1
}

ServicePolicyRules  netrule3
{
     PolicyScope        DataTraffic
     Direction          Both
     Permission         Allowed
     ProtocolNumber     6         # tcp
     SourcePortRange    2161 2180
     ServiceReference   stream1
}

ServicePolicyRules  netrule4
{
```

```
     PolicyScope        DataTraffic
     Direction          Both
     Permission         Allowed
     ProtocolNumber     6         # tcp
     SourcePortRange    2181 2190
     ServiceReference   batch1
}

ServicePolicyRules  rule2
{
     PolicyScope        DataTraffic
     Direction          Outgoing
     Permission         Allowed
     ProtocolNumber     1         # ping
     ServiceReference   inter2
}
```

For our tests, the SourcePortRange was especially meaningful since our application differentiated traffic on the basis of this parameter. It allowed us to control the priority of our traffic using the port designation in each iteration of the application.

As these statements show, we set SourcePortRanges for netrules 1 through 4, and used rule2 to set a priority for *ping* traffic. Thus, our configuration file settings can be summarized as follows:

Priority	TOS Setting	Service Category	ServicePolicyRule	Protocol	Port Range
1	11100000	inter1	netrule1	#6 tcp	2121-2140
1	11000000	inter2	rule2	#1 ping	
2	10100000	ftp1	netrule2	#6 tcp	2141-2160
2	10000000	ftp2			
3	01100000	stream1	netrule3	#6 tcp	2161-2180
3	01000000	stream2			
4	00100000	batch1	netrule4	#6 tcp	2181-2190
4	00000000	batch2			

Empty cells indicate unused settings.

With a customized configuration file installed, you can now start PAGENT. The pagent command is located in the **/usr/lpp/tcpip/sbin** directory, which should be in your path. Include the configuration file's path in your command as well:

```
pagent -c /tmp/pagent.conf
```

You should verify that the agent successfully started by browsing the **/tmp/pagent.log** file to ensure that only informational messages were generated. You can also specify the **–d** flag with the pagent command to display startup progress.

Once the agent is running you can begin TCP/IP transmissions that correspond to the setting in your policy configuration file.

As priority queuing is designed, any traffic assigned priority 1 is transmitted from the TCP/IP stack as soon as it is received. In order to improve throughput, priorities 2 through 4 may be held for millisecond periods to allow blocking of Maximum Transfer Units (datagrams) before being transmitted, in priority order. If the link is

not saturated, the priority scheme may have little impact on your traffic. In that case all traffic is– released as soon as it is received, effectively on a first comefirst served basis. This makes it difficult to predict how fast one application may transmit data relative to another.

VLAN Priority Tagging

To test this function we updated the service policy agent data set to modify the SetSubnetPrioTosMask statement by adding VLAN tags . See “Priority Queuing” on page 256 for more about the service policy agent.

```
SetSubnetPrioTosMask
{
   SubnetAddr         10.10.11.161  # CHPID F0
   SubnetTosMask      11100000
   PriorityTosMapping 1 11100000 4
   PriorityTosMapping 1 11000000 4
   PriorityTosMapping 2 10100000 3
   PriorityTosMapping 2 10000000 3
   PriorityTosMapping 3 01100000 2
   PriorityTosMapping 3 01000000 2
   PriorityTosMapping 4 00100000 1
   PriorityTosMapping 4 00000000 1
}
```

The VLAN tags (shown in bold) set the Virtual LAN priority. Higher numbers indicate higher priority. In this way we set the VLAN priority to match the existing TOS priority, which assigns higher priority to lower numbers. Thus, traffic with highest TOS priority, 1, was also assigned the highest VLAN priority, 4. No other modifications were required.

Once the policy agent was invoked and traffic was run, we were able to verify that each packet contained an additional packet right after the Ethernet header. This was the 802.1Q packet reflecting the VLAN priorities set in the service policy agent data set.

Refer to <!--SC31-8775 z/OS Communications Server: IP Configuration Guide-->*z/OS Communications Server: IP Configuration Guide* for more information.

Sample TCP/IP Profile (IPv4 and IPv6)

This profile was used to test IPv6 and includes the INTERFace definition statement unique to IPv6.

```
; Device definitions:
;
; IPv4
;--------------------------------------------
;  VIPA definitions
  DEVICE VDEV1  VIRTUAL 0
  LINK   VLINK1 VIRTUAL 0 VDEV1
; Gigabit CHPID 02
  DEVICE DEV02 MPCIPA NONRouter ;GbE
  LINK LNK02 IPAQGNET DEV02
; For Enterprise Extender
  DEVICE IUTSAMEH MPCPTP
  LINK TOVTAM MPCPTP IUTSAMEH
;--------------------------------------------
; IPv6
;--------------------------------------------
; DEVICE DEV02 MPCIPA NONR
  INTERFACE LNK02V6 DEFINE IPAQENET6 PORTNAME DEV02
```

Test Examples

```
; SOURCEVIPAINT LV6VIPA1
  IPADDR FEC0:0:0:1::3302
         FEC0:0:0:1001::3302
         2020:10:10:141::30
         FEC0:0:0:1::/64
;-----------------------------------------
;
; IPv4 HOME Internet addresses of each link in the host.
;
;
  HOME
  8.10.141.120   VLINK1            ;Static VIPA for EE
  8.10.141.121   TOVTAM            ;Enterprise Extender
  10.10.141.30   LNK02             ;GbE
;
; ------------------------------------------------------------------------
; STATIC ROUTING FOR IPv4 and IPv6 ADDRs
;
BEGINROUTES
  ROUTE FE80::0/10 = LNK02V6 MTU 8992
  ROUTE FEC0::0/10 = LNK02V6 MTU 8992
  ROUTE 2020::0/16 = LNK02V6 MTU 8992
  ROUTE DEFAULT6 2020:10:10:141::165 LNK02V6 MTU 1500
  ROUTE 10.10.41.40 HOST = LNK02 MTU 8992
  ROUTE 8.10.41.120 HOST 10.10.41.40 LNK02 MTU 8992
  ROUTE 10.10.0.0/16 = LNK02   MTU 8992
  ROUTE DEFAULT 10.10.141.165 LNK02 MTU 1500
ENDROUTES
.
.
.
START DEV02
 START LNK02V6
 START IUTSAMEH
```

Appendix C. OSA-Express Function/Mode Summary

The following tables summarize the capabilities and functional limits of each OSA-Express feature type for the z990 pocessor.. To determine your OSA licensed internal code (LIC) level for OS/390 or z/OS, issue `D NET,TRL,TRLE=`*`trle statement name`* when TCP/IP is active. (You can also use the OSA/SF GUI to obtain the same information from the options menu bar on the main window.) For information about licensed internal code upgrades, contact your IBM service representative.

Table 16. OSA-Express LAN-Channel Type Matrix

Channel Type	OSA-Express Feature	Available
OSE	**Fast Ethernet**	x
	1000Base-T	x
	Token Ring	x
OSD	**Fast Ethernet**	x
	1000Base-T	x
	Token Ring	x
	Gigabit SX	x
	Gigabit LX	x

Table 17. OSA-Express Function-Channel Type Matrix (for OSE)

OSA-Express Function	Available
IPv4	x
Broadcast	x
Multicast	x
VIPA	x
SNMP (via OSA/SF)	x
SNA	x

Table 18. OSA-Express Function-Channel Type Matrix (for OSD)

OSA-Express Function	Available
IPv4	x
IPv6 (ethernet only)	x
VLAN (priority tagging - Ethernet only)	x
VLAN (full - Ethernet only)	x
ARP Query	x
ARP Purge	x
Broadcast	x
Multicast	x
SNMP (via OSA/SF)	x
SNMP (direct - QDIO only)	x
VIPA	x
Primary/Secondary Routers	x

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Table 18. OSA-Express Function-Channel Type Matrix (for OSD) (continued)

OSA-Express Function	Available
Multiple Secondary Routers (QDIO Ethernet only)	x

Table 19. OSA-Express Functional Limits

OSA-Express Functional Limits		Number
IP	**Home IPs (IPv4+IPv6)**	2,048
	ARP Table Size *	8,192
	Multicast Addresses (IPv4 + IPv6)	1,024
	# PUs	4,096
OSE	**# Devices**	240
	# IP Stacks	120
OSD	**# Devices**	480
	# IP Stacks	160
VLANs	**LINUX**	4,096

* Note: The capacity of the ARP Table limits the sum of the IPv4 Home Addresses, plus the IPv6 Home Addresses, plus the IPv4 Multicast Addresses, plus the IPv6 Multicast Addresses, and plus the IPv4 Remote Addresses stored in the table.

Table 20. OSA-Express Feature-LAN Transmission Matrix

OSA-Express Feature	Auto Sense	Auto Negotiate	Operating Mode	Frame Size
Gigabit Ethernet	NO	YES	full duplex	802.3: 1492 DIX: 1492 jumbo: 8992
Fast Ethernet	NO	YES	full duplex half duplex	802.3 1492 DIX: 1492
1000Base-T	NO	YES	full duplex half duplex (for 100 or 10 Mb/ps only)	802.3 1492 DIX: 1492 1000 Mbs QDIO Jumbo: 8992 1000 Mbs non-QDIO Jumbo: not supported
Token Ring	YES	NO	4Mbps: full/half duplex 16Mbps: full/half duplex 100Mbps: full duplex	Frame size: 4 Mbps: 4550 16/100 Mbps: 18200

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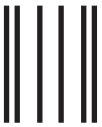

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