

z/OS Communications Server



SNA Migration

Version 1 Release 4

z/OS Communications Server



SNA Migration

Version 1 Release 4

Note:

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 119.

Third Edition (September 2002)

This edition applies to Version 1 Release 4 of z/OS (5694-A01) and Version 1 Release 4 of z/OS.e (5655-G52) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this document

The purpose of this document is to describe the migration considerations for the SNA component of z/OS™ Version 1 Release 4 Communications Server (z/OS CS), including the migration considerations from the following earlier releases of Communications Server:

- z/OS Communications Server V1R2
- z/OS Communications Server V1R1
- Communications Server for OS/390® V2R10

It is strongly recommended that you read *z/OS and z/OS.e Planning for Installation* in conjunction with this document. For an overview and map of the documentation available for z/OS, refer to the *z/OS Information Roadmap*.

For an overview of the IP component of z/OS V1R4 Communications Server, refer to *z/OS Communications Server: IP Migration*.

This document supports z/OS.e™.

Who should use this document

This document is designed for planners, system programmers, and network administrators who are planning to install z/OS V1R4 Communications Server and who want to learn more about its new and enhanced features.

Before using this document, you should be familiar with the basic concepts of telecommunication, SNA and VTAM®, and with the version and release you are upgrading.

How to use this document

Depending on the version and release you are upgrading, you need read only certain chapters in this document. Table 1 on page xii helps you determine the chapters you need to read.

See Chapter 1, “z/OS V1R4 Communications Server release summary” on page 1; it provides the following information for each new function and enhancement introduced in z/OS V1R4 Communications Server:

- A description of the function or enhancement
- Restrictions, if any, associated with using the function
- Migration procedures
- A list of new and changed user interfaces required

This document also presents information for upgrading the following levels of product to z/OS V1R4 Communications Server:

- z/OS Communications Server V1R2
- Communications Server for OS/390 V2R10

Note: The tasks for migrating from z/OS V1R1 Communications Server are the same tasks as migrating from Communications Server for OS/390 V2R10. z/OS CS did not ship new function for V1R3.

Table 1. How to determine chapters you need to read

To upgrade this version and release	Read the following chapters
z/OS V1R2 Communications Server	<p>Chapter 1, “z/OS V1R4 Communications Server release summary” on page 1</p> <p>Chapter 3, “Upgrading z/OS V1R2 Communications Server to z/OS V1R4 Communications Server” on page 25</p> <p>Chapter 6, “Post-installation considerations for z/OS V1R4 Communications Server” on page 47.</p>
z/OS V1R1 Communications Server	<p>The tasks for migrating from z/OS V1R1 Communications Server are the same tasks as migrating from Communications Server for OS/390 V2R10; read these chapters:</p> <p>Chapter 1, “z/OS V1R4 Communications Server release summary” on page 1</p> <p>Chapter 5, “Upgrading Communications Server for OS/390 V2R10 to z/OS V1R4 Communications Server” on page 35</p> <p>Chapter 6, “Post-installation considerations for z/OS V1R4 Communications Server” on page 47.</p>
Communications Server for OS/390 V2R10	<p>Chapter 1, “z/OS V1R4 Communications Server release summary” on page 1</p> <p>Chapter 5, “Upgrading Communications Server for OS/390 V2R10 to z/OS V1R4 Communications Server” on page 35</p> <p>Chapter 6, “Post-installation considerations for z/OS V1R4 Communications Server” on page 47</p>

How this document is organized

This document contains the following chapters and appendixes.

- Chapter 1, “z/OS V1R4 Communications Server release summary” on page 1 describes each new function and enhancement introduced in z/OS V1R4 Communications Server.
- Chapter 2, “Upgrading z/OS V1R3 Communications Server to z/OS V1R4 Communications Server” on page 23 informs you that no function was shipped for V1R3 in z/OS CS.
- Chapter 3, “Upgrading z/OS V1R2 Communications Server to z/OS V1R4 Communications Server” on page 25 explains the changes you need to make to z/OS V1R2 Communications Server user interfaces before implementing the functions and enhancements available in z/OS V1R4 Communications Server.
- Chapter 4, “Upgrading z/OS V1R1 Communications Server to z/OS V1R4 Communications Server” on page 33 informs you that z/OS V1R1 Communications Server is identical in function to Communications Server for OS/390 V2R10.
- Chapter 5, “Upgrading Communications Server for OS/390 V2R10 to z/OS V1R4 Communications Server” on page 35 explains the changes you need to make to Communications Server for OS/390 V2R10 user interfaces before implementing the functions and enhancements available in z/OS V1R4 Communications Server.
- Chapter 6, “Post-installation considerations for z/OS V1R4 Communications Server” on page 47 describes post-installation considerations.

- Appendix A, “z/OS V1R2 Communications Server release summary” on page 73 describes each new function and enhancement introduced in z/OS V1R2 Communications Server. It is included here for reference purposes.
- Appendix B, “Storage estimate worksheets” on page 103 describes how to estimate the virtual storage required to run z/OS V1R4 Communications Server on the z/OS operating system.
- Appendix C, “Architectural specifications” on page 111 lists documents that provide architectural specifications for the SNA Protocol.
- Appendix D, “Information APARs” on page 113 lists information apars for IP and SNA documents.
- Appendix E, “Accessibility” on page 117 helps a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully.
- “Communicating Your Comments to IBM” on page 129 tells you how to convey your comments to IBM.
- “Notices” on page 119 contains notices and trademarks used in this document.

This document also includes an index.

Where to find more information

This section contains:

- Pointers to information available on the Internet
- Information about licensed documentation
- Information about LookAt, the online message tool
- A set of tables that describes the documents in the z/OS Communications Server (z/OS CS) library, along with related publications

Where to find related information on the Internet

z/OS

- <http://www.ibm.com/servers/eserver/zseries/zos/>

z/OS Internet Library

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

IBM Communications Server product

- <http://www.software.ibm.com/network/commserver/>

IBM Communications Server product support

- <http://www.software.ibm.com/network/commserver/support/>

IBM Systems Center publications

- <http://www.redbooks.ibm.com/>

IBM Systems Center flashes

- <http://www-1.ibm.com/support/techdocs/atstvastr.nsf>

RFCs

- <http://www.ietf.org/rfc.html>

RFC drafts

- <http://www.ietf.org/ID.html>

Information about Web addresses can also be found in information APAR I111334.

DNS web sites

For more information about DNS, see the following USENET news groups and mailing:

USENET news groups:

comp.protocols.dns.bind

For BIND mailing lists, see:

- <http://www.isc.org/ml-archives/>
 - BIND Users
 - Subscribe by sending mail to bind-users-request@isc.org.
 - Submit questions or answers to this forum by sending mail to bind-users@isc.org.
 - BIND 9 Users (Note: This list may not be maintained indefinitely.)
 - Subscribe by sending mail to bind9-users-request@isc.org.
 - Submit questions or answers to this forum by sending mail to bind9-users@isc.org.

For definitions of the terms and abbreviations used in this document, you can view or download the latest *IBM Glossary of Computing Terms* at the following Web address:

<http://www.ibm.com/ibm/terminology>

Note: Any pointers in this publication to Web sites are provided for convenience only and do not in any manner serve as an endorsement of these Web sites.

Accessing z/OS licensed documents on the Internet

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

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

Licensed documents are available only to customers with a z/OS license. Access to these documents requires an IBM Resource Link user ID and password, and a key code. With your z/OS order you received a Memo to Licensees, (GI10-0671), that includes this key code.

To obtain your IBM Resource Link user ID and password, log on to:

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

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

1. Sign in to Resource Link using your Resource Link user ID and password.
2. Select **User Profiles** located on the left-hand navigation bar.

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

Printed licensed documents are not available from IBM.

You can use the PDF format on either **z/OS Licensed Product Library CD-ROM** or IBM Resource Link to print licensed documents.

Using LookAt to look up message explanations

LookAt is an online facility that allows you to 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 where you can access a TSO/E command line (for example, TSO/E prompt, ISPF, z/OS UNIX System Services running OMVS). You can also download code from the *z/OS Collection* (SK3T-4269) and the LookAt Web site that will allow you to access LookAt from a handheld computer (Palm Pilot VIIx suggested).

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 **News** section on the LookAt Web site.

Some messages have information in more than one document. For those messages, LookAt displays a list of documents in which the message appears.

How to contact IBM service

For immediate assistance, visit this Web site:

<http://www.software.ibm.com/network/commserver/support/>

Most problems can be resolved at this Web site, where you can submit questions and problem reports electronically, as well as access a variety of diagnosis information.

For telephone assistance in problem diagnosis and resolution (in the United States or Puerto Rico), call the IBM Software Support Center anytime (1-800-237-5511). You will receive a return call within 8 business hours (Monday – Friday, 8:00 a.m. – 5:00 p.m., local customer time).

Outside of the United States or Puerto Rico, contact your local IBM representative or your authorized IBM supplier.

If you would like to provide feedback on this publication, see “Communicating Your Comments to IBM” on page 129.

z/OS Communications Server information

This section contains descriptions of the documents in the z/OS Communications Server library.

z/OS Communications Server publications are available:

- Online at the z/OS Internet Library web page at <http://www.ibm.com/servers/eserver/zseries/zos/bkserv>
- In softcopy on CD-ROM collections.

Softcopy information

Softcopy publications are available in the following collections:

Titles	Order Number	Description
<i>z/OS V1R4 Collection</i>	SK3T-4269	This is the CD collection shipped with the z/OS product. It includes the libraries for z/OS V1R4, in both BookManager® and PDF formats.
<i>z/OS Software Products Collection</i>	SK3T-4270	This CD includes, in both BookManager and PDF formats, the libraries of z/OS software products that run on z/OS but are not elements and features, as well as the <i>Getting Started with Parallel Sysplex®</i> bookshelf.
<i>z/OS V1R4 and Software Products DVD Collection</i>	SK3T-4271	This collection includes the libraries of z/OS (the element and feature libraries) and the libraries for z/OS software products in both BookManager and PDF format. This collection combines SK3T-4269 and SK3T-4270.
<i>z/OS Licensed Product Library</i>	SK3T-4307	This CD includes the licensed documents in both BookManager and PDF format.
<i>System Center Publication IBM S/390® Redbooks™ Collection</i>	SK2T-2177	This collection contains over 300 ITSO redbooks that apply to the S/390 platform and to host networking arranged into subject bookshelves.

z/OS Communications Server library

z/OS V1R4 Communications Server documents are available on the CD-ROM accompanying z/OS (SK3T-4269 or SK3T-4307). Unlicensed documents can be viewed at the z/OS Internet library site.

Updates to documents are available on RETAIN® and in information APARs (info APARs). See Appendix D, “Information APARs” on page 113 for a list of the documents and the info APARs associated with them.

- Info APARs for OS/390 documents are in the document called *OS/390 DOC APAR and PTF ++HOLD Documentation* which can be found at http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/BOOKS/IDDOCMST/CCONTENTS.
- Info APARs for z/OS documents are in the document called *z/OS and z/OS.e DOC APAR and PTF ++HOLD Documentation* which can be found at http://publibz.boulder.ibm.com:80/cgi-bin/bookmgr_OS390/BOOKS/ZIDOCMST/CCONTENTS.

Planning and migration:

Title	Number	Description
<i>z/OS Communications Server: SNA Migration</i>	GC31-8774	This document is intended to help you plan for SNA, whether you are migrating from a previous version or installing SNA for the first time. This document also identifies the optional and required modifications needed to enable you to use the enhanced functions provided with SNA.
<i>z/OS Communications Server: IP Migration</i>	GC31-8773	This document is intended to help you plan for TCP/IP Services, whether you are migrating from a previous version or installing IP for the first time. This document also identifies the optional and required modifications needed to enable you to use the enhanced functions provided with TCP/IP Services.
<i>z/OS Communications Server: IPv6 Network and Application Design Guide</i>	SC31-8885	This document is a high-level introduction to IPv6. It describes concepts of z/OS Communications Server’s support of IPv6, coexistence with IPv4, and migration issues.

Resource definition, configuration, and tuning:

Title	Number	Description
<i>z/OS Communications Server: IP Configuration Guide</i>	SC31-8775	This document describes the major concepts involved in understanding and configuring an IP network. Familiarity with the z/OS operating system, IP protocols, z/OS UNIX [®] System Services, and IBM Time Sharing Option (TSO) is recommended. Use this document in conjunction with the <i>z/OS Communications Server: IP Configuration Reference</i> .
<i>z/OS Communications Server: IP Configuration Reference</i>	SC31-8776	This document presents information for people who want to administer and maintain IP. Use this document in conjunction with the <i>z/OS Communications Server: IP Configuration Guide</i> . The information in this document includes: <ul style="list-style-type: none"> • TCP/IP configuration data sets • Configuration statements • Translation tables • SMF records • Protocol number and port assignments
<i>z/OS Communications Server: SNA Network Implementation Guide</i>	SC31-8777	This document presents the major concepts involved in implementing an SNA network. Use this document in conjunction with the <i>z/OS Communications Server: SNA Resource Definition Reference</i> .
<i>z/OS Communications Server: SNA Resource Definition Reference</i>	SC31-8778	This document describes each SNA definition statement, start option, and macroinstruction for user tables. It also describes NCP definition statements that affect SNA. Use this document in conjunction with the <i>z/OS Communications Server: SNA Network Implementation Guide</i> .
<i>z/OS Communications Server: SNA Resource Definition Samples</i>	SC31-8836	This document contains sample definitions to help you implement SNA functions in your networks, and includes sample major node definitions.
<i>z/OS Communications Server: AnyNet SNA over TCP/IP</i>	SC31-8832	This guide provides information to help you install, configure, use, and diagnose SNA over TCP/IP.
<i>z/OS Communications Server: AnyNet Sockets over SNA</i>	SC31-8831	This guide provides information to help you install, configure, use, and diagnose sockets over SNA. It also provides information to help you prepare application programs to use sockets over SNA.
<i>z/OS Communications Server: IP Network Print Facility</i>	SC31-8833	This document is for system programmers and network administrators who need to prepare their network to route SNA, JES2, or JES3 printer output to remote printers using TCP/IP Services.

Operation:

Title	Number	Description
<i>z/OS Communications Server: IP User's Guide and Commands</i>	SC31-8780	This document describes how to use TCP/IP applications. It contains requests that allow a user to log on to a remote host using Telnet, transfer data sets using FTP, send and receive electronic mail, print on remote printers, and authenticate network users.

Title	Number	Description
<i>z/OS Communications Server: IP System Administrator's Commands</i>	SC31-8781	This document describes the functions and commands helpful in configuring or monitoring your system. It contains system administrator's commands, such as TSO NETSTAT, PING, TRACERTE and their UNIX counterparts. It also includes TSO and MVS™ commands commonly used during the IP configuration process.
<i>z/OS Communications Server: SNA Operation</i>	SC31-8779	This document serves as a reference for programmers and operators requiring detailed information about specific operator commands.
<i>z/OS Communications Server: Quick Reference</i>	SX75-0124	This document contains essential information about SNA and IP commands.

Customization:

Title	Number	Description
<i>z/OS Communications Server: SNA Customization</i>	LY43-0092	This document enables you to customize SNA, and includes the following: <ul style="list-style-type: none"> • Communication network management (CNM) routing table • Logon-interpret routine requirements • Logon manager installation-wide exit routine for the CLU search exit • TSO/SNA installation-wide exit routines • SNA installation-wide exit routines

Writing application programs:

Title	Number	Description
<i>z/OS Communications Server: IP Application Programming Interface Guide</i>	SC31-8788	This document describes the syntax and semantics of program source code necessary to write your own application programming interface (API) into TCP/IP. You can use this interface as the communication base for writing your own client or server application. You can also use this document to adapt your existing applications to communicate with each other using sockets over TCP/IP.
<i>z/OS Communications Server: IP CICS Sockets Guide</i>	SC31-8807	This document is for programmers who want to set up, write application programs for, and diagnose problems with the socket interface for CICS® using z/OS TCP/IP.
<i>z/OS Communications Server: IP IMS Sockets Guide</i>	SC31-8830	This document is for programmers who want application programs that use the IMS™ TCP/IP application development services provided by IBM's TCP/IP Services.
<i>z/OS Communications Server: IP Programmer's Reference</i>	SC31-8787	This document describes the syntax and semantics of a set of high-level application functions that you can use to program your own applications in a TCP/IP environment. These functions provide support for application facilities, such as user authentication, distributed databases, distributed processing, network management, and device sharing. Familiarity with the z/OS operating system, TCP/IP protocols, and IBM Time Sharing Option (TSO) is recommended.
<i>z/OS Communications Server: SNA Programming</i>	SC31-8829	This document describes how to use SNA macroinstructions to send data to and receive data from (1) a terminal in either the same or a different domain, or (2) another application program in either the same or a different domain.

Title	Number	Description
<i>z/OS Communications Server: SNA Programmer's LU 6.2 Guide</i>	SC31-8811	This document describes how to use the SNA LU 6.2 application programming interface for host application programs. This document applies to programs that use only LU 6.2 sessions or that use LU 6.2 sessions along with other session types. (Only LU 6.2 sessions are covered in this document.)
<i>z/OS Communications Server: SNA Programmer's LU 6.2 Reference</i>	SC31-8810	This document provides reference material for the SNA LU 6.2 programming interface for host application programs.
<i>z/OS Communications Server: CSM Guide</i>	SC31-8808	This document describes how applications use the communications storage manager.
<i>z/OS Communications Server: CMIP Services and Topology Agent Guide</i>	SC31-8828	This document describes the Common Management Information Protocol (CMIP) programming interface for application programmers to use in coding CMIP application programs. The document provides guide and reference information about CMIP services and the SNA topology agent.

Diagnosis:

Title	Number	Description
<i>z/OS Communications Server: IP Diagnosis</i>	GC31-8782	This document explains how to diagnose TCP/IP problems and how to determine whether a specific problem is in the TCP/IP product code. It explains how to gather information for and describe problems to the IBM Software Support Center.
<i>z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures and z/OS Communications Server: SNA Diagnosis Vol 2, FFST Dumps and the VIT</i>	LY43-0088 LY43-0089	These documents help you identify an SNA problem, classify it, and collect information about it before you call the IBM Support Center. The information collected includes traces, dumps, and other problem documentation.
<i>z/OS Communications Server: SNA Data Areas Volume 1 and z/OS Communications Server: SNA Data Areas Volume 2</i>	LY43-0090 LY43-0091	These documents describe SNA data areas and can be used to read an SNA dump. They are intended for IBM programming service representatives and customer personnel who are diagnosing problems with SNA.

Messages and codes:

Title	Number	Description
<i>z/OS Communications Server: SNA Messages</i>	SC31-8790	This document describes the ELM, IKT, IST, ISU, IUT, IVT, and USS messages. Other information in this document includes: <ul style="list-style-type: none"> • Command and RU types in SNA messages • Node and ID types in SNA messages • Supplemental message-related information
<i>z/OS Communications Server: IP Messages Volume 1 (EZA)</i>	SC31-8783	This volume contains TCP/IP messages beginning with EZA.
<i>z/OS Communications Server: IP Messages Volume 2 (EZB)</i>	SC31-8784	This volume contains TCP/IP messages beginning with EZB.
<i>z/OS Communications Server: IP Messages Volume 3 (EZY)</i>	SC31-8785	This volume contains TCP/IP messages beginning with EZY.
<i>z/OS Communications Server: IP Messages Volume 4 (EZZ-SNM)</i>	SC31-8786	This volume contains TCP/IP messages beginning with EZZ and SNM.

Title	Number	Description
<i>z/OS Communications Server: IP and SNA Codes</i>	SC31-8791	This document describes codes and other information that appear in z/OS Communications Server messages.

APPC Application Suite:

Title	Number	Description
<i>z/OS Communications Server: APPC Application Suite User's Guide</i>	SC31-8809	This documents the end-user interface (concepts, commands, and messages) for the AFTP, ANAME, and APING facilities of the APPC application suite. Although its primary audience is the end user, administrators and application programmers may also find it useful.
<i>z/OS Communications Server: APPC Application Suite Administration</i>	SC31-8835	This document contains the information that administrators need to configure the APPC application suite and to manage the APING, ANAME, AFTP, and A3270 servers.
<i>z/OS Communications Server: APPC Application Suite Programming</i>	SC31-8834	This document provides the information application programmers need to add the functions of the AFTP and ANAME APIs to their application programs.

Redbooks

The following Redbooks may help you as you implement z/OS Communications Server.

Title	Number
<i>TCP/IP Tutorial and Technical Overview</i>	GG24-3376
<i>SNA and TCP/IP Integration</i>	SG24-5291
<i>IBM Communications Server for OS/390 V2R10 TCP/IP Implementation Guide: Volume 1: Configuration and Routing</i>	SG24-5227
<i>IBM Communications Server for OS/390 V2R10 TCP/IP Implementation Guide: Volume 2: UNIX Applications</i>	SG24-5228
<i>IBM Communications Server for OS/390 V2R7 TCP/IP Implementation Guide: Volume 3: MVS Applications</i>	SG24-5229
<i>Secureway Communications Server for OS/390 V2R8 TCP/IP: Guide to Enhancements</i>	SG24-5631
<i>TCP/IP in a Sysplex</i>	SG24-5235
<i>Managing OS/390 TCP/IP with SNMP</i>	SG24-5866
<i>Security in OS/390-based TCP/IP Networks</i>	SG24-5383
<i>IP Network Design Guide</i>	SG24-2580
<i>Migrating Subarea Networks to an IP Infrastructure</i>	SG24-5957
<i>IBM Communication Controller Migration Guide</i>	SG24-6298

Related information

For information about z/OS products, refer to *z/OS Information Roadmap* (SA22-7500). The Roadmap describes what level of documents are supplied with each release of z/OS Communications Server, as well as describing each z/OS publication.

Relevant RFCs are listed in an appendix of the IP documents. Architectural specifications for the SNA protocol are listed in an appendix of the SNA documents.

The table below lists documents that may be helpful to readers.

Title	Number
<i>z/OS Security Server Firewall Technologies</i>	SC24-5922
<i>S/390: OSA-Express Customer's Guide and Reference</i>	SA22-7403
<i>z/OS JES2 Initialization and Tuning Guide</i>	SA22-7532
<i>z/OS MVS Diagnosis: Procedures</i>	GA22-7587
<i>z/OS MVS Diagnosis: Reference</i>	GA22-7588
<i>z/OS MVS Diagnosis: Tools and Service Aids</i>	GA22-7589
<i>z/OS Security Server LDAP Client Programming</i>	SC24-5924
<i>z/OS Security Server LDAP Server Administration and Use</i>	SC24-5923
<i>Understanding LDAP</i>	SG24-4986
<i>z/OS UNIX System Services Programming: Assembler Callable Services Reference</i>	SA22-7803
<i>z/OS UNIX System Services Command Reference</i>	SA22-7802
<i>z/OS UNIX System Services User's Guide</i>	SA22-7801
<i>z/OS UNIX System Services Planning</i>	GA22-7800
<i>z/OS MVS Using the Subsystem Interface</i>	SA22-7642
<i>z/OS C/C++ Run-Time Library Reference</i>	SA22-7821
<i>z/OS Program Directory</i>	GI10-0670
<i>DNS and BIND</i> , Fourth Edition, O'Reilly and Associates, 2001	ISBN 0-596-00158-4
<i>Routing in the Internet</i> , Christian Huitema (Prentice Hall PTR, 1995)	ISBN 0-13-132192-7
<i>sendmail</i> , Bryan Costales and Eric Allman, O'Reilly and Associates, 1997	ISBN 156592-222-0
<i>TCP/IP Tutorial and Technical Overview</i>	GG24-3376
<i>TCP/IP Illustrated, Volume I: The Protocols</i> , W. Richard Stevens, Addison-Wesley Publishing, 1994	ISBN 0-201-63346-9
<i>TCP/IP Illustrated, Volume II: The Implementation</i> , Gary R. Wright and W. Richard Stevens, Addison-Wesley Publishing, 1995	ISBN 0-201-63354-X
<i>TCP/IP Illustrated, Volume III</i> , W. Richard Stevens, Addison-Wesley Publishing, 1995	ISBN 0-201-63495-3
<i>z/OS System Secure Sockets Layer Programming</i>	SC24-5901

Determining if a publication is current

As needed, IBM updates its publications with new and changed information. For a given publication, updates to the hardcopy and associated BookManager softcopy are usually available at the same time. Sometimes, however, the updates to hardcopy and softcopy are available at different times. The following information describes how to determine if you are looking at the most current copy of a publication:

- At the end of a publication's order number there is a dash followed by two digits, often referred to as the dash level. A publication with a higher dash level is more current than one with a lower dash level. For example, in the publication order number GC28-1747-07, the dash level 07 means that the publication is more current than previous levels, such as 05 or 04.
- If a hardcopy publication and a softcopy publication have the same dash level, it is possible that the softcopy publication is more current than the hardcopy publication. Check the dates shown in the Summary of Changes. The softcopy publication might have a more recently dated Summary of Changes than the hardcopy publication.

- To compare softcopy publications, you can check the last two characters of the publication's filename (also called the book name). The higher the number, the more recent the publication. Also, next to the publication titles in the CD-ROM booklet and the readme files, there is an asterisk (*) that indicates whether a publication is new or changed.

Summary of Changes

Summary of changes for GC31-8774-02 z/OS Version 1 Release 4

This document contains information previously presented in GC31-8774-01, which supports z/OS Version 1 Release 2.

New information

- Chapter 1, “z/OS V1R4 Communications Server release summary” on page 1 includes descriptions and migration procedures of all new functions and enhancements for this release.
- Chapter 3, “Upgrading z/OS V1R2 Communications Server to z/OS V1R4 Communications Server” on page 25 describes the migration considerations of upgrading from z/OS V1R2 Communications Server.

An appendix that provides a list of documents that contain architectural specifications for the SNA protocol has been added.

An appendix with z/OS product accessibility information has been added.

Changed information

- Chapter 5, “Upgrading Communications Server for OS/390 V2R10 to z/OS V1R4 Communications Server” on page 35 has been updated to reflect migration considerations.

Deleted information

- The chapters on upgrading from Communications Server for OS/390 V2R8, Communications Server for OS/390 V2R7, and Communications Server for OS/390 V2R6 were removed from this document because migrating from those releases is not supported in z/OS CS V1R4 and beyond. You can still access the old information by referring to *z/OS IBM Communications Server: SNA Migration Version 1 Release 2* at the following URL:
<http://www.ibm.com/servers/eserver/zseries/zos/bkserv/>.

This document includes terminology, maintenance, and editorial changes. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.

Starting with z/OS V1R4, you may notice a change in the style of this document — headings that use uppercase for the first letter of initial words only. The change reflects an ongoing improvement to the consistency of our documents.

This document supports z/OS.e.

Summary of changes for GC31-8774-01 z/OS Version 1 Release 2

This document contains information previously presented in GC31-8774-00, which supports z/OS Version 1 Release 1.

New information

- "Chapter 1. z/OS V1R2 Communications Server release summary" includes descriptions and migration procedures of all new functions and enhancements for this release.
- "Chapter 3. Upgrading Communications Server for OS/390 V2R10 to z/OS V1R2 Communications Server" describes the migration consideration of upgrading from Communications Server for OS/390 V2R10.

Changed information

- The chapters on upgrading have been updated to reflect migration considerations.

This document includes terminology, maintenance, and editorial changes. The descriptions of the new functions are presented in an improved format that includes tables with migration tasks and procedures. Technical changes or additions to the text and illustrations are indicated by a vertical line to the left of the change.

Summary of changes for GC31-8774-00 z/OS Version 1 Release 1

This document includes information presented in *OS/390 V2R10 IBM CS: SNA Migration*.

New information

- "Chapter 2. Upgrading z/OS V1R1 Communications Server to z/OS V1R2 Communications Server".

Changed information

This document differs from its predecessor, *OS/390 V2R10 IBM CS: SNA Migration*, in the following ways:

- The chapters and sections documenting functions and enhancements introduced prior to CS for OS/390 V2R6 are removed from this document because migrating from CS for OS/390 V2R5 and before is not supported in z/OS CS V1R1 and beyond. You can still access the old information; refer to "Where to find related information on the Internet" on page xiii for web addresses.
- The chapter called "Installing Communications Server for OS/390 V2R10" was renamed to "Post-Installation Considerations for z/OS Communications Server". Minor technical updates were made in this chapter, including a rewrite of the "Preparing Your Operating System" section. The section called "Loading Communications Server for OS/390 V2R10" was deleted. References to unsupported releases were removed.
- Appendix B, "Related Publications" was deleted. The information that was contained in that appendix was moved to the preface of this document, under the heading "Where to Find More Information".

Chapter 1. z/OS V1R4 Communications Server release summary

This chapter helps you decide which SNA functions of z/OS V1R4 Communications Server to plan for and implement.

Refer to the preventive service planning (PSP) bucket for a complete list of the IBM products to which you might need to apply PTFs, the conditions under which you might need to apply the PTFs, and the PTF numbers. The PSP bucket is available through the following sources:

- Information Access
- SoftwareXcel Extended
- IBMLink (ServiceLink)

If you do not have access to these sources, contact the IBM Support Center at 1-800-237-5511 (U.S. and Canada) to determine the PTFs you need to apply.

Introduction

z/OS V1R4 Communications Server is a network communication access method; it implements Systems Network Architecture (SNA), including advanced peer-to-peer networking (APPN) and high-performance routing (HPR). It provides the interface between application programs residing in a host processor, and resources residing in a SNA network; it also links peer users in the network.

Note: For the purposes of this library, zSeries is defined to mean the hardware that is known as the IBM S/390 Parallel Enterprise Server Generation 5 (G5) and Generation 6 (G6), the IBM S/390 Multiprise 3000 Enterprise Server, as well as the IBM @server zSeries 800 (z800) and 900 (z900).

The remainder of this chapter consists of sections that describe the functions and enhancements new to z/OS V1R4 Communications Server, including any migration procedures.

CSALIMIT start option behavioral change

z/OS V1R4 Communications Server changes the behavior of the CSALIMIT start option. Prior to z/OS V1R4 CS, if a value was specified for the CSALIMIT start option and that value was reached, VTAM might have stopped executing. With z/OS V1R4 Communications Server, VTAM now continues executing beyond the value specified for CSALIMIT if sufficient CSA and ECSA storage is available. This might preclude the need to restart VTAM when the specified CSALIMIT is reached.

The ability to specify the ,F modifier has been extended to the CSALIMIT start option. It was previously only applicable to the MODIFY CSALIMIT and MODIFY VTAMOPTS,CSALIMIT commands. Refer to *z/OS Communications Server: SNA Operation* and *z/OS Communications Server: SNA Resource Definition Reference*.

Changed sample display, some new messages, and a changed message are associated with this enhancement. For example, if a programmed operator receives the output of a display BFRUSE command message group, a new message is added. If a programmed operator receives console output, two new messages are added. See “New and changed interfaces that enable use of this function” on page 2 for details about these updates.

Restrictions

None.

What this change affects

- Availability
- Usability
- Storage

Migration procedures

If you want VTAM to continue executing beyond the value specified for CSALIMIT if sufficient CSA and ECSA storage is available, you do not need to take any action. With z/OS V1R4 Communications Server, that is the default behavior of CSALIMIT. If, however, you want a value currently coded for the CSALIMIT start option to execute exactly as it has in the past, a new CSALIMIT start option modifier may be required. If that is the case, then perform the task in the following table.

Table 2. CSALIMIT start option behavioral change - Migration task

Task	Procedure	Reference
If you want the CSALIMIT start option to behave as it did in prior releases, use a new command modifier.	Add a comma F after the value. For example, CSALIMIT=(value,F).	<i>z/OS Communications Server: SNA Resource Definition Reference</i>

New and changed interfaces that enable use of this function

Changed command output

Message IST1831I is added to this display:

```
d net,bfruse,buffer=summary
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = BUFFER POOL DATA
IST449I CSALIMIT = NOLIMIT, CURRENT = 1388K, MAXIMUM = 1388K
IST790I MAXIMUM CSA USED = 1388K
IST1667I SYSTEM CSA LIMIT = 1887436K
IST1831I 56% OF SYSTEM CSA STORAGE REMAINING = 1056964K
IST449I CSA24 LIMIT = NOLIMIT, CURRENT = 76K, MAXIMUM = 76K
IST790I MAXIMUM CSA24 USED = 76K
IST595I IRNLIMIT = NOLIMIT, CURRENT = 0K, MAXIMUM = 0K
IST981I VTAM PRIVATE: CURRENT = 4550K, MAXIMUM USED = 4603K
IST924I -----
IST1565I CSA MODULES = 1384K
IST1565I CSA24 MODULES = 40K
IST1565I PRIVATE MODULES = 5205K
IST314I END
```

New messages

The following message is added to the DISPLAY BFRUSE output:

```
IST1831I 56% OF SYSTEM CSA STORAGE REMAINING = 1056964K
```

The following message indicates that the CSALIMIT start option or modify value is too small:

```
IST1832I CSALIMIT VALUE %%%%%%%%%K MIGHT BE TOO SMALL
```

The following message indicates that the CSA storage usage exceeds the CSALIMIT value:

```
IST1833I CSA STORAGE ALLOCATION EXCEEDS SPECIFIED CSALIMIT VALUE
```

Changed message

This message, a part of the IST449I Display BFRUSE group, now displays total CSA plus ECSA storage. Prior to z/OS V1R4 Communications Server, it displayed only 90% of that value:

```
IST1667I SYSTEM CSA LIMIT = nnnnnnnnK
```

Enterprise Extender dial processing enhancements

z/OS V1R4 CS enhances the dial processing for Enterprise Extender connections to attempt automatic redial both in the case where an initial dial fails and in the case where an existing connection fails. Prior to z/OS V1R4 Communications Server, there was no mechanism to automatically attempt to redial a switched Physical Unit for Enterprise Extender when a dial attempt failed or when an existing connection INOPed.

Restrictions

None.

What this change affects

- Usability
- Operations

Migration procedures

The dial processing enhancements involve the tasks in Table 3. Perform the tasks of your choice.

Usage Note: When VARY HANGUP is issued for an Enterprise Extender connection, it causes a connection INOP on the remote host. Therefore, if DWINOP=YES is coded on the switched PU on the remote host, the remote host will attempt to re-establish the connection by dialing back to the host that issued the VARY HANGUP. If the VARY HANGUP command successfully placed the switched PU in connectable state on this host, then that dial attempt will succeed. (See the next-to-last step in the following table.) If you want to prevent connection re-establishment when DWINOP is coded on the switched PU definition on the remote host, then perform the last step in the following table.

Table 3. Enterprise Extender dial processing enhancements - Migration tasks

Task	Procedure	Reference
Enable XCA Enterprise Extender line to be automatically reactivated after link INOP.	No action is required; in z/OS V1R4 Communications Server, this is the default behavior (the default is KEEPACT=YES). If you wish to code it anyway, code the new KEEPACT operand on the GROUP or LINE statement in the XCA major node used for Enterprise Extender as KEEPACT=YES.	<i>z/OS Communications Server: SNA Resource Definition Reference</i>
Keep the behavior of past releases and disallow the XCA Enterprise Extender line to be automatically reactivated after link INOP.	Code KEEPACT=NO on the GROUP or LINE statement in the XCA major node used for Enterprise Extender if you do <i>not</i> want VTAM to attempt to automatically reactivate the line.	<i>z/OS Communications Server: SNA Resource Definition Reference</i>

Table 3. Enterprise Extender dial processing enhancements - Migration tasks (continued)

Task	Procedure	Reference
Enable the switched PU used for Enterprise Extender to be automatically redialed <i>after a dial failure</i> , and specify how often to attempt to redial and for how long.	Code the new REDDELAY operand on the PATH statement to specify how long to wait after the dial failure before attempting a redial. Code the existing REDIAL operand on the PATH statement to a value in the range of 1 - 254 to specify a limited number of redial attempts, or code it to FOREVER to specify an unlimited number of redial attempts.	<i>z/OS Communications Server: SNA Resource Definition Reference</i>
Enable the switched PU used for Enterprise Extender to be automatically redialed <i>after failure of an existing connection</i> , and specify how often to attempt redial and for how long.	Code the new DWINOP operand on the PU statement in the switched major node as DWINOP=YES. Code REDIAL and REDDELAY on the PATH statement as described in the preceding procedure.	<i>z/OS Communications Server: SNA Resource Definition Reference</i>
Allow connection re-establishment when DWINOP is coded on the switched PU definition on the remote host.	Code either CALL=IN or CALL=INOUT on the Enterprise Extender PATH statement, and code ANSWER=ON on GROUP statement in the XCA major node to which the PATH statement applies.	<i>z/OS Communications Server: SNA Resource Definition Reference</i>
Break the connection and prevent connection re-establishment when DWINOP is coded on the switched PU definition on the remote host.	Do one of the following: <ul style="list-style-type: none"> Code either CALL=OUT on the Enterprise Extender PATH statement or ANSWER=OFF on GROUP statement in the XCA major node to which the PATH statement applies, then issue the VARY NET HANGUP command. Issue the VARY NET INACT command for the switched PU. 	<i>z/OS Communications Server: SNA Resource Definition Reference</i>

New and changed interfaces that enable use of this function

New and changed SNA definition statements

The following updates were made to the SNA definition statements as a result of this enhancement:

- There is a new KEEPACT operand on GROUP and LINE for XCA major node for EE only.
- There is a new REDDELAY operand on PATH for switched major node for EE only.
- There is a changed REDIAL operand on PATH for switched major node for EE only.
- There is a new DWINOP for PU for switched major node for EE only.

Enterprise Extender addressing enhancement for logical lines and PUs

z/OS V1R4 Communications Server enhances the addressing for Enterprise Extender's (EE's) logical lines and physical units (PUs) by making their assigned element addresses into extended element addresses. This is reflected in the displays seen with messages IST1863I and IST1864I in response to a DISPLAY VTAMSTOR, RESOURCE or a DISPLAY VTAMSTOR,NETADDR command.

The enhancement alleviates the constraint of network addresses for EE by expanding the network address allocations above and beyond the 64K line, up to 16M.

Restrictions

The number of available element address for EE's logical lines and PUs are still subject to a limit, although the limit has been raised up to 16M.

What this change affects

- APPN
- Scalability

Migration procedures

The Enterprise Extender addressing enhancement for logical lines and PUs function does not require any action; it is automatically enabled.

Enable HPR-only VRNs for interchange sessions

Prior to z/OS V1R4 CS, you could not configure Interchange Nodes (ICNs) with links to some types of connection networks (such as ATM and Enterprise Extender connection networks) due to a configuration restriction that did not allow ICNs to exploit HPR over connection networks for sessions that cross from APPN into subarea. (ICNs could compute session paths through these connection networks for other APPN NNs or ENs that have links to them. However, the ICNs themselves could not activate a link to these types of connection networks. Instead, ICNs were required to predefine links to all other nodes on the connection network, or allow APPN to compute session paths that include additional nodes.)

z/OS V1R4 CS eliminates this restriction for Enterprise Extender connection networks. In addition, this function will also allow HPR to be used (instead of ISR) over other types of connection networks (like token-ring) for sessions that cross from APPN into subarea.

Restrictions

This function does not support Interchange Nodes defining and activating links to ATM connection networks.

Incompatibilities

If Interchange Nodes attempt to define and activate links to Enterprise Extender connection networks when one or more VTAM Network Nodes in the network are running pre-z/OS CS V1R2, then sessions may fail intermittently with sense code x'08400002'.

Dependencies

In order to define and activate links to Enterprise Extender connection networks at Interchange Nodes, all VTAM Network Nodes in that APPN network must be running z/OS CS V1R2 or above. In addition, both the Interchange Node and the node on the other side of the connection network (if it is a VTAM node) must be running z/OS V1R4 or above.

What this change affects

- Usability
- Availability
- Connectivity

Migration procedures

No start option changes are required to enable this enhancement; however, you do need to perform the tasks in the following table. **Perform the migration tasks in the order listed.**

Table 4. Enable HPR-only VRNs for interchange sessions - Migration tasks

Task	Procedure	Reference
Ensure that all VTAM NNs and ICNs in the network are running at z/OS CS V1R2 or a later release.	Determine the release you are running by issuing the DISPLAY VTAMOPTS command.	<i>z/OS Communications Server: SNA Operation</i>
Ensure that all VTAM NNs, ICNs, ENs, and MDHs that define connections to the same EE connection network as other ICNs are running at z/OS CS V1R4 or a later release.	Determine the release you are running by issuing the DISPLAY VTAMOPTS command.	<i>z/OS Communications Server: SNA Operation</i>
After you have completed the first two tasks in this table, define and activate the link to the EE connection network at ICNs.	Define an XCA major node with MEDIUM=HPRIP and VNNAME.	<i>z/OS Communications Server: SNA Resource Definition Reference</i>

Display ID=rtpname diagnostic enhancement

z/OS V1R4 CS adds additional data to the display for an RTP physical unit for diagnostic purposes. The operator can control whether or not most of this additional data is displayed.

Restrictions

None.

What this change affects

- Usability
- Diagnosis
- Serviceability

Migration procedures

This enhancement does not require any action unless you want to take advantage of the function. If so, perform the tasks in the following table.

Table 5. Additional diagnostic data for Display ID=rtpname - Migration tasks

Task	Procedure	Reference
View the base diagnostic and performance information for an RTP physical unit, including the actual data flow rate and the number of sessions using this RTP.	Issue the DISPLAY ID=rtpname command.	<i>z/OS Communications Server: SNA Operation and z/OS Communications Server: SNA Messages</i>
View additional diagnostic and performance information for an RTP physical unit.	Issue the DISPLAY ID=rtpname,HPRDIAG=YES command.	<i>z/OS Communications Server: SNA Operation and z/OS Communications Server: SNA Messages</i>

New and changed interfaces that enable use of this function

New operand

There is a new HPRDIAG operand for DISPLAY ID=rtpname only.

Changed output

```
d net,id=cnr00004,hprdiag=yes

IST097I DISPLAY ACCEPTED
IST075I NAME = CNR00004, TYPE = PU_T2.1
IST1392I DISCNTIM = 00010 DEFINED AT PU FOR DISCONNECT
IST486I STATUS= ACTIV--LX-, DESIRED STATE= ACTIV
IST1043I CP NAME = SSCP2A, CP NETID = NETA, DYNAMIC LU = YES
IST1589I XNETALS = YES
IST875I APPNCOS TOWARDS RTP = #INTER
IST1476I TCID X'031BC6A200000014' - REMOTE TCID X'031BCA8E0000001E'
IST1481I DESTINATION CP NETA.SSCP2A - NCE X'D000000000000000'
IST1587I ORIGIN NCE X'D000000000000000'
IST1477I ALLOWED DATA FLOW RATE = 1600 KBITS/SEC
IST1516I INITIAL DATA FLOW RATE = 1600 KBITS/SEC
IST1841I ACTUAL DATA FLOW RATE = 0 KBITS/SEC
IST1511I MAXIMUM NETWORK LAYER PACKET SIZE = 16410 BYTES
IST1478I NUMBER OF UNACKNOWLEDGED BUFFERS = 0
IST1479I RTP CONNECTION STATE = CONNECTED - MNPS = NO
IST1855I NUMBER OF SESSIONS USING RTP = 1
IST1697I RTP PACING ALGORITHM = ARB RESPONSIVE MODE
IST1480I RTP END TO END ROUTE - RSCV PATH
IST1460I TGN CPNAME TG TYPE HPR
IST1461I 21 NETA.SSCP2A APPN RTP
IST875I ALSNAME TOWARDS RTP = AHHCPU1
IST1738I ANR LABEL TP ER NUMBER
IST1739I 8001000A00000000 *NA* *NA*
IST1860I NUMBER OF NLPS SENT = 3639 - OVERFLOW = 0
IST1861I NUMBER OF NLPS RECEIVED = 3883 - OVERFLOW = 0
IST1842I NUMBER OF NLPS RETRANSMITTED = 0
IST1843I NUMBER OF NLPS ON WAITING-TO-SEND QUEUE = 0
IST1847I NUMBER OF NLPS ON WAITING-FOR-ACKNOWLEDGEMENT QUEUE = 0
IST1862I ARB MAXIMUM SEND RATE = 32000 KBITS/SEC
IST1844I ARB MODE = GREEN
IST1846I CURRENT RECEIVER THRESHOLD = 36999 MICROSECONDS
IST1846I MAXIMUM RECEIVER THRESHOLD = 37000 MICROSECONDS
IST1846I MINIMUM RECEIVER THRESHOLD = 17000 MICROSECONDS
IST1848I SEND BYTE COUNT = 177842 RECEIVE BYTE COUNT = 182458
IST1849I LARGEST NLP SENT = 140 BYTES
IST1850I LARGEST NLP RECEIVED = 104 BYTES
IST1851I SMOOTHED ROUND TRIP TIME = 15 MILLISECONDS
IST1852I LIVENESS TIMER = 172 SECONDS
IST1853I NUMBER OF NLPS ON OUT-OF-SEQUENCE QUEUE = 0
IST1854I NUMBER OF NLPS ON INBOUND SEGMENTS QUEUE = 0
IST1855I NUMBER OF SESSIONS USING RTP = 1
IST1856I LAST PATH SWITCH OCCURRENCE WAS ON 01/09/02 AT 11:52:43
IST1822I PATH SWITCH REASON: UNKNOWN
IST924I -----
IST1857I BACKPRESSURE REASON COUNTS:
IST1858I PATHSWITCH SEND QUEUE MAX STORAGE FAILURE
IST1859I 0 0 0
IST924I -----
IST231I RTP MAJOR NODE = ISTRTPMN
IST654I I/O TRACE = OFF, BUFFER TRACE = OFF
IST1500I STATE TRACE = OFF
IST314I END
```

New messages

The following messages are new for DISPLAY ID=rtpname only:

```

IST1841I    ACTUAL DATA FLOW RATE = actual units
IST1855I    NUMBER OF SESSIONS USING RTP = sessions
IST1860I    NUMBER OF NLPS SENT = sent - OVERFLOW = overflow
IST1861I    NUMBER OF NLPS RECEIVED = received - OVERFLOW = overflow
IST1842I    NUMBER OF NLPS RETRANSMITTED = retransmitted
IST1843I    NUMBER OF NLPS ON WAITING-TO-SEND QUEUE = waitsend
IST1847I    NUMBER OF NLPS ON WAITING-FOR-ACKNOWLEDGEMENT QUEUE = waitack
IST1862I    ARB MAXIMUM SEND RATE = maximum units
IST1844I    ARB MODE = mode
IST1845I    BOUNDARY DIVIDING REGIONS lower AND upper = boundary MILLISECONDS
IST1846I    Type RECEIVER THRESHOLD = threshold MICROSECONDS
IST1848I    SEND BYTE COUNT = sendcount RECEIVE BYTE COUNT = receivecount
IST1849I    LARGEST NLP SENT = size BYTES
IST1850I    LARGEST NLP RECEIVED = size BYTES
IST1851I    SMOOTHED ROUND TRIP TIME = smoothed_time MILLISECONDS
IST1852I    LIVENESS TIMER = liveness SECONDS
IST1853I    NUMBER OF NLPS ON OUT-OF-SEQUENCE QUEUE = outofsequence
IST1854I    NUMBER OF NLPS ON INBOUND SEGMENTS QUEUE = inboundsegs
IST1856I    LAST PATHSWITCH OCCURRENCE WAS ON date AT time
IST1817I    PATH SWITCH REASON: RTP CONNECTION UNAVAILABLE
IST1818I    PATH SWITCH REASON: SHORT REQUEST RETRY LIMIT EXHAUSTED
IST1819I    PATH SWITCH REASON: TG INOP
IST1820I    PATH SWITCH REASON: MODIFY RTP COMMAND ISSUED
IST1821I    PATH SWITCH REASON: AUTO PATH SWITCH FOR PSRETRY
IST1822I    PATH SWITCH REASON: UNKNOWN]
IST924I    -----
IST1857I    BACKPRESSURE REASON COUNTS:
IST1858I    PATHSWITCH    SEND QUEUE MAX    STORAGE FAILURE
IST1859I    pathswitch    sendqmax        storefail
IST924I    -----

```

SRB mode dump enhancement

When an error occurs, a dump may be scheduled as part of recovery processing. Sometimes the data to be dumped may have changed between the time the error occurred and the time the dump is actually taken. This loss of data may require you to re-create the problem in order to capture sufficient data to diagnose the problem.

z/OS V1R4 CS improves dump processing when running in SRB mode. During recovery, if running in SRB mode, the dump process now suspends processing until the data has been captured. This prevents the loss of data during the dump process and therefore requires fewer re-creates. Furthermore, in some cases, both VTAM and TCP address spaces will be dumped, making the dump more useful.

Restrictions

None.

What this change affects

- Diagnosis
- Serviceability

Migration procedures

This enhancement does not require any action; it is automatically enabled.

Increase maximum value for AUTOGEN on XCA major nodes

z/OS V1R4 CS increases the maximum value for the num_stmts parameter for the AUTOGEN operand on the XCA major node from 4096 (4K) to 65 536 (64K). This is useful because increasing the number of line and PU statements that may be generated for each GROUP in an XCA major node will allow you to use AUTOGEN to eliminate the definitional requirement of defining multiple GROUPs or predefining all line and PU names when more than 4096 EE connection partners exist.

Restrictions

For specifications of 4097 or higher, the maximum number of line and PU seed characters permitted will be four. Up to five seed characters will still be permitted for specifications of 4096 or less. For specifications of 4097 or higher, the CUA will not be included in the generated names.

What this change affects

- Operations
- Usability

Migration procedures

This enhancement does not require any action unless you want to take advantage of the function. If so, perform the task in the following table.

Table 6. Increase maximum value for AUTOGEN on XCA major nodes - Migration tasks

Task	Procedure	Reference
Specify that between 4097 and 65 536 line and PU statements should be automatically generated for an XCA major node group.	On the GROUP statement for an XCA major node, specify AUTOGEN=(65535,XLIN,XPU), for example.	<i>z/OS Communications Server: SNA Resource Definition Reference</i>

VIT data timestamp enhancement

z/OS V1R4 CS includes estimated timestamps for the VIT records extracted from both internal VITs (ECSA and data space) by the VTAMMAP VITAL dump formatting tool. These timestamps are approximated using times saved in VTAM internal control blocks and available at dump formatting time to VITAL. The actual timestamps contained in the dump record the times when certain landmark events occurred in writing the internal VIT records, such as the time that each VIT wrapped and the time that data from the ECSA VIT was last copied to the data space VIT.

This enhancement benefits you because approximated timestamps in the VITAL output, while not necessarily accurately representing the actual clock time when events occurred, can be used to specify, as input to the VIT Analysis tool, start and stop times for subsets of records that you might wish to extract to another data set. This was not possible prior to z/OS CS V1R4 because all VIT records extracted by the VITAL function contained the same timestamp.

Restrictions

None.

What this change affects

- Diagnosis
- Usability

Migration procedures

This enhancement does not require any action unless you want to take advantage of the function. If so, perform the tasks in the following table.

Table 7. Additional timestamp data requested in VIT data - Migration tasks

Task	Procedure	Reference
Extract VIT records from the internal VITs (both ECSA and data space VITs) that contain approximated time stamps.	Invoke the VTAMMAP VITAL function under IPCS for a VTAM dump.	<i>z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures</i> and <i>z/OS Communications Server: SNA Diagnosis Vol 2, FFST Dumps and the VIT</i>
Use the timestamps in the VITAL output obtained in the previous task to extract a subset of VIT records from the VITAL output based on start and stop times.	Perform the following steps: <ol style="list-style-type: none">1. Extract the desired VIT records of the problem to be solved by specifying one of the following as input to the VIT Analysis Tool:<ul style="list-style-type: none">• A resource name• VIT options or entries• Address• Other hexadecimal or character string2. Note the approximated timestamps on the entries thus obtained that correspond to the events in which you are interested.3. Use those timestamps as input for the Start Time and Stop Time parameters when invoking the VIT Analysis Tool again to help identify the part of the VIT that corresponds to the time of the failure being analyzed.	<i>z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures</i> and <i>z/OS Communications Server: SNA Diagnosis Vol 2, FFST Dumps and the VIT</i>

VARY ACT,UPDATE command for CDRSC Major Nodes enhancement

z/OS V1R4 CS enhances the VARY ACT,UPDATE command to allow specification of a CDRSC Major Node on the command. You can now update a CDRSC Major Node to add or modify a CDRSC without having to inactivate the entire Major Node, thereby eliminating the disruption of all existing sessions using the CDRSC resources under the node.

Restrictions

None.

What this change affects

- Availability
- Usability

Migration procedures

This enhancement does not require any action unless you want to take advantage of the function. If so, perform the tasks in the following table.

Table 8. VARY ACT,UPDATE command for CDRSC Major Nodes enhancement - Migration tasks

Task	Procedure	Reference
Add a CDRSC definition to an active CDRSC Major Node.	Perform the following steps: <ol style="list-style-type: none">1. Add the new CDRSC definition to the VTAMLST member for the active CDRSC Major Node.2. Issue V NET,ACT,ID=cdrscmajnode,UPDATE=ADD or V NET,ACT,ID=cdrscmajnode,UPDATE=ALL.	<i>z/OS Communications Server: SNA Operation</i>
Delete a CDRSC definition from an active CDRSC Major Node.	Perform the following steps: <ol style="list-style-type: none">1. Delete the CDRSC definition from the VTAMLST member for the active CDRSC Major Node.2. Be sure that the CDRSC to be deleted is inactive (If D NET,ID=cdrscname shows the CDRSC is active, issue V NET,INACT,ID=cdrscname).3. Issue V NET,ACT,ID=cdrscmajnode,UPDATE=ALL. Note: Steps 1 and 2 can be done in reverse order.	<i>z/OS Communications Server: SNA Operation</i>
Modify a table name operand (ASLTAB, MDLTAB, or MODETAB) for a CDRSC definition in an active CDRSC Major node.	Perform the following steps: <ol style="list-style-type: none">1. Modify the desired table name operands on the CDRSC definition in the VTAMLST member for the active CDRSC Major Node. You do not have to inactivate the CDRSC being modified to change these operands.2. Issue V NET,ACT,ID=cdrscmajnode,UPDATE=ALL.	<i>z/OS Communications Server: SNA Operation</i>
Modify any operand other than a table name operand (ASLTAB, MDLTAB, or MODETAB) for a CDRSC definition in an active Major Node.	Perform the following steps: <ol style="list-style-type: none">1. Modify the desired operands on the CDRSC definition in the VTAMLST member for the active CDRSC Major Node.2. Be sure that the CDRSC to be deleted is inactive (If D NET,ID=cdrscname shows the CDRSC is active, issue V NET,INACT,ID=cdrscname).3. Issue V NET,ACT,ID=cdrscmajnode,UPDATE=ALL. Note: Steps 1 and 2 can be done in reverse order.	<i>z/OS Communications Server: SNA Operation</i>

OPEN Application Control Block (ACB) limit increase

z/OS V1R4 CS increases application capacity through VTAM to a new limit of 1,044,480. Prior to z/OS V1R4 CS, the limit was approximately 65K open ACBs at a time.

Restrictions

None.

What this change affects

- Application capacity

Migration procedures

This enhancement does not require any action; it is automatically enabled.

NQNModes support for Directory Services (DS) database entries

Prior to z/OS V1R4 Communications Server, you could not predefine the real name of resources on a Network Node and have that name used for APPN searches from other nodes. The resource could be predefined as an APPN Cross-Domain Resource (CDRSC) to prime the Directory Services (DS) database by coding CPNAME= on the CDRSC, but DS did not have a concept of REAL versus ALIAS names. When DS received a locate request with an ALIAS name (non-authentic NETID), DS searched the database and returned the first name entry found, but when the search was forwarded it still indicated that the NETID was not authentic. This can cause search problems especially in multiple subnetwork environments, because the Extended Border Nodes will not use the proper adjacent cluster tables to control the searching of multiple subnetworks.

z/OS V1R4 CS adds NQNModes support to Directory Services (DS) by enhancing the existing predefined CDRSC process. When CPNAME= is coded on a CDRSC, the NQNModes value will be passed to DS during CDRSC processing. When DS performs a database query, if a predefined entry is found then DS will use the predefined NETID for all search tasks and will set the NETID indicator to authentic.

z/OS V1R4 CS also enhances the predefined CDRSC process to add NATIVE and SUBAREA operands to improve APPN and subarea search efficiency for predefined resources.

Restrictions

None.

What this change affects

- APPN
- Performance
- Usability

Migration procedures

The NQNModes support for Directory Services (DS) database entries function does not require any action unless you want to take advantage of the function. If so, perform the tasks in the following table.

Table 9. NQNModes support for Directory Services (DS) database entries - Migration tasks

Task	Procedure	Reference
Predefine the real name of a resource on a network node so that served end nodes can utilize the definition.	Code CDRSC with CPNAME= on the network node. If necessary, also code NQNModes=NAME on the network node. (Coding NQNModes=NAME is not required on the CDRSC entry if it is already specified on the NQNModes start option or on a preceding GROUP statement in the CDRSC major node.)	<i>z/OS Communications Server: SNA Resource Definition Reference</i>
Improve APPN and subarea search efficiency.	Code the new NATIVE and SUBAREA operands on CDRSC on the network node or end nodes.	<i>z/OS Communications Server: SNA Resource Definition Reference</i>

New and changed interfaces that enable use of this function

New operands

New operands have been added to the Cross-Domain Resource Major Node:

- NATIVE=YES specifies that the resource is located in the native APPN subnetwork.
- NATIVE=NO specifies that the resource is not located in the native APPN subnetwork.
- SUBAREA=YES specifies that a CDRM session must be crossed to reach the resource.
- SUBAREA=NO specifies that the resource can be reached using an entirely APPN path.

Changed operand

The use of the CPNAME operand on CDRSC definitions is changed to allow it to be coded on an end node.

Changes to installing dump analysis and trace analysis tools

Prior to z/OS V1R4 Communications Server, you had to compile help panels, tables, keylists, and commands for the dump analysis and trace analysis tools. In z/OS V1R4 Communications Server, these items are shipped compiled. You will notice these changes in the installation procedure and in the shortened help panels. See Chapter 6, “Post-installation considerations for z/OS V1R4 Communications Server” on page 47 for more post-installation considerations.

Changes to PF key settings

Your previously-set PF keys will be restored to their prior settings upon exiting the following panels:

- VTAMMAP Analysis Menu (see Figure 5 on page 68).
- VTAM Internal Trace Analysis (see Figure 8 on page 71)

Changes in distribution libraries and parts

The following parts were deleted in z/OS V1R4 Communications Server:

- ISTDHELP
- ISTTHELP
- ISTDTABL
- ISTTTABL
- ISTDFIX
- ISTTFIX
- ISTTH16
- ISTTT026

The following libraries were deleted in z/OS V1R4 Communications Server:

- AISTCLI0
- AISTCLS1
- AISTMSG0
- AISTPNL0
- AISTPNL1
- SISTCLI0
- SISTCLS1
- SISTMSG0
- SISTPNL0
- SISTPNL1

The following parts were moved in distribution libraries in z/OS V1R4
Communications Server:

- ISTDE01
- ISTTE01
- ISTDH*
- ISTTH*
- ISTDТ*
- ISTTT*
- ISTDKEYS
- ISTTKEYS
- ISTDСMDS
- ISTTCMDS

The following REXX EXECs now create tables of the same name:

- ISTDТ020 now creates table ISTDТ020.
- ISTDТ025 now creates table ISTDТ025.
- ISTDТ033 now creates table ISTDТ033.
- ISTDТ037 now creates table ISTDТ037.
- ISTDТ053 now creates table ISTDТ053.
- ISTTT007 now creates table ISTTT007.
- ISTTT010 now creates table ISTTT010.
- ISTTT012 now creates table ISTTT012.
- ISTTT017 now creates table ISTTT017.
- ISTTT024 now creates table ISTTT024.

Restrictions

None.

What this change affects

- Installation

Migration procedures

Be aware that you no longer have to compile help panels, tables, keylists, and commands for the dump analysis and trace analysis tools.

APPN topology traces enhancements

Traces are added to provide a record of the creation, update, and deletion of TRS (Topology and Routing Services) topology records.

There are three locations where topology tracing is done:

- In an NDREC (node record) trace table following the NDREC control block, where the creation and update of a node record is recorded.
- In a TGREC (TG record) trace table following the TGREC control block, where the creation and update of a TG record is recorded.
- In a common TRS (Topology and Routing Services) trace table, where the deletion of NDRECs and TGRECs are recorded.

Users of APPN will notice an increase in storage utilization because VTAM will now allocate an additional one to ten 4K pages for the table of topology deletions, 110 bytes per node record for the NDREC traces, and 180 bytes per TG record for the TGREC traces.

Note: Enhancements to APPN topology traces will be available for z/OS V1R2 Communications Server and will be documented by FIN APAR OW51867.

Restrictions

None.

What this change affects

- Serviceability

Migration procedures

There are no migration procedures; this function is automatic for z/OS V1R4 Communications Server.

New and changed interfaces that enable use of this function

Changed messages

A message is now issued when one page of storage is full and an attempt to allocate an additional page of storage for TRS topology trace entries fails.

IST1260I *type* TRUNCATED - INSUFFICIENT STORAGE

In the message, *type* indicates the specified storage that cannot be allocated and will always be TRS TRACE TABLE.

VTAM IPCS CLIST changes

The VTAM IPCS CLIST ISTVMAP was changed by APAR OW51239 so that there is a new ASID parameter, and that new ASID is now the default. The VTAM IPCS CLIST ISTVMAP maps the storage for an address space. Previously, the only ASID the CLIST used was VTAM's. Now, with this APAR, the VTAM ASID is selected only if three other tests fail. This CLIST can now be used with any ASID, not just VTAM's.

The ASID search order is as follows:

- The ASID parameter value
- The default ASID, if set
- ASID from dump header
- VTAM's ASID
- 001

The first match found in the list above is used.

The ASID of the address space to be mapped may be entered when the CLIST is invoked. The ASID may be specified in decimal or in hexadecimal by using the format X'nn'. For example, to invoke the ISTVMAP CLIST to produce a storage map for ASID X'1B', you could invoke the CLIST in one of the following ways (Note: X'1B' is equal to 27 decimal):

```
ISTVMAP ASID(X'1B')
```

or

```
ISTVMAP ASID(27)
```

If no ASID is specified, the current ASID will be used. The current ASID is the one that was specified in the IPCS SETDEF command. If that ASID cannot be determined, the ASID from the dump header will be used (the ASID that was current when the dump was taken).

Note: If the dump contains multiple address spaces, this ASID will be 0001. If the ASID cannot be obtained from the dump header, VTAM's ASID will be used. If VTAM's ASID cannot be determined, ASID 0001 will be used.

Prior to APAR OW51239, VTAM's ASID was used to produce the storage map. If VTAM's ASID was not dumped, some of the storage ranges would not be available. APAR OW51239 changed the ISTVMAP CLIST to use an ASID that would produce more meaningful results for the dump being processed.

Restrictions

None.

Migration procedures

The VTAM IPCS CLIST changes do not require any action if you want to use the new default ASID parameter. If you want to keep the pre-V1R4 behavior, perform the task in the following table:

Table 10. VTAM IPCS CLIST changes - Migration task to keep pre-V1R4 behavior

Task	Procedure	Reference
Use VTAM's ASID (keep the pre-V1R4 behavior for the VTAM IPCS CLIST ISTVMAP).	Code ISTVMAP ASID(<i>asid</i>) where <i>asid</i> is the VTAM's ASID.	<i>z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures</i>

New and changed interfaces that enable use of this function

New diagnostic message and changed output

A new diagnostic message has been added to the ISTVMAP CLIST output to indicate the ASID and JOBNAME being used to produce the storage map. Refer to *z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures* for sample output.

VTAM INOPDUMP enhancement

In z/OS CS V1R4, VTAM INOPDUMP is enhanced to more granularly control which resources are affected by the function. This is done by allowing the function to be activated or inactivated based on a transport resource list entry (TRLE). For example, INOPDUMP can now be generally inactive, yet active for a specific TRLE. This prevents dumps from being taken when inoperative conditions occur on links other than those targeted by this function.

The Modify INOPDUMP command can be used to alter the TRLE InOpDump status for TRLEs that are not active, as long as that TRLE is contained in the TRL major node. The status will be saved and put into effect when the TRLE becomes active.

Identification of additional normal inoperative conditions has resulted in the internal suppression of INOPDUMP for these conditions.

Prior to z/OS CS V1R4, the VTAM INOPDUMP function had an all-or-nothing operation. This enhancement is a serviceability benefit because it reduces the impact of gathering documentation for an inoperative condition.

Restrictions

Resources not defined within a transport resource list entry cannot be individually controlled. However, the TRLE resources can be excluded from global INOPDUMP control by using the new support to specifically set INOPDUMP off for each active TRLE.

Incompatibilities

Prior to z/OS CS V1R4, the INOPDUMP function is controlled using the INOPDUMP start option. The INOPDUMP start option is displayable and modifiable by specifying INOPDUMP as the option on the DISPLAY VTAMOPTS and MODIFY VTAMOPTS commands. In z/OS CS V1R4, there are new DISPLAY INOPDUMP and MODIFY INOPDUMP commands which also allow you to display and modify the INOPDUMP setting. Display and modification of INOPDUMP is still supported through the DISPLAY VTAMOPTS and MODIFY VTAMOPTS commands, and that mechanism is functionally equivalent to the new method. Both methods set or reset INOPDUMP globally and for each TRLE in the TRL major node.

The responses to the modify commands will differ primarily when the TRL major node is unavailable. If the TRL major node is unavailable, the MODIFY INOPDUMP response will include IST1865I (GLOBAL INOPDUMP = xxx), while the MODIFY VTAMOPTS variation will provide the same response as previous releases. The MODIFY VTAMOPTS variation ends its response with IST223I MODIFY COMMAND COMPLETED, while the MODIFY INOPDUMP response ends with IST223I MODIFY INOPDUMP COMMAND COMPLETED.

The responses to the two display commands will be significantly different. The response to the DISPLAY VTAMOPTS,OPTION=INOPDUMP command will not change. The response to the DISPLAY INOPDUMP command will include IST097I, IST350I, IST1865I, possibly some number of 1866I messages, and IST314I. A sample response from the new command can be seen in “Displaying INOPDUMP information” on page 18.

Migration procedures

If you want to use the VTAM INOPDUMP enhancement, perform the desired tasks in the following table:

Table 11. VTAM INOPDUMP enhancement - Migration tasks

Task	Procedure	Reference
If you need InOpDump for problem analysis, issue the Modify InOpDump command against the trlename for which a dump is to be taken.	Issue MODIFY procname,INOPDUMP=ON,TRLE=trlename.	<i>z/OS Communications Server: SNA Operation and z/OS Communications Server: SNA Messages</i>
Re-create the inoperative condition.	Repeat the steps that lead up to the initial inoperative condition. A dump should be taken. Save the dump for VTAM service.	<i>z/OS Communications Server: SNA Operation and z/OS Communications Server: SNA Messages</i>

Table 11. VTAM INOPDUMP enhancement - Migration tasks (continued)

Task	Procedure	Reference
Reset InOpDump for the TRLE to prevent VTAM from taking additional dumps.	Issue MODIFY procname,INOPDUMP=OFF,TRLE=trlename or MODIFY procname,INOPDUMP=OFF.	<i>z/OS Communications Server: SNA Operation and z/OS Communications Server: SNA Messages</i>
Determine the status of either global InOpDump or individual TRLE InOpDump.	Issue DISPLAY NET,INOPDUMP or DISPLAY NET,ID=trlename or DISPLAY NET,TRL,TRLE=trlename.	<i>z/OS Communications Server: SNA Operation and z/OS Communications Server: SNA Messages</i>
Reset or set global InOpDump and all TRLE InOpDump status with a single command.	Issue MODIFY procname,INOPDUMP=ONIOFF or MODIFY procname,VTAMOPTS,INOPDUMP=ONIOFF.	<i>z/OS Communications Server: SNA Operation and z/OS Communications Server: SNA Messages</i>
Determine the status of global InOpDump. Note that this will not show TRLE InOpDump status.	Issue DISPLAY NET,VTAMOPTS or DISPLAY NET,VTAMOPTS,OPT=INOPDUMP or DISPLAY NET,VTAMOPTS,FUNCTION=ZAPCON or DISPLAY NET,VTAMOPTS,FUNCTION=TRACDUMP.	<i>z/OS Communications Server: SNA Operation and z/OS Communications Server: SNA Messages</i>

New and changed interfaces that enable use of this function

New commands

A new Modify procname,INOPDUMP command is introduced specifically to allow for the control of the INOPDUMP status for TRLEs. The command can also be used instead of the Modify procname,VTAMOPTS,INOPDUMP=ONIOFF command.

A new Display NET,INOPDUMP command is introduced specifically to allow the determination of TRLEs for which INOPDUMP=ON.

New messages

Three new messages are introduced as a result of the VTAM INOPDUMP enhancement:

- IST1865I GLOBAL INOPDUMP = *status*
- IST1866I TRLE = *trlename* INOPDUMP = *status*
- IST1867I INOPDUMP = *status* FOR ALL TRLE-BASED RESOURCES

Changed sample output

Displaying INOPDUMP information: The following sample displays are for displaying INOPDUMP information (given INOPDUMP=OFF for all TRLEs):

```
d net,inopdump
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = INOPDUMP
IST1865I GLOBAL INOPDUMP = OFF
IST314I END
```

```
d net,vtamopts,opt=inopdump
IST097I DISPLAY ACCEPTED
IST1188I VTAM CSV1R4 STARTED AT 13:04:42 ON 02/13/02
IST1349I COMPONENT ID IS 5695-11701-140
IST1348I VTAM STARTED AS INTERCHANGE NODE
IST1189I INOPDUMP = OFF
IST314I END
```

The following sample display is for displaying INOPDUMP information (given INOPDUMP=OFF for all TRLEs except TRLE1A):

```
d net,inopdump
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = INOPDUMP
IST1865I GLOBAL INOPDUMP = OFF
IST1866I TRLE = TRLE1A      INOPDUMP = ON
IST314I END
```

Displaying the TRLE: The following sample display is for displaying the TRLE (given INOPDUMP=ON for TRLE1A):

```
d net,id=trle1a
IST097I DISPLAY ACCEPTED
IST075I NAME = TRLE1A, TYPE = TRLE
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST087I TYPE = LEASED           , CONTROL = MPC , HPDT = YES
IST1715I MPCLEVEL = QDIO      MPCUSAGE = SHARE
IST1716I PORTNAME = NSQDIO1   LINKNUM = 0   OSA CODE LEVEL = *NA*
IST1577I HEADER SIZE = 4096 DATA SIZE = 0 STORAGE = ***NA***
IST1221I WRITE DEV = 0E29 STATUS = ACTIVE   STATE = ONLINE
IST1577I HEADER SIZE = 4092 DATA SIZE = 0 STORAGE = ***NA***
IST1221I READ  DEV = 0E28 STATUS = ACTIVE   STATE = ONLINE
IST1221I DATA DEV = 0E2A STATUS = ACTIVE   STATE = N/A
IST1724I I/O TRACE = OFF TRACE LENGTH = *NA*
IST1717I ULPID = TCPCS
IST1815I IQDIO ROUTING DISABLED
IST1757I PRIORITY1: UNCONGESTED PRIORITY2: UNCONGESTED
IST1757I PRIORITY3: UNCONGESTED PRIORITY4: UNCONGESTED
IST1801I UNITS OF WORK FOR NCB AT ADDRESS X'01461010'
IST1802I P1 CURRENT = 0 AVERAGE = 0 MAXIMUM = 0
IST1802I P2 CURRENT = 0 AVERAGE = 0 MAXIMUM = 0
IST1802I P3 CURRENT = 0 AVERAGE = 0 MAXIMUM = 0
IST1802I P4 CURRENT = 0 AVERAGE = 0 MAXIMUM = 0
IST1221I DATA DEV = 0E2B STATUS = RESET   STATE = N/A
IST1724I I/O TRACE = OFF TRACE LENGTH = *NA*
IST1500I STATE TRACE = OFF
IST1866I TRLE = TRLE1A      INOPDUMP = ON
IST314I END
```

Modifying INOPDUMP information: The following sample display is for modifying INOPDUMP information:

```
f vtam,inopdump=on,trle=trle1a
IST097I MODIFY ACCEPTED
IST1865I GLOBAL INOPDUMP = OFF
IST1866I TRLE = TRLE1A      INOPDUMP = ON
IST223I MODIFY INOPDUMP COMMAND COMPLETED
IST314I END
```

Modifying INOPDUMP start option: The following sample display is for modifying INOPDUMP start option (global InOpDump command):

```
f vtam,vtamopts,inopdump=on
IST097I MODIFY ACCEPTED
IST1865I GLOBAL INOPDUMP = ON
IST1867I INOPDUMP = ON FOR ALL TRLE BASED RESOURCES
IST223I MODIFY COMMAND COMPLETED
```

Modifying global INOPDUMP: The following sample display is for modifying global INOPDUMP:

```
f vtam,inopdump=off
IST097I MODIFY ACCEPTED
IST1865I GLOBAL INOPDUMP = OFF
IST1867I INOPDUMP = OFF FOR ALL TRLE BASED RESOURCES
IST223I MODIFY INOPDUMP COMMAND COMPLETED
```

New start options to adjust the QDIO or iQDIO storage

The amount of storage used for read processing for both QDIO and iQDIO (HiperSockets) devices has been increased. In the tables below, the "New value" columns show the new defaults. The "Old value" columns indicate the previously existing amount of storage, which can be calculated against the new value to determine the storage increase. The increases are on a per active data device basis.

OSA Express storage for read processing

Table 12. OSA Express: Amount of storage for read processing

	Old value	New value
zSeries (64bit)	.5 meg	4 meg
non 64bit	.5 meg	1 meg

HiperSockets storage for read processing

Table 13. HiperSockets: Amount of storage for read processing

CHPID MFS	Old value	New value
64k	4 meg	8 meg
40k	4 meg	5 meg
24k	3 meg	3 meg (no change)
16k	2 meg	2 meg (no change)

As a result of this increase, two new start options allow you to adjust the QDIO or iQDIO storage used for each active data device (read processing). The options are global, which means that they affect all active QDIO or iQDIO devices. For most users, the defaults of these start options are appropriate, and you will probably never have to change them. However, there are valid configurations (such as many OSA adapters, or multiple TCP/IP stacks per LPAR, or many 2nd level guests) in which you may need to adjust this storage.

The new options are as follows:

- The QDIOSTG (QDIO Storage) option allows you to define how much storage VTAM keeps available for read processing for all OSA QDIO data devices.
- The IQDIOSTG (iQDIO Storage) option allows you to define how much storage VTAM keeps available for read processing for all HiperSockets (iQDIO) data devices that use a MFS (Maximum Frame Size) of 64k.

The iQDIO MFS is defined in HCD. The storage units are defined in QDIO SBALs (QDIO read buffers). Each SBAL is 64k. The storage used for this read processing is allocated from CSM data space 4k pool, and is fixed storage.

Note: This function is being made available in z/OS CS V1R2 by APAR OW52291.

Restrictions

None.

Migration procedures

The defaults of the new storage options will be appropriate for most users; however, IBM recommends that all users perform the first task in the following table. The second and third tasks are necessary only if you determine that you need to change the storage options.

Table 14. New start options to adjust the QDIO or iQDIO storage - Migration tasks

Task	Procedure	Reference
Recommended: Review CSM specifications for fixed CSM storage.	Review (and alter if necessary) the IVTPRM00 parmlib member for CSM fixed storage.	Refer to <i>z/OS MVS Initialization and Tuning Reference</i> and refer to <i>SNA Resource Definition Reference</i> Information APAR ii13235 for additional CSM information.
Optionally: Define how much storage VTAM keeps available for read processing for all OSA QDIO data devices.	Code the QDIOSTG (QDIO Storage) start option.	<i>SNA Resource Definition Reference</i> Information APAR ii13235
Optionally: Define how much storage VTAM keeps available for read processing for all HiperSockets (iQDIO) data devices that use a MFS (Maximum Frame Size) of 64k.	Code the IQDIOSTG (iQDIO Storage) start option.	<i>SNA Resource Definition Reference</i> Information APAR ii13235

New and changed interfaces that enable use of this function

New sample display showing QDIOSTG and IQDIOSTG start options

```
d net,vtamopts,opt=iqdiostg
```

```
JOB 2 IST097I DISPLAY ACCEPTED
JOB 2 IST1188I VTAM CSV1R4 STARTED AT 16:20:15 ON 04/11/02
IST1349I COMPONENT ID IS 5695-11701-140
IST1348I VTAM STARTED AS INTERCHANGE NODE
IST1189I IQDIOSTG = 7.8M(126 SBALS)
IST314I END
```

```
f vtam,vtamopts,iqdiostg=100
```

```
JOB 2 IST097I MODIFY ACCEPTED
JOB 2 IST223I MODIFY COMMAND COMPLETED
d net,vtamopts,opt=iqdiostg
```

```
JOB 2 IST097I DISPLAY ACCEPTED
JOB 2 IST1188I VTAM CSV1R4 STARTED AT 16:20:15 ON 04/11/02
IST1349I COMPONENT ID IS 5695-11701-140
IST1348I VTAM STARTED AS INTERCHANGE NODE
IST1189I IQDIOSTG = 6.2M(100 SBALS)
IST314I END
```

```
f vtam,vtamopts,iqdiostg=min
```

```
JOB 2 IST097I MODIFY ACCEPTED
JOB 2 IST223I MODIFY COMMAND COMPLETED
d net,vtamopts,opt=iqdiostg
```

```
JOB 2 IST097I DISPLAY ACCEPTED
JOB 2 IST1188I VTAM CSV1R4 STARTED AT 16:20:15 ON 04/11/02
```

```
|          IST1349I COMPONENT ID IS 5695-11701-140  
|          IST1348I VTAM STARTED AS INTERCHANGE NODE  
|          IST1189I IQDIOSTG = 4.0M(64 SBALS)  
|          IST314I END
```

```
|
```

Chapter 2. Upgrading z/OS V1R3 Communications Server to z/OS V1R4 Communications Server

z/OS CS did not ship any function for V1R3. See Chapter 1, “z/OS V1R4 Communications Server release summary” on page 1 for descriptions of the functional enhancements and migration tasks of z/OS V1R4 Communications Server and see Chapter 3, “Upgrading z/OS V1R2 Communications Server to z/OS V1R4 Communications Server” on page 25 for the upgrading considerations of migrating from z/OS V1R2 Communications Server. Appendix A, “z/OS V1R2 Communications Server release summary” on page 73 is included for reference purposes and it includes descriptions of the functional enhancements of z/OS V1R2 Communications Server.

Chapter 3. Upgrading z/OS V1R2 Communications Server to z/OS V1R4 Communications Server

Migrating to APPN®

z/OS V1R4 Communications Server includes support for advanced peer-to-peer networking (APPN), an extension to the IBM Systems Network Architecture (SNA). This document does not explain how to upgrade an existing VTAM subarea node to an APPN node. Such an upgrade is optional; you can install z/OS V1R4 Communications Server and operate it as a subarea node. It is recommended that you install z/OS V1R4 Communications Server in a test environment, and get it to operate at your current level of function before you install any of the new functions and enhancements. For information about upgrading a VTAM subarea node to an APPN node, refer to the *z/OS Communications Server: SNA Network Implementation Guide*.

Upgrading z/OS V1R2 Communications Server

This chapter describes the effect of migrating from z/OS V1R2 Communications Server to z/OS V1R4 Communications Server.

Planning your upgrade

This section describes the following topics:

- Upward compatibility
- Downward compatibility
- Storage requirements
- Data set requirements

Upward compatibility

Upward compatibility is the ability of z/OS V1R2 Communications Server functions and user interfaces to work in z/OS V1R4 Communications Server. All z/OS V1R2 Communications Server functions are included in z/OS V1R4 Communications Server.

In z/OS V1R4 Communications Server, you might have to change the following interfaces if you want to maintain the behavior of z/OS V1R2 Communications Server:

- The KEEPACT= operand on switched PUs. In z/OS V1R2 Communications Server, the XCA Enterprise Extender line was not allowed to be automatically reactivated after link INOP. In z/OS V1R4 Communications Server, the default for KEEPACT is YES and it enables XCA Enterprise Extender line to be automatically reactivated after link INOP. If you want to keep the z/OS V1R2 Communications Server behavior, code KEEPACT=NO on the GROUP or LINE statement in the XCA major node used for Enterprise Extender so that VTAM will not attempt to automatically reactivate the line.
- The ,F modifier has been extended to the CSALIMIT start option. It was previously only applicable to the MODIFY CSALIMIT and MODIFY VTAMOPTS,CSALIMIT commands.

In z/OS V1R4 Communications Server, the default behavior of CSALIMIT is for VTAM to continue executing beyond the value specified for CSALIMIT if sufficient CSA and ECSA storage is available. If you decide you want a value currently coded for the CSALIMIT start option to execute exactly as it did in z/OS V1R2

Communications Server, you should use the new CSALIMIT start option modifier and add a comma F after the value. For example, CSALIMIT=(value,F).

You do not have to change any other user interfaces to continue to use z/OS V1R2 Communications Server functions in z/OS V1R4 Communications Server unless your setup touches upon automated operation procedures. If so, updates may be required.

Automated operation procedures

If you use automated operation procedures in z/OS V1R2 Communications Server, you might need to change your operating procedures in z/OS V1R4 Communications Server. See “Changes to commands” on page 41, “New and changed command output” on page 42, and “New and changed network operator messages” on page 44 for further information.

Note: Even if you do not use *automated* operation procedures, you might have to make changes to your manual operation procedures because of items such as new or changed messages, commands, or parameters introduced in z/OS V1R4 Communications Server.

Downward compatibility

Downward compatibility is the ability of z/OS V1R4 Communications Server to communicate with and work with prior versions and releases of network products. If you have in your network previous versions and releases of Communications Server for OS/390, VTAM, and other products with which z/OS V1R4 Communications Server must communicate, you might need to apply program temporary fixes (PTFs) to those versions, releases, and products to ensure that they are compatible; refer to the *z/OS Program Directory* for z/OS V1R4 Communications Server.

Refer to the preventive service planning (PSP) bucket for a complete list of the IBM products to which you might need to apply PTFs, the conditions under which you might need to apply the PTFs, and the PTF numbers. The PSP bucket is available through the following sources:

- Information Access
- SoftwareXcel Extended
- IBMLink (ServiceLink)

If you do not have access to these sources, contact the IBM Support Center at 1-800-237-5511 (U.S. and Canada) to determine the PTFs you need to apply.

Storage requirements

The storage required to install and operate z/OS V1R4 Communications Server has increased from that required to install and operate z/OS V1R2 Communications Server; this is true regardless of whether you use the new functions and enhancements introduced in z/OS V1R4 Communications Server.

The APPN topology traces will result in an additional one to ten 4K pages for the TRS table of topology deletions, 110 bytes per node record for the NDREC traces, and 180 bytes per TG record for the TGREC traces.

See Appendix B, “Storage estimate worksheets” on page 103 to determine the approximate storage required to install and operate this release on your system.

Data set requirements

Storage requirements for target and distribution libraries (data sets) changed in z/OS V1R4 Communications Server. The ISPF panels for the VIT Analysis Tool and VTAMMAP Analysis are no longer shipped as source panels that require post-installation steps. These panels are now shipped as compiled panels in the IPCS distribution libraries. All libraries required to install Communications Server for z/OS V1R2 Communications Server are still required to install z/OS V1R4 Communications Server, with the exception of the distribution and target libraries listed in Table 15; those libraries will no longer be shipped or referenced.

Table 15. Libraries deleted in z/OS CS V1R4

Deleted distribution library	Deleted target library	Description
AISTCLI0	SISTCLI0	REXX execs
AISTCLS1	SISTCLS1	CLISTs
AISTMSG0	SISTMSG0	Messages
AISTPNL0	SISTPNL0	Compiled panels
AISTPNL1	SISTPNL1	Source panels

The parts formerly shipped and distributed in these libraries used the IPCS target and distribution libraries as shown in Table 17. Prior to z/OS CS V1R4, the post-installation steps required creation of a user-defined data set for compiling ISPF tables. These data sets are no longer needed; see Table 16. Instead, the tables are shipped already compiled; see Table 17.

Table 16. Target data sets for dump and trace tools that are no longer used in z/OS CS V1R4

Target data set	Action	DDNAME	Comment
User-defined data set	Concatenate	ISPTLIB	This data set can be a new or existing one and needs to be the same data set used for ISPTABL.
User-defined data set (same as used for ISPTLIB)	Replace	ISPTABL	Because ISPTABL can only point to one data set, this data set needs to replace any previous data set (or DDNAME for ISPTLIB).

You must change any JCL that references the deleted target and distribution libraries listed in Table 16 and Table 17. In z/OS CS V1R4, use the following data sets for the VIT Analysis Tool or VTAMMAP Analysis ISPF panels. Failure to do so may cause you to incorrectly use an old copy of the ISPF panels, REXX execs, and CLISTs.

Table 17. DD names used for VIT Analysis Tool and VTAMMAP Analysis ISPF panels in z/OS CS V1R4

DD name	Target library	Description	Number of parts
SYSEXEC	SBLSCLI0	CLISTs and REXX execs	7

Table 17. DD names used for VIT Analysis Tool and VTAMMAP Analysis ISPF panels in z/OS CS V1R4 (continued)

DD name	Target library	Description	Number of parts
SYSPROC	SBLSCLI0	CLISTs and REXX execs	7
ISPTLIB	SBLSTBL0	Tables, keys, commands	14
ISPMLIB	SBLSMMSG0	Messages	12
ISPPLIB	SBLSPNL0	Panels	392

See Figure 2 on page 65 for an example of a LOGON PROC. The data sets necessary for the z/OS Communications Server dump analysis and the VIT analysis tool are shown in bold print.

Upgrading user interfaces

You may need to change existing z/OS V1R2 Communications Server user interfaces: system definitions, application programs, exit routines, tables, modules, and operating procedures.

New start options

z/OS V1R4 Communications Server introduces two new start options to allow you to adjust the QDIO or iQDIO storage used for each data device (read processing). They are QDIOSTG and IQDIOSTG. See “New start options to adjust the QDIO or iQDIO storage” on page 20 for details.

These new start options are documented in the *SNA Resource Definition Reference Information* APAR ii13235.

Changed start option behavior

z/OS V1R4 Communications Server changes the behavior of the CSALIMIT start option. See “CSALIMIT start option behavioral change” on page 1 for details.

For complete information about all start options, refer to *z/OS Communications Server: SNA Resource Definition Reference*.

Changes to definition statements

The following updates were made to the SNA definition statements in z/OS V1R4 Communications Server:

- New KEEPACT operand on GROUP and LINE for XCA Major Node for EE only.
- New REDDELAY operand on PATH for Switched Major Node for EE only.
- Changed REDIAL operand on PATH for Switched Major Node for EE only.
- New DWINOP for PU for switched Major Node for EE only.
- The use of the CPNAME operand on CDRSC definitions is changed to allow it to be coded on an End Node.

In addition, new operands were added to the Cross-Domain Resource Major Node:

- NATIVE = YES Specifies that the resource is located in the native APPN subnetwork.
- NATIVE=NO Specifies that the resource is not located in the native APPN subnetwork

- SUBAREA=YES Specifies that a CDRM session must be crossed to reach the resource.
- SUBAREA=NO Specifies that the resource can be reached using an entirely APPN path

For complete information about all changed and new definition statements, refer to the *z/OS Communications Server: SNA Resource Definition Reference*.

Changes to IBM-supplied default tables and modules

If you have modified any IBM-supplied default user definable tables or user modifiable modules in z/OS V1R2 Communications Server, and have *not renamed* them, those tables and modules are deleted and replaced when you install z/OS V1R4 Communications Server.

To preserve your *modified* IBM-supplied z/OS V1R2 Communications Server tables and modules, make and rename copies of them before you install z/OS V1R4 Communications Server.

To install your *modified and renamed* IBM-supplied z/OS V1R2 Communications Server tables and modules onto z/OS V1R4 Communications Server, perform the following steps:

1. After you install z/OS V1R4 Communications Server, compare your tables and modules to those shipped with z/OS V1R4 Communications Server.
2. Merge differences into your modified tables and modules.
3. Reassemble your modified tables and modules.

For information about the logon mode table and the USS table, refer to the *z/OS Communications Server: SNA Resource Definition Reference*.

Changes to commands

Table 18 on page 29 lists the operator commands changed since z/OS V1R2 Communications Server.

Table 18. Commands changed that might affect migration from z/OS V1R2 Communications Server

Command	Description
DISPLAY ID=rtpname only	Command has a new HPRDIAG operand.
DISPLAY INOPDUMP	Command is new in z/OS CS V1R4. It determines the global and TRLE status for INOPDUMP.
MODIFY INOPDUMP	Command is new in z/OS CS V1R4. It controls the automatic dumping of VTAM when an inoperative condition occurs in one of VTAM's data link control layers. Note that this command provides additional capabilities beyond that available through the MODIFY VTAMOPTS,INOPDUMP command.
VARY ACT,UPDATE	Command is updated to allow specification of a CDRSC major node on the command.

For complete information about all changed and new commands, refer to *z/OS Communications Server: SNA Operation*.

New and changed command output

This section details changes to command output since z/OS V1R2 Communications Server that might affect automated operation procedures. For complete information about all changed and new commands, refer to *z/OS Communications Server: SNA Operation*.

DISPLAY BFRUSE

Message ISTNC01I has been added to the display for BFRUSE to show you how much CSA and ECSA storage is available. See “Changed command output” on page 2 of the CSALIMIT start option behavioral change description for details.

DISPLAY ID=rtpname

z/OS V1R4 Communications Server adds additional data to the display for an RTP physical unit for diagnostic purposes. The operator can control whether or not most of this additional data is displayed. See the “Changed output” on page 7 of the display ID=rtpname diagnostic enhancement for details.

DISPLAY INOPDUMP and MODIFY INOPDUMP and MODIFY VTAMOPTS

z/OS V1R4 Communications Server adds INOPDUMP information to displays. See the “Changed sample output” on page 18 of the VTAM INOPDUMP enhancement for sample output.

New and changed network operator messages

z/OS V1R4 Communications Server introduces the following new messages:

- IST1817I PATH SWITCH REASON: RTP CONNECTION UNAVAILABLE
- IST1818I PATH SWITCH REASON: SHORT REQUEST RETRY LIMIT EXHAUSTED
- IST1819I PATH SWITCH REASON: TG INOP
- IST1820I PATH SWITCH REASON: MODIFY RTP COMMAND ISSUED
- IST1821I PATH SWITCH REASON: AUTO PATH SWITCH FOR PSRETRY
- IST1822I PATH SWITCH REASON: UNKNOWN]
- IST1831I 56% OF SYSTEM CSA STORAGE REMAINING = 1056964K
- IST1832I CSALIMIT VALUE %%%%%%%%%%K MAY BE TOO SMALL
- IST1833I CSA STORAGE ALLOCATION EXCEEDS SPECIFIED CSALIMIT VALUE
- IST1841I ACTUAL DATA FLOW RATE = actual units
- IST1842I NUMBER OF NLPS RETRANSMITTED = retransmitted
- IST1843I NUMBER OF NLPS ON WAITING-TO-SEND QUEUE = waitsend
- IST1844I ARB MODE = mode
- IST1845I BOUNDARY DIVIDING REGIONS lower AND upper = boundary MILLISECONDS
- IST1846I Type RECEIVER THRESHOLD = threshold MICROSECONDS
- IST1847I NUMBER OF NLPS ON WAITING-FOR-ACKNOWLEDGEMENT QUEUE = waitack IST1862I ARB MAXIMUM SEND RATE = maximum units
- IST1848I SEND BYTE COUNT = sendcount RECEIVE BYTE COUNT = receivecount
- IST1849I LARGEST NLP SENT = size BYTES
- IST1850I LARGEST NLP RECEIVED = size BYTES
- IST1851I SMOOTHED ROUND TRIP TIME = smoothed_time MILLISECONDS

- IST1852I LIVENESS TIMER = liveness SECONDS
- IST1853I NUMBER OF NLPS ON OUT-OF-SEQUENCE QUEUE = outofsequence
- IST1854I NUMBER OF NLPS ON INBOUND SEGMENTS QUEUE = inboundsegs
- IST1855I NUMBER OF SESSIONS USING RTP = sessions
- IST1860I NUMBER OF NLPS SENT = sent - OVERFLOW = overflow
- IST1861I NUMBER OF NLPS RECEIVED = received - OVERFLOW = overflow
- IST1856I LAST PATHSWITCH OCCURRENCE WAS ON date AT® time
- IST1857I BACKPRESSURE REASON COUNTS:
- IST1858I PATHSWITCH SEND QUEUE MAX STORAGE FAILURE
- IST1859I pathswitch sendqmax storefail
- IST1865I GLOBAL INOPDUMP = *status*
- IST1866I TRLE = *trlename* INOPDUMP = *status*
- IST1867I INOPDUMP = *status* FOR ALL TRLE-BASED RESOURCES

z/OS V1R4 Communications Server changes the following messages:

- IST1667I SYSTEM CSA LIMIT = nnnnnnnnK
- IST1260I type TRUNCATED - INSUFFICIENT STORAGE

Refer to *z/OS Communications Server: SNA Messages* for complete information on new and changed messages.

Changed VTAMMAP command output

z/OS V1R4 CS includes estimated timestamps for the VIT records extracted from both internal VITs (ECSA and data space) by the VTAMMAP VITAL dump formatting tool. These timestamps are approximated using times saved in VTAM internal control blocks and available at dump formatting time to VITAL. The actual timestamps contained in the dump record the times when certain landmark events occurred in writing the internal VIT records, such as the time that each VIT wrapped and the time that data from the ECSA VIT was last copied to the data space VIT.

Refer to *z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures* for complete details.

Changes to control blocks

If you use any of the control blocks documented in *z/OS Communications Server: SNA Data Areas Volume 1* and *z/OS Communications Server: SNA Data Areas Volume 2*, refer to these documents to determine whether those control blocks have changed.

Changes to VTAM IPCS CLIST

The VTAM IPCS CLIST ISTVMAP was changed by APAR OW51239 so that there is a new ASID parameter, and that new ASID is now the default. The VTAM IPCS CLIST ISTVMAP maps the storage for an address space. Previously, the only ASID the CLIST used was VTAM's. Now, with this APAR, the VTAM ASID is selected only if three other tests fail. This CLIST can now be used with any ASID, not just VTAM's.

See "VTAM IPCS CLIST changes" on page 15 for more information.

| **Implementing new functions and enhancements**

| The following optional functions and enhancements were introduced in z/OS V1R4
| Communications Server:

- | • “CSALIMIT start option behavioral change” on page 1
- | • “Enterprise Extender dial processing enhancements” on page 3
- | • “Enterprise Extender addressing enhancement for logical lines and PUs” on
| page 4
- | • “Enable HPR-only VRNs for interchange sessions” on page 5
- | • “Display ID=rtpname diagnostic enhancement” on page 6
- | • “SRB mode dump enhancement” on page 8
- | • “Increase maximum value for AUTOGEN on XCA major nodes” on page 9
- | • “VIT data timestamp enhancement” on page 9
- | • “VARY ACT,UPDATE command for CDRSC Major Nodes enhancement” on
| page 10
- | • “OPEN Application Control Block (ACB) limit increase” on page 11
- | • “NQNModes support for Directory Services (DS) database entries” on page 12
- | • “Changes to installing dump analysis and trace analysis tools” on page 13
- | • “APPN topology traces enhancements” on page 14
- | • “VTAM INOPDUMP enhancement” on page 16
- | • “New start options to adjust the QDIO or IQDIO storage” on page 20

| See Appendix A, “z/OS V1R2 Communications Server release summary” on
| page 73 for descriptions of the new functions and enhancements of z/OS V1R2
| Communications Server. Note that there were no enhancements made in z/OS
| V1R1 Communications Server or in z/OS V1R3 Communications Server.

Chapter 4. Upgrading z/OS V1R1 Communications Server to z/OS V1R4 Communications Server

The migration considerations of migrating to z/OS V1R4 Communications Server from z/OS V1R1 Communications Server are identical to the migration considerations of migrating from Communications Server for OS/390 V2R10; see Chapter 5, “Upgrading Communications Server for OS/390 V2R10 to z/OS V1R4 Communications Server” on page 35 for those upgrading considerations. See Chapter 1, “z/OS V1R4 Communications Server release summary” on page 1 for descriptions of the functional enhancements and migration tasks of z/OS V1R4 Communications Server and see Appendix A, “z/OS V1R2 Communications Server release summary” on page 73 for descriptions of the functional enhancements and migration tasks of z/OS V1R2 Communications Server.

Chapter 5. Upgrading Communications Server for OS/390 V2R10 to z/OS V1R4 Communications Server

Migrating to APPN

z/OS V1R4 Communications Server includes support for advanced peer-to-peer networking (APPN), an extension to the IBM Systems Network Architecture (SNA). This document does not explain how to upgrade an existing VTAM subarea node to an APPN node. Such an upgrade is optional; you can install z/OS V1R4 Communications Server and operate it as a subarea node. It is recommended that you install z/OS V1R4 Communications Server in a test environment, and get it to operate at your current level of function before you install any of the new functions and enhancements. For information about upgrading a VTAM subarea node to an APPN node, refer to the *z/OS Communications Server: SNA Network Implementation Guide*.

Upgrading Communications Server for OS/390 V2R10

This chapter describes the effect of migrating from CS for OS/390 V2R10 to z/OS V1R4 Communications Server.

Planning your upgrade

This section describes the following topics:

- Upward compatibility
- Downward compatibility
- Storage requirements
- Data set requirements

Upward compatibility

Upward compatibility is the ability of Communications Server for OS/390 V2R10 functions and user interfaces to work in z/OS V1R4 Communications Server. All Communications Server for OS/390 V2R10 functions are included in z/OS V1R4 Communications Server.

In z/OS V1R4 Communications Server, you might have to change the following interfaces if you want to maintain the behavior of Communications Server for OS/390 V2R10:

- The KEEPACT= operand on switched PUs. In Communications Server for OS/390 V2R10, the XCA Enterprise Extender line was not allowed to be automatically reactivated after link INOP. In z/OS V1R4 Communications Server, the default for KEEPACT is YES and it enables XCA Enterprise Extender line to be automatically reactivated after link INOP. If you want to keep the Communications Server for OS/390 V2R10 behavior, code KEEPACT=NO on the GROUP or LINE statement in the XCA major node used for Enterprise Extender so that VTAM will not attempt to automatically reactivate the line.
- The ,F modifier has been extended to the CSALIMIT start option. It was previously only applicable to the MODIFY CSALIMIT and MODIFY VTAMOPTS,CSALIMIT commands.

In z/OS V1R4 Communications Server, the default behavior of CSALIMIT is for VTAM to continue executing beyond the value specified for CSALIMIT if sufficient CSA and ECSA storage is available. If you decide you want a value currently coded for the CSALIMIT start option to execute exactly as it did in

Communications Server for OS/390 V2R10, you should use the new CSALIMIT start option modifier and add a comma F after the value. For example, CSALIMIT=(value,F).

You do not have to change any other user interfaces to continue to use Communications Server for OS/390 V2R10 functions in z/OS V1R4 Communications Server unless your setup touches upon automated operation procedures. If so, updates may be required.

Automated operation procedures

If you use automated operation procedures in Communications Server for OS/390 V2R10, you might need to change your operating procedures in z/OS V1R4 Communications Server. See “Changes to commands” on page 41, “New and changed command output” on page 42, and “New and changed network operator messages” on page 44 for further information.

Note: Even if you do not use *automated* operation procedures, you might have to make changes to your manual operation procedures because of items such as new or changed messages, commands, or parameters introduced in z/OS V1R4 Communications Server.

Downward compatibility

Downward compatibility is the ability of z/OS V1R4 Communications Server to communicate with and work with prior versions and releases of network products. If you have in your network previous versions and releases of Communications Server for OS/390, VTAM, and other products with which z/OS V1R4 Communications Server must communicate, you might need to apply program temporary fixes (PTFs) to those versions, releases, and products to ensure that they are compatible; refer to the *z/OS Program Directory* for z/OS V1R4 Communications Server.

Refer to the preventive service planning (PSP) bucket for a complete list of the IBM products to which you might need to apply PTFs, the conditions under which you might need to apply the PTFs, and the PTF numbers. The PSP bucket is available through the following sources:

- Information Access
- SoftwareXcel Extended
- IBMLink (ServiceLink)

If you do not have access to these sources, contact the IBM Support Center at 1-800-237-5511 (U.S. and Canada) to determine the PTFs you need to apply.

Storage requirements

The storage required to install and operate z/OS V1R4 Communications Server has increased from that required to install and operate Communications Server for OS/390 V2R10; this is true regardless of whether you use the new functions and enhancements introduced in z/OS V1R4 Communications Server.

When z/OS CS is executing in z/Architecture™ mode, both VTAM and TCP/IP support will tend to acquire CSM data space storage backed on or above the 2-gigabyte bar. This support will not significantly change the total amount of fixed storage in use, but most of the CSM data space fixed storage will be backed on or above the 2-gigabyte bar. The fixed limit value in IVTPRM00 applies to the total of fixed storage above and below the bar.

The APPN topology traces will result in an additional one to ten 4K pages for the TRS table of topology deletions, 110 bytes per node record for the NDREC traces, and 180 bytes per TG record for the TGREC traces.

See Appendix B, “Storage estimate worksheets” on page 103 to determine the approximate storage required to install and operate z/OS V1R4 Communications Server on your system.

Data set requirements

Storage requirements for target and distribution libraries (data sets) changed in z/OS V1R4 Communications Server. The ISPF panels for the VIT Analysis Tool and VTAMMAP Analysis are no longer shipped as source panels that require post-installation steps. These panels are now shipped as compiled panels in the IPCS distribution libraries.

All libraries required to install Communications Server for z/OS V1R2 Communications Server are still required to install z/OS V1R4 Communications Server, with the following exceptions:

- The distribution and target libraries listed in Table 19 will no longer be shipped or referenced.
- SISTDBUG is no longer used. The last remaining module that used SISTDBUG, the VIT Analysis Tool module (ISTRAFT1), is now shipped in SYS1.MIGLIB instead of SISTDBUG. You must change any JCL that references SISTDBUG to instead reference SYS1.MIGLIB. Failure to do so may cause you to incorrectly use an old copy of ISTRAFT1.

Table 19. Libraries deleted in z/OS CS V1R4

Deleted distribution library	Deleted target library	Description
AISTCLI0	SISTCLI0	REXX execs
AISTCLS1	SISTCLS1	CLISTs
AISTMSG0	SISTMSG0	Messages
AISTPNL0	SISTPNL0	Compiled panels
AISTPNL1	SISTPNL1	Source panels

The parts formerly shipped and distributed in these libraries used the IPCS target and distribution libraries as shown in Table 21 on page 38. Prior to z/OS CS V1R4, the post-installation steps required creation of a user-defined data set for compiling ISPF tables. These data sets are no longer needed; see Table 20. Instead, the tables are shipped already compiled; see Table 21 on page 38.

Table 20. Target data sets for dump and trace tools that are no longer used in z/OS CS V1R4

Target data set	Action	DDNAME	Comment
User-defined data set	Concatenate	ISPTLIB	This data set can be a new or existing one and needs to be the same data set used for ISPTABL.

Table 20. Target data sets for dump and trace tools that are no longer used in z/OS CS V1R4 (continued)

Target data set	Action	DDNAME	Comment
User-defined data set (same as used for ISPTLIB)	Replace	ISPTABL	Because ISPTABL can only point to one data set, this data set needs to replace any previous data set (or DDNAME for ISPTLIB).

You must change any JCL that references the deleted target and distribution libraries listed in Table 16 on page 27 and Table 21. In z/OS CS V1R4, use the following data sets for the VIT Analysis Tool or VTAMMAP Analysis ISPF panels. Failure to do so may cause you to incorrectly use an old copy of the ISPF panels, REXX execs, and CLISTs.

Table 21. DD names used for VIT Analysis Tool and VTAMMAP Analysis ISPF panels in z/OS CS V1R4

DD name	Target library	Description	Number of parts
SYSEXEC	SBLSCLI0	CLISTs and REXX execs	7
SYSPROC	SBLSCLI0	CLISTs and REXX execs	7
ISPTLIB	SBLSTBL0	Tables, keys, commands	14
ISPMLIB	SBLMSG0	Messages	12
ISPPLIB	SBLSPNL0	Panels	392

See Figure 2 on page 65 for an example of a LOGON PROC. The data sets necessary for the z/OS Communications Server dump analysis and the VIT analysis tool are shown in bold print.

Upgrading user interfaces

You may need to change some of the following existing Communications Server for OS/390 V2R10 user interfaces:

- system definitions
- application programs
- exit routines
- tables
- modules
- operating procedures

New start options

Table 22 on page 39 lists start options that are new since Communications Server for OS/390 V2R10.

For complete information about all start options, refer to *z/OS Communications Server: SNA Resource Definition Reference*.

Table 22. Start options new since CS for OS/390 V2R10

Start option	Description
API64R	Controls the passing of 64-bit backed storage to application programs across the API. API64R=YES is the default and allows 64-bit backed storage to be passed to all applications. API64R=NO can be used to force all storage being passed to all applications to be 31-bit backed. API64R=NO may cause a data move; therefore use API64R=YES unless API64R=NO is required.
CNNRTMSG	Controls the suppression of the IST1774I message group. The default for CNNRTMSG is to suppress the message group, and it is dynamically modifiable.
IQDCHPID	IQDCHPID=chpid specifies the (hexadecimal) Channel Path ID (CHPID) that is to be used for HiperSockets communications from one Logical Partition (LPAR) to other LPARs within the central electronics complex (CEC).
IQDIOSTG	Defines how much storage VTAM keeps available for read processing for all HiperSockets (iQDIO) data devices that use a MFS (Maximum Frame Size) of 64k.
QDIOSTG	Defines how much storage VTAM keeps available for read processing for all OSA QDIO data devices.

See “Sample display showing VTAM start options that are new to z/OS CS V1R2” on page 100 for sample output of the CNNRTMSG, IQDCHPID, and API64R start options. See “New sample display showing QDIOSTG and IQDIOSTG start options” on page 21 for sample output of the QDIOSTG and IQDIOSTG start options.

Changed start option behavior

z/OS V1R4 Communications Server changes the behavior of the CSALIMIT start option. See “CSALIMIT start option behavioral change” on page 1 for details.

For complete information about all start options, refer to *z/OS Communications Server: SNA Resource Definition Reference*.

Changes to definition statements

The following updates were made to the SNA definition statements in z/OS V1R4 Communications Server:

- New KEEPACT operand on GROUP and LINE for XCA Major Node for EE only.
- New REDDELAY operand on PATH for Switched Major Node for EE only.
- Changed REDIAL operand on PATH for Switched Major Node for EE only.
- New DWINOP for PU for switched Major Node for EE only.
- The use of the CPNAME operand on CDRSC definitions is changed to allow it to be coded on an End Node.

In addition, new operands were added to the Cross-Domain Resource Major Node:

- NATIVE = YES Specifies that the resource is located in the native APPN subnetwork.
- NATIVE=NO Specifies that the resource is not located in the native APPN subnetwork
- SUBAREA=YES Specifies that a CDRM session must be crossed to reach the resource.
- SUBAREA=NO Specifies that the resource can be reached using an entirely APPN path

For complete information about all changed and new definition statements, refer to the *z/OS Communications Server: SNA Resource Definition Reference*.

Changes to Exit Parameter List (XPL)

A new MAXinMEG bit is added to the ISTXPL exit parameter. Refer to *z/OS Communications Server: SNA Data Areas Volume 1* for complete details.

Changes to IBM-supplied default tables and modules

If you have modified any IBM-supplied default user definable tables or user modifiable modules in Communications Server for OS/390 V2R10, and have *not renamed* them, those tables and modules are deleted and replaced when you install z/OS V1R4 Communications Server.

To preserve your *modified* IBM-supplied CS for OS/390 V2R10 tables and modules, make and rename copies of them before you install z/OS V1R4 Communications Server.

To install your *modified and renamed* IBM-supplied CS for OS/390 V2R10 tables and modules onto z/OS V1R4 Communications Server, perform the following steps:

1. After you install z/OS V1R4 Communications Server, compare your tables and modules to those shipped with z/OS V1R4 Communications Server.
2. Merge differences into your modified tables and modules.
3. Reassemble your modified tables and modules.

For information about the logon mode table and the USS table, refer to the *z/OS Communications Server: SNA Resource Definition Reference*.

Changes to IBM-supplied default tables

The following IBM-supplied default table has changed:

- **Message Flooding Prevention Table** added message flooding prevention for the IST1774I message group.

Changes to RAPI and APPCCMD support

LUAFFIN = APPL | NOTAPPL is a new RAPI keyword. This option indicates that a specific LU affinity is desired for an OPNDST/OPNSEC and is therefore specified in this NIB.

LUAFFIN = APPL | NOTAPPL is also a new parameter for two APPCCMD macros.

In addition to the enhancement to both RAPI and APPCCMD that allows LU level of control of affinity, the RAPI CHANGE macro (which is used by both RAPI and APPCCMD interfaces to support Generic Resources) now provides a new OPTCD that forces the affinity to terminate. The new CHANGE request is OPTCD = ENDAFFNF (End Affinity Force). The OPTCD causes VTAM to terminate the affinity regardless of session count and regardless of who (VTAM | APPL) currently owns the affinity. A sample invocation follows:

```
CHANGE ACB=IMS1,NIB=NIB01,OPTCD=ENDAFFNF
NIB01 NIB NAME=LUABC,NETID=NETA,GNAME=IMS,LISTEND=YES
```

In this example, the GR affinity will be terminated for LUABC (regardless of session count or ownership).

Refer to the LUAFFIN topics in *z/OS Communications Server: SNA Programming*, *z/OS Communications Server: SNA Programmer's LU 6.2 Guide*, and *z/OS Communications Server: SNA Programmer's LU 6.2 Reference* for information.

Changes to commands

Table 23 on page 41 lists the operator commands changed since Communications Server for OS/390 V2R10.

Table 23. Commands changed that might affect migration from Communications Server for OS/390 V2R10

Command	Operand	Description
DISPLAY COS	TYPE=APPN	Displays APPN Class of Service entries.
DISPLAY ID=rtpname only	HPRDIAG	Displays additional diagnostic and performance information for an RTP physical unit.
DISPLAY INOPDUMP		Command is new in z/OS CS V1R4. It determines the global and TRLE status for INOPDUMP.
DISPLAY RTPS	ID and TEST	Initiates the HPR route test.
DISPLAY TOPO	LIST=TDUINFO	Displays TDU processing information.
DISPLAY TRL	TRLE=IUTIQDIO	Displays details about device congestion when specific I/O device has an excessive amount of queued outbound work.
DISPLAY VTAMOPTS	CNNRTMSG=NOSUPP	Issues message group IST1774I when optimal route through CNN is not chosen.
	IQDCHPID=CHPID	Specifies the Channel Path ID (CHPID) used for iQDIO communications from one LP to another within a CEC.
	API64R=YES and API64R=NO	Controls the passing of 64-bit backed storage to the application programs across the API.
MODIFY INOPDUMP command		Command is new in z/OS CS V1R4. It controls the automatic dumping of VTAM when an inoperative condition occurs in one of VTAM's data link control layers. Note that this command provides additional capabilities beyond that available through the MODIFY VTAMOPTS,INOPDUMP command.
MODIFY NOTNSTAT	TRLE=	Controls tuning statistics for TRLE controlled devices.
MODIFY TNSTAT	ACTION=	Controls processing and initiation options for CNSL and/or TIME operands.
	TRLE=	Controls tuning statistics for TRLE controlled devices.
MODIFY VTAMOPTS	CNNRTMSG=NOSUPP	Issues message group IST1774I when optimal route through CNN is not chosen.
	IQDCHPID=CHPID	Specifies the Channel Path ID (CHPID) used for iQDIO communications from one LP to another within a CEC.
	API64R=YES and API64R=NO	Controls the passing of 64-bit backed storage to the application programs across the API.
VARY ACT	UPDATE	Command is updated to allow specification of a CDRSC major node on the command.

For complete information about all changed and new commands, refer to *z/OS Communications Server: SNA Operation*.

New and changed command output

This section details changes to command output since Communications Server for OS/390 V2R10 that might affect automated operation procedures. For complete information about all changed and new commands, refer to *z/OS Communications Server: SNA Operation*.

DISPLAY BFRUSE

Message ISTNC01I has been added to the display for BFRUSE to indicate how much CSA and ECSA storage is available. See “Changed command output” on page 2 of the CSALIMIT start option behavioral change description for details.

DISPLAY COS

The command output is changed when using the D NET,COS command so that it displays the APPN class of service entries. In addition, the IST350I DISPLAY TYPE = SUBAREA COS is added to the existing example for displaying a class of service table for a specific PU. See the “Changed command output” on page 78 for display APPN Class of Service for sample output.

DISPLAY CPCP

DISPLAY CPCP is a new operator command that displays the CP-CP session status to adjacent nodes. See the “New operator command” on page 99 for CP-CP diagnostic enhancements for sample output.

DISPLAY CSM

The DISPLAY CSM command response is changed to differentiate between 31-bit backed and 64-bit backed CSM data space pools. See the “Changed command output” on page 87 of 64-bit real addressing support for details and sample output.

DISPLAY ID=rtpname

z/OS V1R4 Communications Server adds additional data to the display for an RTP physical unit for diagnostic purposes. The operator can control whether or not most of this additional data is displayed. See the “Changed output” on page 7 of the display ID=rtpname diagnostic enhancement for details.

DISPLAY INOPDUMP and MODIFY INOPDUMP and MODIFY VTAMOPTS

z/OS V1R4 Communications Server adds INOPDUMP information to displays. See the “Changed sample output” on page 18 of the VTAM INOPDUMP enhancement for sample output.

DISPLAY RTPS

The new operands, ID and TEST, on the DISPLAY RTPS command initiate the HPR Route Test. See the “New operands” on page 98 for HPR Route Test Support for sample output.

DISPLAY TOPO

The command output is changed when using the DISPLAY TOPO,LIST=SUMMARY. Message IST1781I is added to show the time stamp of the last topology garbage collection. The command output is also changed to include new messages IST1769I, IST1770I, IST1771I, and IST1772I for the display TOPO command for a specific node. See the “Changed command output” on page 76 of Display TDU (Topology Database Update) Statistics for sample output.

LIST=TDUINFO is a new option added to the DISPLAY TOPO command. The related operands, SCOPE=RECENTIACTIVITY NUM=number CLEAR=YESINO, are

valid only if LIST=TDUINFO is specified on the command. See the “New command option” on page 77 of Display TDU (Topology Database Update) Statistics for sample output.

The nodetype displayed on the IST1296I message will display GVRN for TOPO information related to a Global Virtual Routing Network. The IST1295I and IST1296 messages will be displayed on various D,NET,TOPO commands. See the “Changed display output” on page 84 of the Enterprise Extender global connection network enhancements for sample output.

DISPLAY TRL

The DISPLAY TRL command output is enhanced. The new message IST1800I will follow IST1314I for any device that is currently marked congested. The message will display the TRLE name and the text **** CONGESTED ****. Because QDIO devices already have a concept of congestion, that criteria will not be changed. The command output provides a quick means for the operator to view all devices for a potential storage problem.

When a device is flagged as ****CONGESTED****, the operator can obtain additional storage details about the element counts using the existing DISPLAY TRL,TRLE=trlename command.

The two new messages, IST1801I and IST1802I, will always be displayed when the TRLE is displayed. (It can be displayed by either issuing DISPLAY TRL,TRLE=trlename or DISPLAY ID=trlename.) The new heading message and the new counts message provide the UNITS of WORK (current average and maximum) within this DLC.

See the “Changed display output” on page 94 of DLC work unit tracking for sample output.

The same display of an individual TRLE for a QDIO or a HiperSockets device will provide the details of each priority queue, using the same new message IST1802I but with a variable text (“P1-4”) displayed for the priority queue numbers. See “Changed command output” on page 80 for sample output of displaying a HiperSockets TRLE.

DISPLAY VTAMOPTS

See “Sample display showing VTAM start options that are new to z/OS CS V1R2” on page 100 for an example of displaying all VTAM start options.

MODIFY TNSTAT

The device tuning statistics enhancements function introduces a TRLE operand to the MODIFY TNSTAT and the MODIFY NOTNSTAT commands. This controls tuning statistics for TRLE controlled devices. When the TRLE operand is specified, initiation and termination of statistical recording for non-TRLE devices is unaffected.

The MODIFY TNSTAT command also has a new operand, ACTION.

MODIFY VTAMOPTS

The command display is changed when using the CNNRTMSG option on DISPLAY VTAMOPTS and MODIFY VTAMOPTS.

The MODIFY VTAMOPTS command is updated to include API64R, CNNRTMSG, and IQDCHPID.

MODIFY TRACE and MODIFY NOTRACE

The SCOPE=ALL parameter for the MODIFY TRACE command and for the MODIFY NOTRACE command is modified for the I/O and buffer trace of a model application. In addition to its previous function, SCOPE=ALL on the MODIFY TRACE command also activates traces for all existing dynamic applications created using the model dynamic applications. Likewise, in addition to its previous function, SCOPE=ALL on the MODIFY NOTRACE command also turns off trace options for all existing dynamic applications created using the model application.

In other words, when SCOPE=ALL is coded, the trace options for existing dynamic applications created using the model application specified on the command will be turned on (if the command is MODIFY TRACE) or turned off (if the command is MODIFY NOTRACE). Prior to z/OS V1R2 Communications Server, when the ID operand specifies a model application name, the SCOPE=ALL was treated exactly like SCOPE=ONLY, and the trace options for the existing dynamic applications created using the model were not affected by the commands (MODIFY TRACE or MODIFY NOTRACE).

See “Changed parameters for the MODIFY TRACE and MODIFY NOTRACE commands” on page 92 for sample output.

New and changed network operator messages

The following messages contain field realignment that may affect automation:

- IST1224I %4 %4 %2 %4
- IST1298I %3 %4 %10 %4
- IST1762I %8 ACT FAILED, TCPNAME OR IPADDR START OPTION REQUIRED
- IVT5533I %5 %13 %9 %9 %9
- IVT5534I %5 %13 POOL DOES NOT EXIST
- IVT5535I TOTAL %13 %9 %9 %9
- IVT5536I TOTAL ALL SOURCES %9 %9 %9
- IVT5538I FIXED MAXIMUM = %9 FIXED CURRENT = %9
- IVT5539I ECSA MAXIMUM = %9 ECSA CURRENT = %9
- IVT5553I %5 %13 %9
- IVT5554I TOTAL %13 %9
- IVT5556I TOTAL FOR OWNERID %9
- IVT5557I OWNERID: ASID = %4 JOBNAME = %8
- IVT5558I %5 %13 UNABLE TO DETERMINE BUFFER VALUES

The following message was retired:

- IST432I TUNING STATISTICS NOT ACTIVE, SMF NOT IN SYSTEM

z/OS V1R4 Communications Server introduces the following new messages:

- IST1817I PATH SWITCH REASON: RTP CONNECTION UNAVAILABLE
- IST1818I PATH SWITCH REASON: SHORT REQUEST RETRY LIMIT EXHAUSTED
- IST1819I PATH SWITCH REASON: TG INOP
- IST1820I PATH SWITCH REASON: MODIFY RTP COMMAND ISSUED
- IST1821I PATH SWITCH REASON: AUTO PATH SWITCH FOR PSRETRY
- IST1822I PATH SWITCH REASON: UNKNOWN]
- IST1831I 56% OF SYSTEM CSA STORAGE REMAINING = 1056964K
- IST1832I CSALIMIT VALUE %%%K MAY BE TOO SMALL
- IST1833I CSA STORAGE ALLOCATION EXCEEDS SPECIFIED CSALIMIT VALUE

- IST1841I ACTUAL DATA FLOW RATE = actual units
- IST1842I NUMBER OF NLPS RETRANSMITTED = retransmitted
- IST1843I NUMBER OF NLPS ON WAITING-TO-SEND QUEUE = waitsend
- IST1844I ARB MODE = mode
- IST1845I BOUNDARY DIVIDING REGIONS lower AND upper = boundary
MILLISECONDS
- IST1846I Type RECEIVER THRESHOLD = threshold MICROSECONDS
- IST1847I NUMBER OF NLPS ON WAITING-FOR-ACKNOWLEDGEMENT
QUEUE = waitack IST1862I ARB MAXIMUM SEND RATE = maximum units
- IST1848I SEND BYTE COUNT = sendcount RECEIVE BYTE COUNT =
receivecount
- IST1849I LARGEST NLP SENT = size BYTES
- IST1850I LARGEST NLP RECEIVED = size BYTES
- IST1851I SMOOTHED ROUND TRIP TIME = smoothed_time MILLISECONDS
- IST1852I LIVENESS TIMER = liveness SECONDS
- IST1853I NUMBER OF NLPS ON OUT-OF-SEQUENCE QUEUE =
outofsequence
- IST1854I NUMBER OF NLPS ON INBOUND SEGMENTS QUEUE =
inboundsegs
- IST1855I NUMBER OF SESSIONS USING RTP = sessions
- IST1860I NUMBER OF NLPS SENT = sent - OVERFLOW = overflow
- IST1861I NUMBER OF NLPS RECEIVED = received - OVERFLOW = overflow
- IST1856I LAST PATHSWITCH OCCURRENCE WAS ON date AT time
- IST1857I BACKPRESSURE REASON COUNTS:
- IST1858I PATHSWITCH SEND QUEUE MAX STORAGE FAILURE
- IST1859I pathswitch sendqmax storefail
- IST1865I GLOBAL INOPDUMP = *status*
- IST1866I TRLE = *trlename* INOPDUMP = *status*
- IST1867I INOPDUMP = *status* FOR ALL TRLE-BASED RESOURCES

z/OS V1R4 Communications Server changes the following message:

- IST1667I SYSTEM CSA LIMIT = nnnnnnnnK
- IST1260I type TRUNCATED - INSUFFICIENT STORAGE

Refer to *z/OS Communications Server: SNA Messages* for complete information on new and changed messages.

Changed VTAMMAP command output

z/OS V1R4 CS includes estimated timestamps for the VIT records extracted from both internal VITs (ECSA and data space) by the VTAMMAP VITAL dump formatting tool. These timestamps are approximated using times saved in VTAM internal control blocks and available at dump formatting time to VITAL. The actual timestamps contained in the dump record the times when certain landmark events occurred in writing the internal VIT records, such as the time that each VIT wrapped and the time that data from the ECSA VIT was last copied to the data space VIT.

The output for the VTAMMAP commands CSMALL, CSMOWNER, CSMBUF, and CSMPOOL are changed. CSMALL is changed to add 64-bit backed data space to the table.

CSMOWNER and CMSPOOL are changed to allow for differentiation between 31- and 64-bit backed data space.

CSMBUF output is changed to open an additional 2 character gap between the pool type (ECSA or DSPACE) and the word 'POOL'. This allows for DSPACE31 and DSPACE64.

Refer to *z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures* for complete details.

Changes to control blocks

If you use any of the control blocks documented in *z/OS Communications Server: SNA Data Areas Volume 1* and *z/OS Communications Server: SNA Data Areas Volume 2*, refer to these documents to determine whether those control blocks have changed.

Changes to VTAM IPCS CLIST

The VTAM IPCS CLIST ISTVMAP was changed by APAR OW51239 so that there is a new ASID parameter, and that new ASID is now the default. The VTAM IPCS CLIST ISTVMAP maps the storage for an address space. Previously, the only ASID the CLIST used was VTAM's. Now, with this APAR, the VTAM ASID is selected only if three other tests fail. This CLIST can now be used with any ASID, not just VTAM's.

See "VTAM IPCS CLIST changes" on page 15 for more information.

Implementing new functions and enhancements

The following optional functions and enhancements were introduced in z/OS V1R4 Communications Server:

- "CSALIMIT start option behavioral change" on page 1
- "Enterprise Extender dial processing enhancements" on page 3
- "Enterprise Extender addressing enhancement for logical lines and PUs" on page 4
- "Enable HPR-only VRNs for interchange sessions" on page 5
- "Display ID=rtpname diagnostic enhancement" on page 6
- "SRB mode dump enhancement" on page 8
- "Increase maximum value for AUTOGEN on XCA major nodes" on page 9
- "VIT data timestamp enhancement" on page 9
- "VARY ACT,UPDATE command for CDRSC Major Nodes enhancement" on page 10
- "OPEN Application Control Block (ACB) limit increase" on page 11
- "NQNM mode support for Directory Services (DS) database entries" on page 12
- "Changes to installing dump analysis and trace analysis tools" on page 13
- "APPN topology traces enhancements" on page 14
- "VTAM INOPDUMP enhancement" on page 16
- "New start options to adjust the QDIO or iQDIO storage" on page 20

See Appendix A, "z/OS V1R2 Communications Server release summary" on page 73 for descriptions of the new functions and enhancements of z/OS V1R2 Communications Server. Note that there were no enhancements made in z/OS V1R1 Communications Server or in z/OS V1R3 Communications Server.

Chapter 6. Post-installation considerations for z/OS V1R4 Communications Server

This chapter describes some post-installation considerations for z/OS V1R4 Communications Server under the z/OS operating system, which involves:

- Calculating virtual storage requirements
- Using the operating system
- Starting z/OS V1R4 Communications Server
- Installing the z/OS V1R4 Communications Server dump analysis and the VIT analysis tools

Calculating virtual storage requirements

For information about estimating the virtual storage required to run z/OS V1R4 Communications Server on the z/OS operating system, see Appendix B, “Storage estimate worksheets” on page 103.

Defining data sets

This section describes z/OS data sets that you need to define or modify for z/OS V1R4 Communications Server. Table 24 shows the z/OS data sets that contain information for z/OS V1R4 Communications Server, and Table 25 on page 50 shows the z/OS data sets that contain information for both VTAM and NCP.

Enterprise Extender requires IP dataset definitions in addition to the SNA data sets described in this guide. For more information, refer to *z/OS Communications Server: IP Configuration Guide*.

Note: If you are upgrading a previous version and release to z/OS V1R4 Communications Server, see one of the following sections to determine which data sets are new to you. These sections also show you the approximate storage requirements for any new data sets and for any existing data sets whose requirements might have changed.

- If you are upgrading CS for OS/390 V2R10 to z/OS V1R4 Communications Server, there are no new data set requirements.

Table 24. z/OS data sets containing information for z/OS Communications Server

Name of data set	Contents	Comments
SYS1.DSDB1	Data files of APPN directory information	Required for APPN directory checkpointing function; must be allocated before z/OS Communications Server initialization. This data set cannot be allowed to span multiple volumes.
SYS1.DSDB2	Data files of APPN directory information	Required for APPN directory checkpointing function; must be allocated before z/OS Communications Server initialization. This data set cannot be allowed to span multiple volumes.

Table 24. z/OS data sets containing information for z/OS Communications Server (continued)

Name of data set	Contents	Comments
SYS1.DSDBCTRL	Current [®] status of SYS1.DSDB1 and SYS1.DSDB2	Required for APPN directory checkpointing function; must be allocated before z/OS Communications Server initialization. This data set cannot be allowed to span multiple volumes.
SYS1.DUMPxx	Records of SVC DUMP	Required for diagnosis.
SYS1.LINKLIB	z/OS Communications Server initialization module, ISTINM01, which is used when z/OS Communications Server is started	Required.
	Logon manager load modules	Required for logon manager.
SYS1.LOGREC	z/OS Communications Server error records	Required.
SYS1.LPALIB	z/OS Communications Server load modules and user-written exit routines to be loaded into the shared link pack area	Required.
SYS1.MACLIB	z/OS Communications Server application program interface macros and APPC Application Suite application program interface headers	Required.
SYS1.MIGLIB	z/OS Communications Server formatted dump routines for the interactive problem control system (IPCS) and the z/OS Communications Server VIT Analysis Tool module, ISTRAFT1, which is used for problem diagnosis	Required.
SYS1.NUCLEUS	z/OS Communications Server resident SVCs and abnormal termination modules	Required.
SYS1.PARMLIB	z/OS Communications Server-related information	Required. This may also be a data set in the logical parmlib concatenation.
SYS1.PROCLIB	JCL for started tasks	Required for logon manager.
SYS1.SAPPDAT2	APPC Application Suite messages	Required for APPC Application Suite.
SYS1.SAPPDAT4	APPC Application Suite ANAME database skeleton	Required for APPC Application Suite.
SYS1.SAPPMOD1	APPC Application Suite load modules	Required for APPC Application Suite.
SYS1.AAPPMOD2	APPC Application Suite API load modules	Required for APPC Application Suite.
SYS1.SAPPSAMP	APPC Application Suite installation and execution samples	Required for APPC Application Suite.
SYS1.SBLSCLI0	Command lists and REXX execs	Required for z/OS Communications Server dump analysis enhancements and VIT analysis. See “Installing dump analysis and VIT analysis tools” on page 64 for more information.
SYS1.SBLSMSG0	Compiled messages	Required for z/OS Communications Server dump analysis enhancements and VIT analysis. See “Installing dump analysis and VIT analysis tools” on page 64 for more information.

Table 24. z/OS data sets containing information for z/OS Communications Server (continued)

Name of data set	Contents	Comments
SYS1.SBLSPNL0	Compiled panels	Required for z/OS Communications Server dump analysis enhancements and VIT analysis. See "Installing dump analysis and VIT analysis tools" on page 64 for more information.
SYS1.SBLSTBL0	Compiled tables, keylists, and commands	Required for z/OS Communications Server dump analysis enhancements and VIT analysis. See "Installing dump analysis and VIT analysis tools" on page 64 for more information.
SYS1.SISTASGD	ASN.1 and GDMO syntax data sets	Included for reference by CMIP services application programmers.
SYS1.SISTASN1	Contains two categories of data set members: <ul style="list-style-type: none"> • ACYPRES: List of abstract syntax notation 1 (ASN.1) definition data sets. This is a member of a partitioned data set. • The members listed in ACYPRES. 	Required for CMIP services. See "SYS1.SISTASN1" on page 51 for a description.
SYS1.SISTCLIB	z/OS Communications Server load modules to be loaded into common service area and extended common service area (CSA/ECSA) storage	Required.
SYS1.SISTCMIP	Directory definition file. The member name of the directory definition file is ACYDDF.	Required for CMIP services. See "SYS1.SISTCMIP" on page 51 for a description.
SYS1.SISTDAT1	Online tools	Optional. Use this library only if you intend to use the online information tools shipped with z/OS Communications Server.
SYS1.SISTDAT2	Message skeleton file for translation	Required. Refer to <i>z/OS Communications Server: SNA Network Implementation Guide</i> .
SYS1.SISTGDMO	Compiled definitions for the ISO standard, Guidelines for the Definition of Managed Objects (GDMO). This is a partitioned data set consisting of one member, ACYGDMO.	Required for CMIP services. Member name ACYGDMO must be included on the DD statement for SISTGDMO in the VTAM start procedure: //ACYGDMO DD SYS1.SISTGDMO(ACYGDMO),DISP=SHR.
SYS1.SISTMAC1	z/OS Communications Server macros used to build user tables and parameter lists to build installation exits	Required.
SYS1.TRACE	GTF trace records	Required to run external trace. Note: For information about using multiple SYS1.TRACE data sets, refer to the <i>z/OS MVS Diagnosis: Tools and Service Aids</i> .
SYS1.TRSDB	Network topology database	Required for APPN topology database checkpointing function; must be allocated before initialization. This data set cannot be allowed to span multiple volumes.

Table 24. z/OS data sets containing information for z/OS Communications Server (continued)

Name of data set	Contents	Comments
Dynamic I/O configuration data sets	Dynamically created definitions of devices with all associated LUs	Optional; includes USER1.AUTO.VTAMLST and a catalog entry checkpoint data set. Required for dynamic I/O configuration.

Table 25 shows the z/OS data sets that contain VTAM information and NCP information if there is an NCP owned by that VTAM.

Table 25. z/OS data sets containing information for both VTAM and NCP

Name of data set	Contents	Comments
SYS1.ASAMPLIB	Sample of network operator command table and sample JCL for installation	Required for installation. Provided by IBM.
SYS1.SAMPLIB	Alterable copy of sample network operator command table, sample JCL for installation, and command lists for dynamic I/O	Required for installation. Provided by IBM.
SYS1.SSPLIB	NCP loader utility program	Required; added when NCP is installed. Refer to "SYS1.SSPLIB" on page 60 for information on SYS1.SSPLIB requirements.
	NCP dump utility program	Required; added when NCP is installed. Refer to "SYS1.SSPLIB" on page 60 for information on SYS1.SSPLIB requirements.
	NCP dump bootstrap program	Required; added when NCP is installed. Refer to "SYS1.SSPLIB" on page 60 for information on SYS1.SSPLIB requirements.
SYS1.VTAMLIB	<ul style="list-style-type: none"> Load modules for z/OS Communications Server User-defined tables, default tables, and exit routines 	Only z/OS Communications Server load modules are required. Created during system generation. Must be listed in an IEAAPFxx parmlib member.
SYS1.VTAMLST	z/OS Communications Server definition statements and start options	Required; created by user before starting z/OS Communications Server. You can modify this data set, but you need to be very careful about the relationship between z/OS Communications Server and NCP definition statements. For example, changing a VTAMLST member without changing a corresponding NCP definition statement can cause serious errors that are difficult to diagnose.
Configuration restart data sets	z/OS Communications Server status of minor nodes for each major node	Required if a warm restart is to be used. Created by user before starting z/OS Communications Server.
SYS1.NODELST	z/OS Communications Server status of major nodes	Required if restart of all previously active major nodes is desired.
NCP load library	NCP load modules	Each NCP stored as a separate member of library. Created during NCP generation. Must be an APF-authorized library.
NCP dump data set	Dump records for NCP	Required if z/OS Communications Server is requested to provide a dump of NCP. Created by user before starting z/OS Communications Server.

Table 25. z/OS data sets containing information for both VTAM and NCP (continued)

Name of data set	Contents	Comments
SYS1.LDRIOTAB	Dump records for loader channel I/O trace	Required to hold loader channel I/O trace dumps. Created by user before starting z/OS Communications Server.
CSP and MOSS dump data set	Dump records for CSP and MOSS	Required if z/OS Communications Server is requested to provide a dump of CSP or MOSS and if the user wants to store the CSP or MOSS dump in a unique data set. Created by user before starting z/OS Communications Server.

Data sets containing information for z/OS V1R4 Communications Server

This section describes data sets that contain information for z/OS V1R4 Communications Server.

SYS1.SISTCLIB

SYS1.SISTCLIB contains the z/OS Communications Server modules to be loaded into common service area and extended common service area (CSA/ECSA) storage.

To prepare the SYS1.SISTCLIB data set, do the following:

1. Allocate the SYS1.SISTCLIB data set using a utility program, and catalog the data set before SMP/E installation. Refer to the installation JCL sample ISTJEXAL in the *z/OS Program Directory* for a sample job using the IEFBR14 program to allocate SYS1.SISTCLIB.
2. Add a DD card for SYS1.SISTCLIB in the VTAM NET procedure as follows:
//SISTCLIB DD DSN=SYS1.SISTCLIB,DISP=SHR
3. Define SYS1.SISTCLIB as an authorized library (a library listed in the currently used IEAAPFxx).

SYS1.SISTCMIP

SYS1.SISTCMIP contains the IBM-supplied CMIP directory definition file (with the DD name ISTCMIP), which you can edit to restrict access to CMIP services.

The LRECL and BLKSIZE for this file are both 80.

The file is loaded when CMIP services is started and can be reloaded using the **MODIFY TABLE** command. Start CMIP services using one of the following methods:

- Issue the **MODIFY VTAMOPTS** command with the **OSIMGMT=YES** operand.
- Start z/OS Communications Server with the **OSIMGMT=YES** start option.

If CMIP services is active, edit the directory definition file and then load it by issuing the **MODIFY TABLE** command:

```
MODIFY proc, TABLE, OPT=LOAD, TYPE=CMIPDDF
```

SYS1.SISTASN1

The LRECL and BLKSIZE for this file are both 1024.

SYS1.VTAMLST

SYS1.VTAMLST is the z/OS Communications Server definition library, which consists of files containing the definitions for network resources and start options. It

is a required partitioned data set, and you need to allocate it on a direct-access volume before you file z/OS Communications Server network definitions.

This data set can be allocated and cataloged at either of the following times:

- Any time before its initial use. Run the IEHPROGM utility program or the IEBUPDTE utility program.
- When the data set is first used. Code the appropriate job control language (JCL).

To prepare the SYS1.VTAMLST data set, do the following:

1. Allocate space to accommodate the filing of definitions for major nodes and anticipated sets of start options. The amount needed depends on the number of nodes and operands used and on the number of start options. For more information about start options, refer to *z/OS Communications Server: SNA Network Implementation Guide*.
2. Specify the DD name for SYS1.VTAMLST as VTAMLST. You should specify the following DCB subparameters:
RECFM=FB,LRECL=80,BLKSIZE=any multiple of 80
3. Code **LABEL=RETPD=0** on all DD statements for SYS1.VTAMLST. If you do not, an operator awareness message requiring a reply might be generated.
4. If you generate a NEWDEFN data set as part of NCP generation processing, ensure that it is loaded into SYS1.VTAMLST prior to activating the NCP. Failure to do so can cause serious problems. z/OS Communications Server uses the NCP source, in addition to the NCP load module and RRT, when loading and activating communication controllers. SYS1.VTAMLST must contain either the source used as input to the NCP generation process, if a NEWDEFN data set was not created, or the NEWDEFN data set, if one was created. For more information about NEWDEFN, refer to *NCP, SSP, and EP Generation and Loading Guide*.
5. If you are configuring z/OS Communications Server as an APPN node (or plan to do so in the future), copy the IBM-supplied APPN Class of Service (CoS) definitions and APPN transmission group (TG) profiles from ASAMPLIB into SYS1.VTAMLST. Two sets of IBM-supplied CoS definitions are available:
 - COSAPPN
The definitions in COSAPPN are made up of 8-row LINEROW entries for all Classes of Service and are appropriate for most sessions.
 - ISTACST2
The definitions in ISTACST2 are made up of 8-row LINEROW entries for all Classes of Service except #BATCH, #BATCHSC, #INTER, and #INTERSC (which are made up of 12-row entries) and 8-row NODEROW entries for all Classes of Service. Twelve-row LINEROW entries better enable z/OS Communications Server to select an optimal route for a session. This is most useful for multiple types of connections with different TG characteristics. For example, this is useful when channel-to-channel, token ring network, FDDI LAN, or ATM are used in the network.

Either COSAPPN or ISTACST2 is required if z/OS Communications Server is configured as an APPN node. To use COSAPPN or ISTACST2, you must copy the appropriate set of definitions into SYS1.VTAMLST at z/OS Communications Server installation, and then activate the member in which the definitions reside. You can copy both sets of definitions into SYS1.VTAMLST, but you can have only one set active at any time.

COSAPPN is automatically activated when z/OS Communications Server is initialized. If you choose to use ISTACST2, you must use the **VARY ACT** command to activate it, or place the ISTACST2 member in the configuration list to automatically activate it at z/OS Communications Server initialization. You can rename the IBM-supplied sets of definitions so that ISTACST2 is named COSAPPN and COSAPPN is either not used or is renamed to something else. This enables the set of definitions with 12-row LINEROW entries to be automatically activated at initialization.

Very Important: With 12-row LINEROW entries, you should have a set of definitions with 12-row LINEROW entries activated on each network node in the network for optimal routing in networks that include ATM native connections.

Not all HPR APPN products support CoS definitions with 12-row LINEROW entries. This could affect your ability to optimally use native ATM connections among the nodes in your network. Consult technical representatives for the HPR APPN products in your network to determine if those products support CoS definitions with 12-row LINEROW entries.

If you use CoS definitions with 12-row LINEROW entries, routes selected for nonnative ATM sessions could be different than those selected when you use CoS definitions with 8-row LINEROW entries.

The IBM-supplied TG profiles are in IBMTGPS in ASAMPLIB. IBMTGPS is not required, but it is strongly recommended that you include it.

Notes:

1. Because CP-CP session paths may include subarea VRs, it is also strongly recommended that you update your logon mode tables (including the IBM-supplied logon mode table, ISTINCLM) to include an appropriate CoS= value on the CPSVCMG and CPSVRMGR mode table entries. Otherwise, a blank CoS name will be used to determine the subarea VR and transmission priority that will be used for the VR portion of the CP-CP session path.
2. You can modify SYS1.VTAMLST, but you need to be very careful about the relationship between z/OS Communications Server and NCP definition statements. For example, changing a VTAMLST member without changing a corresponding NCP definition statement can cause serious errors that are difficult to diagnose.

SYS1.VTAMLIB

SYS1.VTAMLIB is the z/OS Communications Server load module library, which consists of files containing the user tables, exit routines, and replaceable constants. It is a required partitioned data set.

To prepare the SYS1.VTAMLIB data set, do the following:

1. Allocate the SYS1.VTAMLIB data set using the IEHPROGM utility program, and catalog the data set before SMP/E installation.
2. Define the data set on a direct-access volume (which can be the system residence volume), and secondary space can be allocated. Space requirements are described in the *z/OS Program Directory* that is shipped with the z/OS Communications Server distribution tape.

SYS1.VTAMLIB is used to store the following user tables:

- Class of Service (CoS) table
- Communication network management (CNM) routing table

- Note:** SYS1.LPALIB can no longer be used to store the CNM routing table.
- Interpret table containing logon descriptions and any installation-coded logon routines in this table
 - Logon mode table
 - Session awareness (SAW) data filter table
 - Unformatted system services table
3. Code the DD name for SYS1.VTAMLIB as VTAMLIB. You should specify the following subparameters on the DCB parameter, with BLKSIZE specified as full-track blocking relative to the capacity of your direct access storage device (DASD):
RECFM=U,BLKSIZE=
 4. Define SYS1.VTAMLIB as an authorized library (a library listed in the currently used IEAAPFxx).

Parmlib member for Communication Storage Manager (CSM)

The IVTPRM00 parmlib member sets parameters for CSM storage. IVTPRM00 is read during CSM initialization as a result of the first issuance of the IVTCSM REQUEST=CREATE_POOL macro. (z/OS Communications Server issues this macro when started.) These definitions can also be changed without requiring a re-IPL by editing the IVTPRM00 member and issuing the MODIFY CSM command without specifying the parameters on the command.

The parameter member IVTPRM00 can be found in:

- A data set defined by the PARMLIB DD statement in the TSO start procedure
- A data set in the logical parmlib concatenation
- SYS1.PARMLIB

IVTPRM00 has the following format:

```
column |...+...1....+...2....+...3....+...4....+...
        FIXED MAX(maxfixKIM)
        ECSA MAX(maxecsaKIM)
        [POOL(bufsize, bufsource, initbuf, minfree, expbuf)]
```

Note: FIXED and MAX or ECSA and MAX keywords must be separated by one or more spaces. It must be completed with its values on the same line.

The first two lines in the CSM parmlib member define the maximum amount of storage to be dedicated to fixed and ECSA buffers in CSM. Note that the fixed maximum represents the total fixed storage above and below the 2-gigabyte bar. You can also specify one POOL definition for each CSM buffer pool of a particular *bufsize* and *bufsource* combination. If parameters are not provided for a given CSM buffer pool, the IBM-supplied default values are used unless a program has provided these values on an IVTCSM REQUEST=CREATE_POOL macro.

The following describes the variable fields in the CSM parmlib member:

maxfix A decimal integer specifying the maximum bytes of fixed storage to be dedicated for use by CSM. The range is from 1024K to 30720M. The default is 100M.

<i>maxecsa</i>	A decimal integer specifying the maximum bytes of ECSA storage to be dedicated for use by CSM. The range is from 1024K to 2048M. The default is 100M.												
K	Denotes size in kilobytes												
M	Denotes size in megabytes.												
<i>bufsize</i>	Specifies the size of the buffers in the pool to be created. Valid pool sizes are 4K, 16K, 32K, 60K and 180K. <i>bufsize</i> is required for each POOL definition.												
<i>bufsource</i>	Specifies the storage source from which buffers are allocated. The values for <i>bufsource</i> are: ECSA Buffers are allocated from ECSA storage. DSPACE Buffers are allocated from data space storage. The <i>bufsource</i> variable is required for each POOL definition.												
<i>expbuf</i>	Specifies the number of buffers by which the pool is expanded when the number of free buffers falls below the <i>minfree</i> value. The valid ranges for each CSM buffer pool size are as follows: <table border="0" style="margin-left: 2em;"> <thead> <tr> <th style="text-align: left;">Bufsize</th> <th style="text-align: left;">Range for Expbuf</th> </tr> </thead> <tbody> <tr> <td>4K</td> <td>1–256</td> </tr> <tr> <td>16K</td> <td>1–256</td> </tr> <tr> <td>32K</td> <td>1–128</td> </tr> <tr> <td>60K</td> <td>1–68</td> </tr> <tr> <td>180K</td> <td>1–22</td> </tr> </tbody> </table> The <i>expbuf</i> variable is required for each POOL definition.	Bufsize	Range for Expbuf	4K	1–256	16K	1–256	32K	1–128	60K	1–68	180K	1–22
Bufsize	Range for Expbuf												
4K	1–256												
16K	1–256												
32K	1–128												
60K	1–68												
180K	1–22												
<i>initbuf</i>	Specifies the initial number of buffers to be created in the pool when the first IVTCSM REQUEST=CREATE_POOL macro is issued by an application. If this value is specified as 0, only the base pool structure is created. In this case, the pool will be expanded on the first IVTCSM REQUEST=GET_BUFFER based on the specification for <i>expbuf</i> . The pool will not contract below the level specified by either <i>initbuf</i> or <i>expbuf</i> , whichever is higher. The range for <i>initbuf</i> is 0–9999. If <i>initbuf</i> is omitted, the IBM-supplied default value is used unless overridden by an application's CREATE_POOL request.												
<i>minfree</i>	Specifies the minimum number of buffers to be free in the pool at any time. The storage pool will be expanded if the number of free buffers falls below this limit. The range for <i>minfree</i> is 0–9999. If <i>minfree</i> is omitted, the IBM-supplied default value is used unless overridden by an application's CREATE_POOL request.												

Table 26 on page 56 shows the IBM-supplied default values for *expbuf*, *initbuf*, and *minfree* for the CSM buffer pools.

Table 26. IBM-supplied default values for CSM buffer pools

BuFSIZE	4K	16K	32K	60K	180K
INITBUF	64	32	16	16	2
MINFREE	8	4	2	2	1
EXPBUF	16	8	4	4	2

z/OS system symbols can be used in IVTPRM00. For more information about this function, refer to *z/OS Communications Server: SNA Network Implementation Guide*.

APPN checkpointing data sets

The following data sets are used when z/OS Communications Server is defined as a network node or interchange node, and are required for the APPN checkpointing function. These data sets cannot be allowed to span multiple volumes.

- SYS1.DSDB1
- SYS1.DSDB2
- SYS1.DSDBCTRL
- SYS1.TRSDDB

SYS1.DSDB1 and SYS1.DSDB2 contain APPN directory information that is used to initialize the directory database when z/OS Communications Server is restarted.

Directory database information is stored alternately between SYS1.DSDB1 and SYS1.DSDB2. The directory database information is written to one of the data sets whenever a **MODIFY CHKPT TYPE=ALL** or **TYPE=DIR, HALT**, or **HALT QUICK** command is issued.

Not all of the resources from the directory database are written to the data sets when there is a checkpoint. The resources that are written to the data sets are those that:

- Have been the target of a search
- Have a dynamic entry type that is not registered
- Have been updated within a period of time specified by the **DIRTIME** start option

The resources that are registered to the database at startup through resource registration and definition are not included in the checkpointed information.

SYS1.DSDBCTRL contains the current status of SYS1.DSDB1 and SYS1.DSDB2. It is read by z/OS Communications Server during initialization to determine whether SYS1.DSDB1 or SYS1.DSDB2 will be used to load the APPN directory database.

SYS1.TRSDDB is required for checkpointing the network topology database. The information in this data set is used to initialize the network topology database whenever z/OS V1R4 Communications Server is restarted. The network topology database is written to this file whenever a **MODIFY CHKPT TYPE=TOPO** or **TYPE=ALL, HALT**, or **HALT QUICK** command is issued.

The APPN checkpointing data sets should be allocated and cataloged prior to z/OS Communications Server initialization. To prepare the APPN checkpointing data sets, do the following:

- Specify the DD name for SYS1.DSDB1 as DSDB1, for SYS1.DSDB2 as DSDB2, for SYS1.DSDBCTRL as DSDBCTRL, and SYS1.TRSDDB as TRSDDB.

- Specify the following DCB subparameters for SYS1.DSDB1, SYS1.DSDB2, and SYS1.TRSDB:
RECFM=FB,LRECL=1000,BLKSIZE=any multiple of 1000,DSORG=PS
- Specify the following DCB subparameters for SYS1.DSDBCTRL:
RECFM=FB,LRECL=20,BLKSIZE=20,DSORG=PS

Notes:

1. It is recommended that you not modify any of the foregoing data sets.
2. The DSDBCTRL is a fixed, 20-byte file; it requires a 20-byte block.
Regarding DSDB1 and DSDB2: Every thousand resources to be checkpointed occupies 35 logical records, or six 6KB blocks of space; the only resources to be checkpointed are the cache DLU entries found during the search.
3. z/OS Communications Server fails the initial load of the network topology database if the checkpointed data set of another node is used, or the **SSCPNAME** operand is changed between the two IPLs. Should the initial load fail, z/OS Communications Server can acquire the information dynamically using TDUs.

Configuration restart data sets

If you want to use the z/OS Communications Server configuration restart facility, define configuration restart Virtual Storage Access Method (VSAM) data sets. For a description of the configuration restart support, refer to *z/OS Communications Server: SNA Network Implementation Guide*.

To set up data sets for the major nodes that you will be using with configuration restart, do the following:

1. Use a DD statement to define a configuration restart VSAM data set for each major node. The *ddname* must match the *ddname* on the **CONFIGDS** operand of either the **PCCU** definition statement for the associated NCP or the **VBUILD** definition statement for the associated major node. There are no z/OS Communications Server restrictions on this data set name.

The following example defines a catalog entry to allocate space for a VSAM data set to contain the configuration restart data:

```
DEFINE
  CLUSTER(NAME(RESTART) -
    VOL(PUBLIC) -
    KEYS(18 0) -
    DATA(NAME(RESTART.DATA) -
    RECORDS(200 20) -
    RECORDSIZE(46 158)) -
  INDEX(NAME(RESTARTI.INDEX) -
    TRACKS(1))
```

2. Code the **INDEX** operand on the **DEFINE** command, or let it default. (See the sample **DEFINE** command above.) The data set must be indexed.
3. Code **KEYS** (18 0). A key length of 18 bytes and an offset of 0 bytes are required.
4. Code **RECORDSIZE** (46 158). The average record size must be 46 bytes, and the maximum record size must be 158 bytes.
5. Make sure that the number of records in the file is equal to the number of minor nodes defined in the major node. When you choose the number of records for a switched major node, include each **PATH** definition statement. Therefore, the primary allocation should be the number of minor nodes in the major node, and the secondary allocation should be about 0.1 times the number of minor nodes.
6. When you change a major node definition in SYS1.VTAMLST, do not use the **WARM** start option when activating the new definition for the first time.

Dynamic configuration data sets for channel-attached devices

You can dynamically configure channel-attached devices in your network. For a full description of this support, refer to *z/OS Communications Server: SNA Network Implementation Guide*.

To prepare your system to support dynamic configuration of channel-attached devices, complete the following steps during your installation:

1. Define USER1.AUTO.VTAMLST as a partitioned data set. You can customize the name of the data set by altering its name in the ISTDEFIN command list. A sample of ISTDEFIN is found in SYS1.SAMPLIB.
2. Concatenate the USER1.AUTO.VTAMLST data set to the SYS1.VTAMLST data set as defined on the VTAMLST DD statement in the z/OS Communications Server start procedure. You also need to code the AUTO.VTAMLST data set as shared (DISP=SHR).

```
⋮
//VTAMLST DD DSN=SYS1.VTAMLST,DISP=SHR
           DD DSN=USER1.AUTO.VTAMLST,DISP=SHR
⋮
```

USER1.AUTO.VTAMLST is used by ISTDEFIN for storing automatically generated major nodes. Each member of USER1.AUTO.VTAMLST representing a data host will then contain the definition for just one device. A local SNA major node will also include any of its associated LUs.

3. Set the data set control block (DCB) information for this data set with the same values as for the other VTAMLST data sets.
4. Define a catalog entry checkpoint data set (AUTOCKPT) for dynamic configuration support:

```
DEFINE
  CLUSTER(NAME('VSAM.AUTOCKPT') -
    VOL(PUBLIC) -
    KEYS(4 0) -
    DATA(NAME('VSAM.AUTOCKPT.DATA')) -
    RECORDS(200 20) -
    RECORDSIZE(24 136)) -
  INDEX(NAME(VSAM.AUTOCKPT.INDEX) -
    TRACKS(1))
```

5. Add this data set using the AUTOCKPT DD statement in the z/OS Communications Server start procedure:

```
⋮
//AUTOCKPT DD DSN=VSAM.AUTOCKPT,AMP=AMORG,DISP=OLD
⋮
```

First Failure Support Technology™ (FFST™)

First Failure Support Technology helps you diagnose software problems by capturing information about a potential problem when it occurs.

NODELST data set

You can define a NODELST data set to maintain a list of major nodes that are active at one time. If you use the NODELST facility, you need to define VSAM data sets. For more information on how NODELST is used, refer to *z/OS Communications Server: SNA Network Implementation Guide*.

To define a NODELST data set, perform the following steps:

1. Use the **DEFINE** command to define a catalog entry and allocate space for an indexed cluster:

```

DEFINE
  CLUSTER(NAME(NODLST1) -
    VOL(PUBLIC) -
    KEYS(2 0) -
    DATA(NAME(NODLST1.DATA) -
    RECORDS(120 20) -
    RECORDSIZE(10 10)) -
  INDEX(NAME(NODLST1I.INDEX) -
    TRACKS(1))

```

2. Code the **INDEX** operand on the **DEFINE** command, or let it default. (See the preceding sample **DEFINE** command.) The data set must be indexed.
3. Code **KEYS** (2 0). A key length of 2 bytes and an offset of 0 bytes are required.
4. Code **RECORDSIZE** (10 10). The average record and the maximum record must each have a length of 10 bytes.
5. Make sure that the number of records in the file is equal to the number of major node and dynamic reconfiguration data set (DRDS) file activations that occur from the time z/OS Communications Server is started until it is halted. This includes major nodes that are reactivated. The primary allocation should be about 1.2 times the total number of major nodes and DRDS files in the network, and the secondary allocation should be about 0.2 times the total number.

You can use defaults for all other data characteristics.

Data sets containing information for NCP

This section describes some of the data sets that contain information for NCP. You might need to define these data sets for your communication controller.

NCP load library

The NCP load library contains the NCP and the resource resolution table (RRT) load modules.

To load NCP, create an NCP load module data set to allocate space. Cataloging the data set is optional. To activate the NCP, the NCP load library must also be available so that the RRT can be accessed.

Figure 1 on page 60 shows the correlation between the DD statement for the NCP load module data set and the **NCP BUILD** definition statement.

DD Statement for NCP Load Module Data Set in VTAM Start Procedure

•
•
•

```
//NCPLOAD DD DSN=SYS1.NCPLOAD,DISP=...
```

•
•
•

NCP Definition Statement

```
BUILD . DD name, lowest level qualifier of  
      . data set name, and value of LOADLIB  
      . operand must match ( in this example,  
      . these three are NCPLOAD).  
LOADLIB=NCPLOAD,  
      .  
      .  
      .
```

Figure 1. Correlation between DD statement and NCP definition statement

NCP load module data sets must be in an authorized program facility (APF) library. Since z/OS Communications Server must be loaded from an authorized library, the system verifies that all modules subsequently loaded by z/OS Communications Server be contained in authorized libraries. If the NCP load library is not APF authorized, an ABEND306 may occur when z/OS Communications Server attempts to load the NCP RRT during an NCP activation. An NCP load module data set can contain more than one NCP.

SYS1.SSPLIB

SYS1.SSPLIB contains the System Support Program (SSP) utilities used by NCP. SYS1.SSPLIB is a required partitioned data set and is added when NCP is installed. It must be in one of the following:

- SYS1.LINKLIB
- A concatenation of SYS1.LINKLIB (a library listed in the currently used LNKLSxxx parmlib member)
- A STEPLIB in the start procedure, to specify an authorized program facility (APF) library

NCP dump

The NCP dump data set receives the NCP dump output (one data set for each host z/OS Communications Server). To dump NCP, you need to allocate space for this data set. You can also catalog this data set. The name of the NCP dump data set is defined when NCP is coded.

This dump data set must accommodate a dump of the entire communication controller storage. The size of communication controller storage depends on the model number.

The DD statement defines the dump data set for the communication controller. The *ddname* must match the *ddname* on the DUMPDS operand of the PCCU definition statement for the associated NCP. z/OS Communications Server has no restrictions on the data set name.

z/OS Communications Server dump processing fails if the SSP modules that need to be loaded to process the dump are not accessible to z/OS Communications

Server. See “SYS1.SSPLIB” on page 60 for information on SYS1.SSPLIB requirements. (For a sample STEPLIB DD statement, see the example under “Starting z/OS V1R4 Communications Server” on page 62.)

For more information about the NCP dump data set, refer to the *NCP, SSP, and EP Diagnosis Guide*.

Loader channel I/O trace

The loader channel I/O trace data set (LDRIOTAB) receives communication controller channel information if a load of an NCP fails. The information collected includes channel control words, channel status words, and the first 20 bytes of any data associated with a **WRITE**, **WRITEIPL**, or **WRITEBRK** channel command.

The DD statement defines the trace data set for the SSP load utility. The *ddname* must be LDRIOTAB, but there are no restrictions on the data set name. The data requires only one track of DASD storage and should have a blocksize and logical record length of 121. The data set must be allocated before it is defined in the z/OS Communications Server start procedure.

Set the disposition of the data set as share, pass, and keep in the z/OS Communications Server start procedure. (For a sample STEPLIB DD statement, see the example under “Starting z/OS V1R4 Communications Server” on page 62.)

Refer to *NCP, SSP, and EP Trace Analysis Handbook* for more information about the loader channel I/O trace data set.

CSP and MOSS dump (IBM 3720, 3725, and 3745 only)

The communication scanner processor (CSP) and maintenance and operator subsystem (MOSS) dump data sets, which apply only to the IBM 3720, 3725, and 3745 Communication Controllers, are used for traces of the CSP and MOSS. To dump the CSP and MOSS microcode for problem determination, create one data set for the dump of each component. These data sets can be cataloged. The names of these data sets are defined to z/OS Communications Server in the start procedure. “Starting z/OS V1R4 Communications Server” on page 62 contains an example of a start procedure.

The DD statement for each dump data set defines it for the NCP utility used to dump the communication controller. The *ddname* must match the *ddname* on the **CDUMPDS** (for a CSP dump) or **MDUMPDS** (for a MOSS dump) operand of the **PCCU** definition statement for the appropriate NCP. z/OS Communications Server has no restrictions on the data set name.

Defining z/OS V1R4 Communications Server to z/OS

To define z/OS Communications Server, do the following:

1. Change the message routing codes by coding a system user exit routine (if there is multiple console support).

Message routing codes determine the console at which messages will appear. If the routing codes provided for z/OS Communications Server messages do not meet your needs, you can change the routing codes used on the messages by coding a system user exit routine (if there is multiple console support). The exit routine receives control before messages are routed so it can examine the messages' routing codes (and descriptor codes) and change them. The system uses the modified routing codes to route these messages. To change routing codes, do the following:

- a. Prepare the write-to-operator/write-to-operator-with-response (WTO/WTOR) exit routine, and add it to the control program. The WTO/WTOR exit routine can be inserted into the resident portion (communications task) of the control program either before or after system generation.
 - b. Refer to *z/OS Communications Server: SNA Messages* for the message routing codes, and decide which new routing codes you want to assign to each message.
2. Define channel-attached devices.

If you are adding channel-attached devices, you can define these devices using the Hardware Configuration Definition (HCD) to dynamically add the devices. Refer to *z/OS Communications Server: SNA Network Implementation Guide* for general information about dynamically adding channel-attached devices, and see “Dynamic configuration data sets for channel-attached devices” on page 58 of this book for installation information.

3. Determine the ECSA value.

The ECSA value is defined by the second value on the CSA parameter in member IEASYSxx. IBM recommends that you examine the ECSA value to ensure that it is adequate for z/OS V1R4 Communications Server. You can determine the ECSA value by reviewing Appendix B, “Storage estimate worksheets” on page 103.

Using automatic restart manager

Automatic restart manager is a z/OS function that can automatically restart z/OS Communications Server after an abnormal end (abend).

During initialization, z/OS Communications Server automatically registers with the automatic restart manager, using the following options:

- REQUEST=REGISTER
- ELEMENT=NET@*cp_name*
- EVENTEXIT=NO_EVENTEXIT
- STARTTXT=NO_STARTTXT
- ELEMTYPE=SYSVTAM
- TERMTYPE=ELEMTERM

Note: The *cp_name* is the same name as that used on the SSCPNAME start option.

For more information about automatic restart manager, refer to *z/OS MVS Setting Up a Sysplex*.

Starting z/OS V1R4 Communications Server

You should code a z/OS Communications Server start procedure and save it in SYS1.PROCLIB. The system operator specifies the procedure when starting z/OS Communications Server.

The start procedure is called NET. The name NET is not required but is strongly recommended for consistency in entering the z/OS Communications Server operator commands and to reduce the operator’s chances of making a syntax error. The procedure name you specify must be the first operand on the **START**, and **MODIFY** operator commands. For **DISPLAY**, **HALT**, and **VARY** the procedure name is always NET.

Following is an example of job control statements for a typical start procedure.

```
//NET      PROC
//VTAM     EXEC PGM=ISTINM01,TIME=1440,REGION=4096K,
//STEPLIB DD DSN=SYS1.SSPLIB,DISP=SHR
//FFSTLIB DD DSN=SYS1.VTAMLIB,DISP=SHR
//VTAMLST DD DSN=SYS1.VTAMLST,DISP=SHR
//         DD DSN=USER1.AUTO.VTAMLST,DISP=SHR
//SISTCLIB DD DSN=SYS1.SISTCLIB,DISP=SHR
//AUTOCKPT DD DSN=VSAM.AUTOCKPT,AMP=AMORG,DISP=OLD
//VTAMLIB DD DSN=SYS1.VTAMLIB,DISP=SHR
//NCPDUMP DD DSN=SYS1.NCPDUMP,DISP=SHR
/* DATA SETS FOR APPN DATABASE CHECKPOINTING
//DSDB1   DD DSN=SYS1.DSDB1,DISP=SHR
//DSDB2   DD DSN=SYS1.DSDB2,DISP=SHR
//DSDBCTRL DD DSN=SYS1.DSDBCTRL,DISP=SHR
//TRSDB   DD DSN=SYS1.TRSDB,DISP=SHR
/* DATA SETS 3720, 3725, AND 3745 DUMPS
//LDRIOTAB DD DSN=SYS1.LDRIOTAB,DISP=(SHR,PASS,KEEP)
//CSPDUMP DD DSN=SYS1.CDUMP,DISP=SHR
//MOSSDUMP DD DSN=SYS1.MDUMP,DISP=SHR
//NCPLOAD DD DSN=SYS1.NCPLOAD,DISP=SHR
/* NODELST DATA SET
//NODLST1 DD DSN=VSAM.NODLST1,AMP=AMORG,DISP=OLD
/* ALTERNATE NODELST DATA SET
//NODLST2 DD DSN=VSAM.NODLST2,AMP=AMORG,DISP=OLD
/* RESTART DATA SET
=SYS1.RESTART,AMP=AMORG,DISP=OLD
/* CMIP services Data Sets
//ISTCMIP DD DSN=SYS1.SISTCMIP,DISP=SHR
//ACYGDMO DD DSN=SYS1.SISTGDMO(ACYGDMO),DISP=SHR
//ISTASN1 DD DSN=SYS1.SISTASN1,DISP=SHR
```

Note: On the EXEC statement, ISTINM01 is the main z/OS Communications Server initialization module name. Code PGM=ISTINM01.

The previous example is based on the following assumptions:

- The node is APPN capable.
- A communication controller is in the network.
- The generated NCP and RRT modules for the communication controller reside in data set SYS1.NCPLOAD (NCPLOAD DD statement). The NCP source is in SYS1.VTAMLST.
- The SSP modules needed to load and dump the communication controllers are in SYS1.SSPLIB (STEPLIB DD statement).
- A dump data set is needed for the communication controller (NCPDUMP DD statement).
- The dynamic configuration of channel-attached devices facility (dynamic I/O) is being used (VTAMLST DD and AUTOCKPT DD statements).
- A dump data set is needed for the communication scanner processor (CSP) (CSPDUMP DD statement). For 3380 DASD, this data set should be allocated with at least 7 cylinders using a block size of 512.
- A dump data set is needed for the maintenance and operator subsystem (MOSS) (MOSSDUMP DD statement). For 3380 DASD, this data set should be allocated with at least 10 cylinders using a block size of 512.
- Two NODELST data sets have been defined and can be used by z/OS Communications Server (NODEDS1 DD and NODEDS2 DD statement).
- The following CMIP services have been defined (these data sets are required to enable CMIP services and the z/OS Communications Server topology agent):
 - SYS1.SISTCMIP

- SYS1.SISTGDMO(ACYGDMO)
- SYS1.SISTASN1

The directory definition file in the SYS1.SISTCMIP data set can be updated while z/OS Communications Server is running, but CMIP services is aware of these changes only when:

- The **MODIFY TABLE** command is issued
- CMIP services is restarted by one of the following methods:
 - If CMIP services is active, stop CMIP services by issuing the **MODIFY VTAMOPTS** command with the **OSIMGMT=NO** start option and then restart CMIP services by issuing the **MODIFY VTAMOPTS** command with the **OSIMGMT=YES** start option.
 - Restart z/OS Communications Server with the **OSIMGMT=YES** start option.

It is recommended that you keep backup copies of both the original directory definition file (or the last directory definition file that loaded without error) and the edited version of the file. When you load the edited file, z/OS Communications Server writes over the existing version of the directory definition file. There is no way to display the contents of the file being used by CMIP services, because the file is read into an internal data structure.

If the edited file has a syntax error, z/OS Communications Server does not use it. Message IST1444I is issued to indicate what is wrong with the file. z/OS Communications Server continues to use the last correct file that it read.

With your backup copies, you can correct the syntax error in the edited file by comparing it to the previous file that loaded without error.

Note: The member name, ACYDDF, must not be changed.

- Space has been allocated for all data sets, and they have been cataloged.

Installing dump analysis and VIT analysis tools

The dump analysis and VIT analysis tools are used for diagnosing software failures. For more information about them, refer to *z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures*.

Concatenating target data sets used in the installation

Table 27 shows the target data sets that contain the data necessary to set up the z/OS Communications Server dump analysis and the VIT analysis tool. You need to concatenate the target data sets into the DDNAME statements shown.

Table 27. Target data sets for dump and trace tools

Target data set	Action	DDNAME	Comment
SYS1.SISTBL0	Concatenate	ISPTLIB	Contains compiled tables, keylists, and commands
SYS1.SISTCLS1	Concatenate	SYSPROC	Contains CLISTs and REXX execs
SYS1.SBLSPNL0	Concatenate	ISPPLIB	Contains compiled panels
SYS1.SBLSMSG0	Concatenate	ISPMLIB	Contains compiled ISPF messages

Use a LOGON PROC to concatenate the data sets. If you create a new LOGON PROC, you need to log off and then log back on for the PROC to take effect.

Figure 2 shows an example of a LOGON PROC. The data sets necessary for the z/OS Communications Server dump analysis and the VIT analysis tool are shown in bold print.

```

I //VTAMPROC EXEC PGM=IKJEFT01,TIME=1440,REGION=2048K,
I // PARM='SPFTPO'
I //STEPLIB DD DSN=USER.LINKLIB,DISP=SHR
I // DD DSN=SYS1.ISRLOAD,DISP=SHR
I // DD DSN=SYS1.ISPLOAD,DISP=SHR
I // DD DSN=SYS1.LINKLIB,DISP=SHR
I //SYSUADS DD DSN=SYS1.UADS,DISP=SHR
I //SYSHLP DD DSN=SYS1.HELP,DISP=SHR
I //SYSPROC DD DSN=USER.CLIST,DISP=SHR
I // DD DSN=SYS1.ISRCLIB,DISP=SHR
I // DD DSN=SYS1.CLIST,DISP=SHR
I // DD DSN=SYS1.SBLSCLS0,DISP=SHR
I // DD DSN=SYS1.ISPEXEC,DISP=SHR
I //ISPLLIB DD DSN=SYS1.SGIMLMD0,DISP=SHR
I //HACPKPT DD DSN=SYS1.HASPKPT,DISP=SHR
I //ISPPLIB DD DSN=USER.PANELS,DISP=SHR
I // DD DSN=ISF.V1R1M0.ISFPLIB,DISP=SHR
I // DD DSN=SYS1.ISRPLIB,DISP=SHR
I // DD DSN=SYS1.ISPPLIB,DISP=SHR
I //ISPMLIB DD DSN=USER.MESSAGES,DISP=SHR
I // DD DSN=SYS1.ISRMLIB,DISP=SHR
I // DD DSN=SYS1.ISPMLIB,DISP=SHR
I //ISPSLIB DD DSN=SYS1.ISRSLIB,DISP=SHR
I // DD DSN=SYS1.ISPSLIB,DISP=SHR
I //ISPTLIB DD DSN=SYS1.SBLSTBL0,DISP=SHR
I // DD DSN=ISF.V1R1M0.ISFTLIB,DISP=SHR
I // DD DSN=SYS1.ISRTLIB,DISP=SHR
I // DD DSN=SYS1.ISPTLIB,DISP=SHR
I // DD DSN=SYS1.SMPE.TABLES,DISP=SHR
I //ISPEXEC DD DSN=SYS1.ISPEXEC,DISP=SHR
I //SMPTABL DD DSN=SYS1.SMPE.TABLES,DISP=SHR
I //ISPCTL1 DD DISP=NEW,UNIT=VIO,SPACE=(CYL,(1,1)),
I // DCB=(LRECL=80,BLKSIZE=800,RECFM=FB)
I //ISPCTL2 DD DISP=NEW,UNIT=VIO,SPACE=(CYL,(1,1)),
I // DCB=(LRECL=80,BLKSIZE=800,RECFM=FB)
I //ISPLST1 DD DISP=NEW,UNIT=VIO,SPACE=(CYL,(1,1)),
I // DCB=(LRECL=121,BLKSIZE=1210,RECFM=FBA)
I //ISPLST2 DD DISP=NEW,UNIT=VIO,SPACE=(CYL,(1,1)),
I // DCB=(LRECL=121,BLKSIZE=1210,RECFM=FBA)

```

Figure 2. Example of a LOGON PROC (Part 1 of 2)

```
//SYSPRINT DD TERM=TS
//SYSIN DD TERM=TS
//DD1 DD DYNAM
//DD2 DD DYNAM
//DD3 DD DYNAM
//DD4 DD DYNAM
//DD5 DD DYNAM
//DD6 DD DYNAM
//DD7 DD DYNAM
//DD8 DD DYNAM
//DD9 DD DYNAM
//DD10 DD DYNAM
//DD11 DD DYNAM
//DD12 DD DYNAM
//DD13 DD DYNAM
//DD14 DD DYNAM
//DD15 DD DYNAM
//DD16 DD DYNAM
//DD17 DD DYNAM
//DD18 DD DYNAM
//DD19 DD DYNAM
//DD20 DD DYNAM
//DD21 DD DYNAM
//DD22 DD DYNAM
//DD23 DD DYNAM
//DD24 DD DYNAM
//DD25 DD DYNAM
```

Figure 2. Example of a LOGON PROC (Part 2 of 2)

Customizing IPCS interface

If you want a customized interface to be active to select the z/OS Communications Server dump analysis commands, customize the IPCS panel BLSPPRIM by adding the highlighted lines in Figure 3 on page 67 to create and activate option 7 on the IPCS Primary Option Menu as shown in Figure 4 on page 68. This modification allows you to access VTAMMAP directly for dump processing. When this option is selected, control is passed to the ISTDE01 EXEC. This EXEC controls the IPCS panels for the dump formatter.

For information regarding TCP/IP IPCS CLISTs, refer to *z/OS Communications Server: IP Diagnosis*.

I **Note:** This sample is not necessarily identical to the one on your system.

```

)ATTR
/* ===== */
/* 5685-001 This panel is "Restricted materials of IBM" */
/* (C) Copyright IBM Corporation 1988 */
/* Licensed materials - property of IBM */
/* Refer to copyright instructions, form number G120-2083 */
/* ===== */
¢ TYPE(INPUT) INTENS(HIGH) CAPS(OFF) JUST(LEFT) PAD(NULLS)
@ TYPE(TEXT) COLOR(GREEN) INTENS(LOW)
)BODY
%----- IPCS PRIMARY OPTION MENU -----
%OPTION ==>¢ZCMD

% 0 +DEFAULTS - Specify default dump and options @* USERID - &ZUSER
% 1 +BROWSE - Browse dump data set @* DATE - &ZDATE
% 2 +ANALYSIS - Analyze dump contents @* JULIAN - &ZJDATE
% 3 +SUBMIT - Submit problem analysis job to batch @* TIME - &ZTIME
% 4 +COMMAND - Enter IPCS subcommand or CLIST @* PREFIX - &ZPREFIX
% 5 +UTILITY - Perform utility functions @* TERMINAL- &ZTERM
% 6 +DUMPS - Manage dump inventory @* PF KEYS - &ZKEYS
% 7 +VTAM - VTAM dump analysis commands %*****
% T +TUTORIAL - Learn how to use the IPCS dialog
% X +EXIT - Terminate using log and list defaults

+Enter%END+command to terminate IPCS dialog
)INIT
&ZPRIM = YES /* Always a primary option menu */
&ZHTOP = BLSPhelp /* Tutorial table of contents */
.CURSOR = ZCMD
.HELP = BLSPhelp
&ZHINDEX = &Z /* No tutorial index is supplied */
)PROC
&PASSLIB = &Z
IF (&ZDBCS = YES, NO)
&PASSLIB = PASSLIB
&ZSEL = TRANS( TRUNC (&ZCMD, '.')
0, 'PGM(BLSGSCMD) PARM(%BLSCSETD)'
1, 'PGM(BLSLDISP) NEWAPPL(BLSL) &PASSLIB'
2, 'PANEL(BLSPSCRN)'
3, 'PANEL(BLSPBKGD)'
4, 'PANEL(BLSPDSLE)'
5, 'PANEL(BLSPUTIL)' /* %00A*/
6, 'PGM(BLSGDUI)'
7, 'PGM(BLSGSCMD) PARM(%ISTDE01) NEWAPPL(ISTD) &PASSLIB'
t, 'PGM(ISPTUTOR) PARM(BLSPTUTR)'
T, 'PGM(ISPTUTOR) PARM(BLSPTUTR)'
, , ,
x, 'EXIT'
X, 'EXIT'
*, '?' )
)END

```

Figure 3. Sample IPCS panel BLSPPRIM customization

```

-----IPCS PRIMARY OPTION MENU-----
OPTION ==> _

0  DEFAULTS   - Specify default dump and options
1  BROWSE     - Browse dump data set
2  ANALYSIS   - Analyze dump contents
3  SUBMIT     - Submit problem analysis job to batch
4  COMMAND    - Enter IPCS subcommand or CLIST
5  UTILITY    - Perform utility functions
6  DUMPS     - Manage dump inventory
7  VTAM      - VTAM dump analysis commands
T  TUTORIAL   - Learn how to use the IPCS dialog
X  EXIT      - Terminate using log and list defaults

Enter END command to terminate IPCS dialog

```

Figure 4. Addition of option 7 to the IPCS primary option menu

Verifying dump formatter panels

To verify that dump formatter panels are set up correctly, choose option 7 on the menu shown in Figure 4.

The first ISPF panel you should see is shown in Figure 5.

```

                VTAMMAP Analysis Menu

Select one of the following. Then press Enter.

— 1. APPC . . - APPLCONV, PARTNRLU, APPLMODE, APPMODAL
   2. APPN . . - APPNBASE, FNDADJCP, FNDANDCB, FNDCOS, FNDDECB, etc
   3. General. - HOST, VTAM, VTBASIC, VTFNDMOD, VTMODS, VITAL, etc
   4. Queues . - PABSCAN, VTCVTPAB, VTREADYQ
   5. Resource - RDTCHECK, RDTFULL, RDTHIER, RDTSUM, VTNODE
   6. Session. - ATMDATA, FINDDSIB, FINDSIB, MNPS, SES, SIBCHECK
   7. Search . - SRTFIND
   8. Storage. - SPANC, STORAGE, VTBUF, VTRPH
   9. CSM . . - CSMALL, CSMBUF, CSMOWNER, CSMPOOL
  10. Waits. . - VTWRE
  11. ERs/VRs. - ROUTES, VTVRBLK
  12. CLISTs. - ISTVABND, ISTVDUMP, ISTVMAP, ISTVSAVE, ISTVSLIP

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Command ==>
F1=Help  F2=Split  F3=Exit  F9=Swap  F12=Cancel

```

Figure 5. Main menu for selecting dump options

Press the PF1 key to verify that the appropriate help panel is displayed.

Customizing ISPF interface

If you want a customized interface to be active to select the z/OS Communications Server trace analysis commands, customize the ISPF panel ISR@PRIM by adding the highlighted lines shown in Figure 6 on page 70 to create and activate option V

on the ISPF/PDF Primary Option Menu as shown in Figure 7 on page 71. When this option is selected, control is passed to the ISTTE01 EXEC. This EXEC controls the ISPF panels for trace formatter.

|
|

Note: The samples shown in Figure 6 on page 70 and Figure 7 on page 71 are not necessarily identical to the ones on your system.

```

)ATTR
+ TYPE(TEXT) COLOR(GREEN) INTENS(LOW)
)BODY
%----- SAMPLE ISPF/PDF PRIMARY OPTION MENU -----+
%OPTION ==>_ZCMD
%
%
%                                +USERID   - &ZUSER
% 0 +ISPF PARMS - Specify terminal and user parameters +TIME     - &ZTIME
% 1 +BROWSE     - Display source data or output listings +TERMINAL - &ZTERM
% 2 +EDIT       - Create or change source data          +PF KEYS  - &ZKEYS
% 3 +UTILITIES  - Perform utility functions
% 4 +FOREGROUND - Invoke language processors in foreground
% 5 +BATCH      - Submit job for language processing
% 6 +COMMAND    - Enter TSO command or CLIST
% 7 +DIALOG TEST - Perform dialog testing
% 8 +LM UTILITIES- Perform library administrator utility functions
% 9 +IBM PRODUCTS- Same as option S (SER PRODUCTS)
% 10 +SCLM      - Software Configuration and Library Manager
% C +CHANGES   - Display summary of changes for this release
% V +VTAM       - VTAM trace analysis commands
% T +TUTORIAL   - Display information about ISPF/PDF
% S +SER PRODUCTS- Southeast Region product options
% I +SER IC TOOLS- Southeast Region Info-Center and Toolkits
% P +RPM        - Regional Problem Management
% X +EXIT       - Terminate ISPF using log and list defaults
%
+Enter%END+command to terminate ISPF.
%
)INIT
  .HELP = ISR00003
  &ZPRIM = YES          /* ALWAYS A PRIMARY OPTION MENU */
  &ZHTOP = ISR00003    /* TUTORIAL TABLE OF CONTENTS */
  &ZHINDEX = ISR91000 /* TUTORIAL INDEX - 1ST PAGE */
  &ZSCLMPRJ = &Z
  VPUT (ZHTOP,ZHINDEX,ZSCLMPRJ) PROFILE
)PROC
&ZQ = &Z
IF (&ZCMD ^= ' ')
  &ZQ = TRUNC(&ZCMD, '.')
  IF (&ZQ = ' ')
    .MSG = ISRU000
  &ZSEL = TRANS( &ZQ
    0, 'PANEL(ISPOPTA)'
    1, 'PGM(ISRBRO) PARM(ISRBRO01)'
    2, 'PGM(ISREDIT) PARM(P,ISREDM01)'
    3, 'PANEL(ISRUTIL)'
    4, 'PANEL(ISRFPA)'
    5, 'PGM(ISRJB1) PARM(ISRJPA) NOCHECK'
    6, 'PGM(ISRPTC)'
    7, 'PGM(ISPYXDR) PARM(ISR) NOCHECK'
    8, 'PANEL(ISRLPRIM)'
    9, 'PANEL(SERPP000)' /* CHANGED HERE? FROM ISRDIIIS */
    10, 'PGM(ISRSCLM) NOCHECK'
    C, 'PGM(ISPTUTOR) PARM(ISR00005)'
    V, 'CMD(%ISTTE01) NEWAPPL(ISTT) &PASSLIB'
    T, 'PGM(ISPTUTOR) PARM(ISR00000)'
    S, 'PANEL(SERPP000)'
    I, 'PANEL(SERIC000)'
    P, 'CMD(%SRRPM)'
    , ,
    , ,
    X, 'EXIT'
    *, '?' )
  &ZTRAIL = .TRAIL
)END

```

Figure 6. Sample ISPF panel `ISR@PRIM` customization

Note: This sample is not necessarily identical to the one on your system.

```
----- ISPF/PDF PRIMARY OPTION MENU -----
OPTION ==>
      0 ISPF PARMS - Specify terminal and user parameters  USERID - USERID
      1 BROWSE    - Display source data or output listings  TIME    - 9:29
      2 EDIT     - Create or change source data           TERMINAL - 3278
      3 UTILITIES - Perform utility functions             PF KEYS - 12
      4 FOREGROUND - Invoke language processors in foreground
      5 BATCH    - Submit job for language processing
      6 COMMAND  - Enter TSO command or CLIST
      7 DIALOG TEST - Perform dialog testing
      8 LM UTILITIES- Perform library administrator utility functions
      9 IBM PRODUCTS- Same as option S (SER PRODUCTS)
     10 SCLM    - Software Configuration and Library Manager
      C CHANGES - Display summary of changes for this release
      V VTAM    - VTAM trace analysis commands
      T TUTORIAL - Display information about ISPF/PDF
      S SER PRODUCTS- Southeast Region product options
      I SER IC TOOLS- Southeast Region Info-Center and Toolkits
      P RPM     - Regional Problem Management
      X EXIT    - Terminate ISPF using log and list defaults

Enter END command to terminate ISPF.
```

Figure 7. Addition of option V to the ISPF/PDF primary option menu

Verifying trace formatter panels

To verify that trace formatter panels are set up correctly, choose option V on the menu shown in Figure 7.

The first ISPF panel you should see is shown in Figure 8.

```
VTAM Internal Trace Analysis

Select one of the following. Then press Enter.

— 1. Storage Analysis
   2. Request/response unit counting
   3. VIT extraction
   4. Input complete

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Command ==>
F1=Help    F2=Split    F3=Exit    F9=Swap    F11=Retrieve F12=Cancel
```

Figure 8. Main menu for selecting trace parameters

Press the PF1 key to verify that the appropriate help panel is displayed.

Note: It is recommended that you position the command line at the bottom of the screen using ISPF PARMS option DISPLAY and changing the 'COMMAND LINE PLACEMENT ==> ASIS' to BOTTOM to improve readability.

Appendix A. z/OS V1R2 Communications Server release summary

This appendix documents the SNA functions that were introduced in z/OS V1R2 Communications Server. All functions introduced in z/OS V1R2 Communications Server are supported in z/OS V1R4 Communications Server.

APPN

The following include enhancements made to provide better APPN interfacing for z/OS V1R2 Communications Server:

- CNN routing failure message
- Display TDU (Topology Database Update) statistics
- Display APPN Class of Service

CNN routing failure message

z/OS V1R2 Communications Server will issue a new message group, IST1774I, on the CNN node when the following conditions are met:

- An optimal route through a composite network node (CNN) is not chosen during session activation.
- A new start option, CNNRTMSG, is coded as CNNRTMSG=NOSUPP.
- Session activation completes

Note: Message group IST1774I is *not* issued when the CNN host is an RTP endpoint or an intermediate node on an RTP for the session.

The IST1774I message group may be controlled through the use of the message flooding prevention table. The information displayed in the message group may be helpful when tuning APPN routes.

Restrictions

None.

Migration procedures

The CNN routing failure message function does not require any action unless you want to take advantage of the function. If so, perform the tasks in the following table.

Table 28. CNN routing failure message - Migration tasks

Task	Procedure	Reference
Enable the CNN Routing Failure Message function.	Specify CNNRTMSG=NOSUPP in VTAM start options or use MODIFY VTAMOPTS,CNNRTMSG=NOSUPP.	<i>z/OS Communications Server: SNA Resource Definition Reference</i> and <i>z/OS Communications Server: SNA Operation</i>
Resolve any errors that occur when implementing the new CNN Routing Failure Message function.	Follow the instructions within the error messages that display in the event that a non-optimal CNN route is chosen during session activation.	<i>z/OS Communications Server: SNA Messages</i>

New and changed interfaces that enable use of this function

New START option: CNNRTMSG —This new start option controls the suppression of the IST1774I message group. The default for CNNRTMSG is to suppress the message group, and it is dynamically modifiable. Refer to *z/OS Communications Server: SNA Resource Definition Reference* for information on the CNNRTMSG start option.

New messages: The following are new messages for the CNN routing failure message function:

- IST1774I OPTIMAL CNN ROUTE NOT CHOSEN - ENTRY/EXIT SUBAREA MISMATCH
- IST1775I CNN ENTRY SUBAREA = %%%%5 CNN EXIT SUBAREA = %%%%5

Message group IST1774I is issued when an optimal route through a CNN is not chosen during session activation. The information displayed may be helpful in tuning APPN routes.

The following is a sample message group:

```
IST1774I OPTIMAL CNN ROUTE NOT CHOSEN - ENTRY/EXIT SUBAREA MISMATCH
IST1775I CNN ENTRY SUBAREA = 4          CNN EXIT SUBAREA = 3
IST664I REAL  OLU=NETA.NETAPPL1      REAL  DLU=NETA.APPLAA1
IST889I SID = F6ABEEC3E16FCD44
IST314I END
```

Refer to *z/OS Communications Server: SNA Messages* for complete information on the IST1774I message group.

Changed command output: The CNNRTMSG start option is now displayable by using the DISPLAY VTAMOPTS command. CNNRTMSG is also displayed for DISPLAY VTAMOPTS,FUNCTION=MESSAGES. The CNNRTMSG start option is dynamically modifiable by using the MODIFY VTAMOPTS command. See “Sample display showing VTAM start options that are new to z/OS CS V1R2” on page 100 for a sample display.

Refer to *z/OS Communications Server: SNA Operation* for complete details of the DISPLAY VTAMOPTS and the MODIFY VTAMOPTS commands.

Display TDU (Topology Database Update) statistics

The display TDU (Topology Database Update) statistics function allows users to display VTAM's TDU processing information that can be used to detect a TDU war in the network, thus aiding in diagnosis. The resources being contended can be identified, and depending on the nature of the problem, the origin of the TDU war can be isolated.

A new TDU display command shows the TDU statistics:

- D TOPO, LIST=TDUINFO

You can specify a SCOPE parameter on the TDU command to refine the statistics that are displayed, as follows:

D TOPO, LIST=TDUINFO, SCOPE=ACTIVITY

SCOPE=ACTIVITY is the default; specifying D TOPO,LIST=TDUINFO will give the same output. When SCOPE=ACTIVITY is specified on the TDU command, it displays a list of resources that are reported in TDUs most frequently since the last time TDU statistics data was cleared.

D TOPO, LIST=TUINFO, SCOPE=RECENT

When SCOPE=RECENT is coded on the command, the output displays a list of resources reported in TDUs received most recently.

For any resource that is displayed on the most active list (SCOPE=ACTIVITY) or the most recent list (SCOPE=RECENT), the TDU accepted count and the TDU rejected count for that resource are shown in message IST1778I. When multiple display TDU commands are issued and the same resource is on both lists for an extended period of time, you should examine the accepted count and the rejected count for that resource.

CLEAR is an optional parameter that can be added to the TDU command. If CLEAR is coded, the TDU statistics data collected so far will be reset. Specifically, the TDU accepted count and TDU rejected count for EACH individual resource in the topology database will be reset to 0. By using the CLEAR=YES operand to clear all TDU statistics data collected so far, subsequent displays can show TDU activities since the last CLEAR command was issued. In a true TDU war, a large amount of TDU traffic will be generated within seconds.

A possible TDU war may be occurring if you continuously receive TDUs for the same resource with one of the following symptoms:

- Continuous rejection of TDUs for a resource (TDU rejected count for the resource rising) with RSN in TDU rising or unchanged
- Continuous acceptance of TDUs for a resource (TDU accepted count for the resource rising) with RSN in the TDU rising

Note, however, that it is not always a TDU war when TDUs flood the network, such as when network nodes propagate topology information to other nodes. For example, when two portions of the same APPN network are connected by CP-CP sessions for the first time, the topology information will be broadcast in TDUs. The TDU traffic will eventually subside and this is not a TDU war.

Restrictions

The display TDU statistics function is only valid on an APPN network node or interchange node.

Migration procedures

The display TDU statistics function does not require any action unless you want to take advantage of the function. If so, perform the tasks in the following table.

Table 29. Display TDU (Topology Database Update) statistics - Migration tasks

Task	Procedure	Reference
Display the TDU statistics that identify the resources that are reported in TDUs most frequently.	Specify DISPLAY NET,TOPO,LIST=TUINFO,SCOPE=ACTIVITY.	<i>z/OS Communications Server: SNA Operation</i> and <i>z/OS Communications Server: SNA Messages</i>
Display the TDU statistics that show the changes in the RSNs, TDU accepted counts and TDU rejected counts for the resources identified in the previous step.	Specify DISPLAY NET,TOPO,LIST=TUINFO,SCOPE=RECENT.	<i>z/OS Communications Server: SNA Operation</i> and <i>z/OS Communications Server: SNA Messages</i>
Reset all TDU statistics information.	Specify DISPLAY NET,TOPO,LIST=TUINFO,CLEAR.	<i>z/OS Communications Server: SNA Operation</i>

New and changed interfaces that enable use of this function

New messages: The following are new messages for the display TDU statistics function:

- IST1769I LAST TDU RECEIVED - %%%%%%%%%%8 %%%%%%%%%%8 FROM %%%%%%%%%%17
- IST1770I TDU COUNTS RESET - %%%%%%%%%%8 %%%%%%%%%%8
- IST1771I SENT - %%%%%%%%%%5 RECEIVED - %%%%%%%%%%5 ACCEPTED - %%%%%%%%%%5
- IST1772I REJECTED - %%%%%%%%%%5 IGNORED - %%%%%%%%%%5
- IST1776I TDUS RECEIVED MOST RECENTLY
- IST1777I CP NAME RSN DESTINATION CP TGN ACC REJ
- IST1778I %%%%%%%%%%17 %%%%%%%%%%8 %%%%%%%%%%17 %3 %%%%%%%%%%5 %%%%%%%%%%5
- IST1779I TDUS RECEIVED BETWEEN %%%%%%%%%%8 %%%%%%%%%%8 - %%%%%%%%%%8 %%%%%%%%%%8
- IST1780I TOPOLOGY RESOURCE RECORDS REFERENCED MOST FREQUENTLY
- IST1781I INITDB CHECKPOINT DATASET LAST GARBAGE COLLECTION
- IST1784I LAST TDU RECEIVED - NONE
- IST1785I %%%%%%%%%%8 %%%%%%%%%%8 %%%%%%%%%%8 %%%%%%%%%%8
- IST1798I TOPOLOGY DATASET RETRIEVED WAS CREATED ON XXXXXXXX XXXXXXXX

Refer to *z/OS Communications Server: SNA Messages* for complete information on messages.

Changed command output: The command output is changed in z/OS V1R2 Communications Server when using the D TOPO,LIST=SUMMARY. A new message is added to show the creation day and time of the topology checkpoint data set that was successfully loaded when VTAM was started with start option INITDB=TOPO or INITDB=BOTH:

```
d net,topo,list=summary
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TOPOLOGY
IST1306I LAST CHECKPOINT  ADJ NN  EN  SERVED EN CDSERVR ICN  BN
IST1307I 08/02/00 10:32:05 1  1  1  0      0      0  0
IST1781I INITDB CHECKPOINT DATASET  LAST GARBAGE COLLECTION
IST1785I 08/02/00 10:32:05          08/02/00 08:32:05
IST314I END
```

The command output is changed to include new messages IST1769I, IST1770I, IST1771I, and IST1772I for the display TOPO command for a specific node:

```
d net,topo,id=sscp1a,list=all
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TOPOLOGY
IST1295I CP NAME          NODETYPE ROUTERES CONGESTION  CP-CP WEIGHT
IST1296I NETA.SSCP1A     NN        1      NONE      *NA*  *NA*
IST1579I
IST1297I                  ICN/MDH  CDSERVR  RSN        HPR
IST1298I                  NO        NO        4          RTP
IST1579I
IST1223I                  BN        NATIVE   TIME LEFT  LOCATE SIZE
IST1224I                  NO        YES     15        16K
IST1769I LAST TDU RECEIVED - 07/12/00 23:39:56 FROM NETA.SSCPAA
IST1770I TDU COUNTS RESET - 07/12/00 22:22:36
IST1771I SENT      - 16      RECEIVED - 6      ACCEPTED - 3
```

```

IST1772I REJECTED - 2          IGNORED - 1
IST1299I TRANSMISSION GROUPS ORIGINATING AT CP NETA.SSCP1A
IST1357I
IST1300I DESTINATION CP      TGN      STATUS  TGTYPE  VALUE WEIGHT
IST1301I NETA.SSCP2A        21      OPER    INTERM  YES  *NA*
IST1301I NETA.SSCP2A        22      OPER    INTERM  YES  *NA*
IST314I END

```

Refer to *z/OS Communications Server: SNA Operation* for complete details of the DISPLAY TOPO command.

New command option: LIST=TDUINFO is a new option added to the DISPLAY TOPO command. The related operands, SCOPE=RECENTIACTIVITY NUM=number CLEAR=YES/NO, are valid only if LIST=TDUINFO is specified on the command.

The following is sample output when using SCOPE=RECENT:

```

d net,topo,list=tduinfo,scope=recent
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TOPOLOGY
IST1776I TDUS RECEIVED MOST RECENTLY
IST1777I CP NAME          RSN      DESTINATION CP      TGN ACC  REJ
IST1778I NETA.SSCP2A      4       NETA.SSCP1A        21  2    0
IST1778I NETA.SSCP2A      2       NETA.SSCP1A        22  2    0
IST1778I NETA.SSCP2A      0       NETA.SSCP1A        22  1    0
IST1778I NETA.SSCPAA      2       NETA.SSCP1A        21  1    0
IST1778I NETA.SSCPAA      2       ***NA***           NA  1    0
IST1778I NETA.SSCP2A      2       NETA.SSCP1A        21  1    0
IST1778I NETA.SSCP2A      2       ***NA***           NA  1    0
IST1454I 7 TDUINFO(S) DISPLAYED
IST1779I TDUS RECEIVED BETWEEN 03/22/01 12:30:13 - 03/22/01 12:33:24
IST1770I TDU COUNTS RESET - 03/22/01 12:27:17
IST314I END

```

The following is sample output when using SCOPE=ACTIVITY:

```

d net,topo,list=tduinfo,scope=activity
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TOPOLOGY
IST1780I TOPOLOGY RESOURCE RECORDS REFERENCED MOST FREQUENTLY
IST1777I CP NAME          RSN      DESTINATION CP      TGN ACC  REJ
IST1778I NETA.SSCP2A      4       NETA.SSCP1A        21  2    0
IST1778I NETA.SSCP2A      2       NETA.SSCP1A        22  2    0
IST1778I NETA.SSCPAA      2       NETA.SSCP1A        21  1    0
IST1778I NETA.SSCPAA      2       ***NA***           NA  1    0
IST1778I NETA.SSCP2A      2       ***NA***           NA  1    0
IST1454I 5 TDUINFO(S) DISPLAYED
IST1770I TDU COUNTS RESET - 03/22/01 12:27:17
IST314I END

```

Display APPN Class of Service

The display APPN Class of Service function allows operators to issue a display command to obtain the currently active APPN Class of Service table entries and the last APPNCOS table that was used to create or update each entry. The information displayed can be used for problem determination on session related problems.

Restrictions

The display APPN Class of Service function is only valid on VTAM nodes that support APPN functions.

Migration procedures

The display APPN Class of Service function does not require any action unless you want to take advantage of the function. If so, perform the task in the following table.

Table 30. Display APPN Class of Service - Migration task

Task	Procedure	Reference
Obtain the active APPN Class of Service entries, the name of the last table used to create or update each entry, and the time and date the entry was created or last updated.	Specify DISPLAY NET,COS,TYPE=APPN.	<i>z/OS Communications Server: SNA Operation</i>

New and changed interfaces that enable use of this function

New messages: The following are new messages for the display APPN Class of Service function:

- IST1782I ENTRY NAME TABLE NAME ACTIVATION TIME
- IST1783I %%%%%%%%%%8 %%%%%%%%%%8 %%%%%%%%%%8 %%%%%%%%%%8

Refer to *z/OS Communications Server: SNA Messages* for complete information on messages.

Changed command output: The command output is changed in z/OS V1R2 Communications Server when using the D NET,COS command so that it displays the APPN Class of Service entries:

```
d net,cos,type=appn
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = APPN COS
IST1782I ENTRY NAME      TABLE NAME      ACTIVATION TIME
IST1783I CPSVCMG        COSAPPN          03/22/01  12:27:22
IST1783I SNASVCMG       COSAPPN          03/22/01  12:27:22
IST1783I #CONNECT       COSAPPN          03/22/01  12:27:22
IST1783I #INTER         COSAPPN          03/22/01  12:27:22
IST1783I #INTERSC       COSAPPN          03/22/01  12:27:22
IST1783I #BATCH         COSAPPN          03/22/01  12:27:22
IST1783I #BATCHSC       COSAPPN          03/22/01  12:27:22
IST314I END
```

In addition, the IST350I DISPLAY TYPE = SUBAREA COS is added to the existing example for displaying a Class of Service table for a specific Physical Unit (PU) type 4 or type 5:

```
d net,cos,type=subarea,id=istpus
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = SUBAREA COS
IST354I PU T4/5 MAJOR NODE = ISTPUS
IST862I NETID = NETA      COSTABLE = ISTSDCOS
IST314I END
```

Refer to *z/OS Communications Server: SNA Operation* for complete details of the DISPLAY commands.

Connectivity

The following include enhancements made to provide better connectivity for z/OS V1R2 Communications Server:

- HiperSockets
- Efficient routing using HiperSockets

- FICON™ CTC support
- Enterprise Extender global connection network enhancements

HiperSockets

HiperSockets is a zSeries™ hardware feature that provides very high-speed, low-latency IP message passing between Logical Partitions (LPARs) on the same processor complex (CEC). It is an interface to device driver software and is similar to the Queued Direct I/O (QDIO) interface used with the OSA-Express adapter with Fast Ethernet and Gigabit Ethernet. HiperSockets can be viewed as an "internal/virtual LAN" within a IBM zSeries 800 (z800) or 900 (z900) CEC. Each virtual LAN is represented by a new CHPID type of IQD. The hardware allows for up to four unique IQD CHPIDs (virtual LANs). z/OS Communications Server supports HiperSockets connectivity for both Dynamic XCF and manually configured (MPCIPA) devices.

Note: HiperSockets is also known as Internal Queued Direct I/O, or iQDIO.

APAR OW49475 enables HiperSockets.

HiperSockets support includes the capability to configure a TCP/IP as a HiperSockets Accelerator. Refer to *z/OS Communications Server: IP Configuration Guide* for an in-depth discussion of HiperSockets, including the HiperSockets Accelerator function. Refer to *z/OS Communications Server: IP Migration* for the IP Migration procedures and new and changed IP interfaces. See "New and changed interfaces that enable use of this function" for SNA external interface considerations.

Restrictions

The HiperSockets function is only allowed if the following requirements are met:

- Subchannel addresses must be configured by CHPID (CHannel Path ID). A minimum of three is required; ten is the maximum allowed. The HiperSockets subchannel devices associated with the selected IQD CHPID will be grouped together into a single MPC group (two read/write control devices and up to eight data devices). The subchannel devices must be online.
- HiperSockets can only be used between Logical Partitions on the same processor complex (CEC).
- Processor hardware support must be provided by the IBM @server zSeries 800 (z800) or 900 (z900). It is automatically detected and used when present. The start option IQDCHPID, and therefore, HiperSockets communications, cannot be specified, modified, or displayed on a processor without the hardware support.

Refer to *z/OS Communications Server: IP Configuration Guide* for more information on all the HiperSockets restrictions.

Migration procedures

Refer to *z/OS Communications Server: IP Migration* for all migration procedures.

New and changed interfaces that enable use of this function

New IQDCHPID start option: A new HiperSockets VTAM start option, IQDCHPID, is used to select which IQD CHPID is used for TCP/IP Dynamic XCF connectivity. This start option is only required when more than one IQD CHPID has been defined (within HCD). IQDCHPID=chpid specifies the (hexadecimal) CHPID (Channel Path ID) that is to be used for iQDIO communications from one LPAR (Logical Partition) to other LPARs within the CEC. Refer to *z/OS Communications Server: SNA Resource Definition Reference* for information on the IQDCHPID start option.

Changed command output: The IQDCHPID start option is now displayable by using the DISPLAY VTAMOPTS command. IQDCHPID is also displayed for DISPLAY VTAMOPTS,FUNCTION=CONNECT. The IQDCHPID start option is dynamically modifiable by way of the MODIFY VTAMOPTS command. See “Sample display showing VTAM start options that are new to z/OS CS V1R2” on page 100 for a sample display. Refer to *z/OS Communications Server: SNA Operation* for details about the DISPLAY VTAMOPTS and the MODIFY VTAMOPTS commands.

The output for displaying a HiperSockets TRLE is also modified, as follows:

```
d net,trl,trl=IUTIQDIO
IST097I DISPLAY ACCEPTED
IST075I NAME = IUTIQDIO, TYPE = TRLE
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST087I TYPE = LEASED, CONTROL = MPC, HPDT = YES
IST1715I MPCLEVEL = QDIO MPCUSAGE = SHARE
IST1716I PORTNAME = IUTIQDFE LINKNUM = 0
IST1577I HEADER SIZE = 4096 DATA SIZE = 64 STORAGE = ***NA***
IST1221I WRITE DEV = 0E29 STATUS = ACTIVE STATE = ONLINE
IST1577I HEADER SIZE = 4092 DATA SIZE = 64 STORAGE = DATASPACE
IST1221I READ DEV = 0E28 STATUS = ACTIVE STATE = ONLINE
IST1221I DATA DEV = 0E2A STATUS = ACTIVE STATE = N/A
IST1724I I/O TRACE = OFF TRACE LENGTH = *NA*
IST1717I ULPID = TCPCS2
IST1221I DATA DEV = 0E2B STATUS = RESET STATE = N/A
IST1724I I/O TRACE = OFF TRACE LENGTH = *NA*
IST314I END
```

The output for displaying HiperSockets tuning statistics is also modified, as follows:

```
IST1230I TIME = 10475400 DATE = 99043 ID = HYD1
IST1231I IPDU = 14 OPDU = 14
IST1569I INLP = 14 ONLP = 14
IST1232I TSWEEP = 0 QSWEEP = 0
IST924I -----
IST1233I DEV = 0E29 DIR = WRITE
IST1234I BSIZE = 65536 MAXBYTES = 404
IST1235I SIO = 14 SLOWDOWN = **NA**
IST1236I BYTECNT = 0 BYTECNT = 1791
IST1570I NBYTECTO = 0 NBYTECT = 1791
IST924I -----
IST1233I DEV = 0E28 DIR = READ
IST1234I BSIZE = 65536 MAXBYTES = 380
IST1235I SIO = 15 SLOWDOWN = 0
IST1236I BYTECNT = 0 BYTECNT = 1683
IST1570I NBYTECTO = 0 NBYTECT = 1683
IST924I -----
```

The following is a second example of modified output for displaying HiperSockets tuning statistics:

```
IST1233I DEV = 0E2A DIR = READ
IST1719I PCIREALO = 0 PCIREAL = 2
IST1720I PCIVIRTO = 0 PCIVIRT = 0
IST1721I SBALWRPO = 0 SBALWRP = 0
IST1722I PACKCNT = 0 PACKCNT = 2
IST1236I BYTECNT = 0 BYTECNT = 320
IST924I -----
IST1233I DEV = 0E2A DIR = WR/1
IST1723I SIGACNT = 0 SIGACNT = 0
IST1721I SBALWRP = 0 SBALWRP = 0
IST1722I PACKCNT = 0 PACKCNT = 0
IST1236I BYTECNT = 0 BYTECNT = 0
IST924I -----
```

```
IST1233I DEV      = 0E2A      DIR      = WR/2
.
.
.
```

Refer to *z/OS Communications Server: SNA Operation* for details about the TRLE display. Refer to *z/OS Communications Server: SNA Resource Definition Reference* for details on tuning statistics.

New codes: There are new iQDIO STAFD codes to support this function:

- X'0065' iQDIO Activation Prohibited
- X'0066' iQDIO CHPID Ambiguous
- X'0067' iQDIO Subchannel Devices Not Available

Refer to *z/OS Communications Server: IP and SNA Codes* for complete information on these new codes.

Efficient routing using HiperSockets Accelerator

z/OS V1R2 Communications Server introduces an improvement in performance when routing IP traffic between HiperSockets (also known as Internal Queued Direct Input/Output or iQDIO) and Queued Direct I/O (QDIO). This type of routing is called *HiperSockets Accelerator* because it allows you to concentrate external network traffic over a single OSA-Express QDIO connection and then accelerates (speeds up) the routing over a HiperSockets link bypassing the TCP/IP stack (IP Forwarding process). Refer to *z/OS Communications Server: IP Configuration Guide* for an in-depth description of HiperSockets and HiperSockets Accelerator. Refer to *z/OS Communications Server: IP Migration* for all Migration procedures and new and changed IP interfaces. See “New and changed interfaces that enable use of this function” for SNA external interface considerations.

Restrictions

There are no SNA restrictions to consider when using efficient routing using HiperSockets Accelerator. Refer to *z/OS Communications Server: IP Migration* for IP restrictions.

Migration procedures

Refer to *z/OS Communications Server: IP Migration* for all migration considerations.

New and changed interfaces that enable use of this function

New report output: The output for displaying an active OSA-Express TRL entry is modified to show a new message indicating whether a given data device for a TCP/IP stack is performing HiperSockets Accelerator. The following example is for two TCP stacks. In the example, HiperSockets Accelerator is enabled on the TCPCS stack and is disabled on the TCPCS2 stack:

```
d net,trl,trle=of8geth
IST097I DISPLAY ACCEPTED
IST075I NAME = OFFETH, TYPE = TRLE 059
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST087I TYPE = LEASED           , CONTROL = MPC , HPDT = YES
IST1715I MPCLEVEL = QDIO      MPCUSAGE = SHARE
IST1716I PORTNAME = OFFETHP   LINKNUM = 0   OSA CODE LEVEL = *NA*
IST1577I HEADER SIZE = 4096 DATA SIZE = 0 STORAGE = ***NA***
IST1221I WRITE DEV = 0E29 STATUS = ACTIVE   STATE = ONLINE
IST1577I HEADER SIZE = 4092 DATA SIZE = 0 STORAGE = ***NA***
IST1221I READ  DEV = 0E28 STATUS = ACTIVE   STATE = ONLINE
IST1221I DATA DEV = 0E2A STATUS = ACTIVE   STATE = N/A
IST1724I I/O TRACE = OFF   TRACE LENGTH = *NA*
IST1717I ULPID = TCPCS
```

```

IST1814I IQDIO ROUTING ENABLED
IST1757I PRIORITY1: UNCONGESTED PRIORITY2: UNCONGESTED
IST1757I PRIORITY3: UNCONGESTED PRIORITY4: UNCONGESTED
IST1801I UNITS OF WORK FOR NCB AT ADDRESS X'0896B010'
IST1802I P1 CURRENT = 0 AVERAGE = 0 MAXIMUM = 0
IST1802I P2 CURRENT = 0 AVERAGE = 0 MAXIMUM = 0
IST1802I P3 CURRENT = 1 AVERAGE = 2 MAXIMUM = 3
IST1802I P4 CURRENT = 0 AVERAGE = 1 MAXIMUM = 1
IST1221I DATA DEV = 0E2B STATUS = ACTIVE STATE = N/A
IST1724I I/O TRACE = OFF TRACE LENGTH = *NA*
IST1717I ULPID = TCPCS2
IST1815I IQDIO ROUTING DISABLED
IST1757I PRIORITY1: UNCONGESTED PRIORITY2: UNCONGESTED
IST1757I PRIORITY3: UNCONGESTED PRIORITY4: UNCONGESTED
IST1801I UNITS OF WORK FOR NCB AT ADDRESS X'08450010'
IST1802I P1 CURRENT = 0 AVERAGE = 0 MAXIMUM = 0
IST1802I P2 CURRENT = 0 AVERAGE = 0 MAXIMUM = 0
IST1802I P3 CURRENT = 0 AVERAGE = 0 MAXIMUM = 0
IST1802I P4 CURRENT = 1 AVERAGE = 2 MAXIMUM = 4
IST314I END

```

New IPCONFIG statement parameters: HiperSockets Accelerator is configured on the IPCONFIG statement using the new IQDIORouting parameter. Refer to *z/OS Communications Server: IP Configuration Reference* for details.

New messages:

```

IST1810I PKTIQDO = pktiqdo PKTIQD = pktiqd
IST1811I BYTIQDO = bytiqdo BYTIQD = bytiqdo
IST1812I PKTIQEO = pktiqeo PKTIQE = pktiqe
IST1813I BYTIQEO = bytiqeo BYTIQE = bytiqe
IST1814I IQDIO ROUTING ENABLED
IST1815I IQDIO ROUTING DISABLED

```

Modified VIT entry: The ODPK VTAM internal trace entry is modified to indicate if the packets being sent are routed by HiperSockets Accelerator. Refer to *z/OS Communications Server: SNA Diagnosis Vol 2, FFST Dumps and the VIT* for complete information on the ODPK VIT entry.

FICON CTC support

The IBM zSeries 800 (z800) and 900 (z900) exploits the FICON capability to provide traditional Channel-to-Channel host communication between processors.

FICON CTC provides the following advantages over ESCON[®] CTC:

- Higher bandwidth
- Reduction in the number of channels needed. In addition, the following is true:
 - Up to 16K devices on an FC CHPID, including FCTCs, are allowed.
 - FCTC and other device types can be intermixed on same CHPID.

FICON support is also available in CS for OS/390 V2R10 by way of a PTF. Refer to the PSP bucket for the PTF number.

Refer to *z/OS HCD Planning* for details.

Restrictions

None.

Migration procedures

To use FICON CTC support, you must define the FCTC devices though HCD/IOCP. Refer to *z/OS HCD Planning* for details.

New and changed interfaces that enable use of this function
None.

Enterprise Extender global connection network enhancements

z/OS V1R2 Communications Server provides an enhancement to allow Enterprise Extender connection networks to span multiple APPN subnetworks and/or NETIDs. This enables users to obtain dynamic direct links between NNs and/or ENs across a common IP network (either the public Internet or intranet). In previous releases, the connection network model could not be used across network boundaries, thus preventing users from having direct connections to all their nodes.

Note: A connection network is a representation of a shared access transport facility (SATF), such as a local area network (LAN). Refer to *z/OS Communications Server: SNA Network Implementation Guide* for a complete discussion.

A pure APPN session path is required with each border node on the path supporting extended subnetwork boundaries (EBNs). Additionally, each of these EBNs must be at a z/OS V1R2 Communications Server or later level.

Restrictions

The following restrictions apply:

- Global Virtual Routing Nodes (GVRNs) will not allow dynamic connections to end nodes (ENs) that are being served by a branch extender (BrNN).
- A GVRN can be utilized when it is defined on the endpoint node, an EBN for the endpoint’s network (or subnetwork), or under certain circumstances a NN in the network (or subnetwork) of the PLU. A GVRN defined on an NN can be utilized when it is in the PLU’s network (or subnetwork) and the final session route determination is being performed in this network (NN located in the network of the OLU in a PLU-init scenario or the network of the DLU in a SLU-init scenario).
- A GVRN will not be used in intermediate networks (or subnetworks) along the session path. A GVRN can only be used in the network (or subnetwork) for the session endpoints.
- A GVRN will not be used in the session route when one of the endpoints resides in the subarea.

Migration procedures

If you want to take advantage of the Enterprise Extender global connection network enhancements, perform the tasks in the following table.

Table 31. Enterprise Extender global connection network enhancements - Migration tasks

Task	Procedure	Reference
Define a Global Virtual Routing Node for each node that will use an Enterprise Extender Connection Network to span multiple APPN subnets and/or NETIDs.	Specify a global VNNAME (name that will be specified on all nodes defining a GVRN) and a VNTYPE of GLOBAL on the Enterprise Extender PORT statement or Group definition. If you specify a VNNAME and VNTYPE on the PORT statement, then you must also specify a VNGROUP. Note: You can define an EE Global Virtual Routing Node (defined for a connection network that can traverse network or subnetwork boundaries) and also have a local virtual routing node defined (this is a connection network that does not traverse network and subnetwork boundaries).	<i>z/OS Communications Server: SNA Resource Definition Reference</i>

Table 31. Enterprise Extender global connection network enhancements - Migration tasks (continued)

Task	Procedure	Reference
Activate at least one line (in the XCA major node) that is contained within the Group that is associated to the Global Virtual Routing Node.	VARY NET,ACT,ID=line_name command is issued for the line.	<i>z/OS Communications Server: SNA Network Implementation Guide</i>

New and changed interfaces that enable use of this function

Changed display output: The nodetype displayed on the IST1296I message will display GVRN for TOPO information related to a Global Virtual Routing Network. The IST1295I and IST1296 messages will be displayed on various D,NET,TOPO commands. For example:

```
d net,topo,id=ip.ip
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TOPOLOGY
IST1295I CP NAME          NODETYPE ROUTERES CONGESTION CP-CP WEIGHT
IST1296I IP.IP            GVRN      1          NONE      YES   *NA*
IST314I END

d net,topo,list=vn
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TOPOLOGY
IST1295I CP NAME          NODETYPE ROUTERES CONGESTION CP-CP WEIGHT
IST1296I NETA.VN1        VN        128      NONE      *NA*  *NA*
IST1296I IP.IP            GVRN      128      NONE      *NA*  *NA*
IST314I END

d net,topo,id=a01n,list=adj
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TOPOLOGY
IST1295I CP NAME          NODETYPE ROUTERES CONGESTION CP-CP WEIGHT
IST1296I NETA.A02N        NN         1        NONE      YES    65
IST1296I NETA.A500N        NN         1        NONE      YES   145
IST1296I IP.IP            GVRN      128      NONE      *NA*  *NA*
IST314I END
```

Refer to *z/OS Communications Server: SNA Operation* for details on the DISPLAY TOPO command and refer to *z/OS Communications Server: SNA Messages* for details about the message IST1296I.

New operand on PORT and GROUP definition statements: A new operand, VNTYPE, is added for the PORT and GROUP definition statement. It defines whether an Enterprise Extender connection network is permitted to span network boundaries. Refer to *z/OS Communications Server: SNA Resource Definition Reference* for details.

Performance

The following is an enhancement made to provide greater performance for z/OS V1R2 Communications Server:

- 64-bit real addressing support

64-bit real addressing support

z/OS V1R2 Communications Server exploits real storage in excess of 2 gigabytes by allowing z/OS to back most fixed CSM data space pages on or above the

2-gigabyte real storage bar. This enhances performance when z/OS V1R2 Communications Server is executing in z/Architecture mode.

IBM recommends that application programs that use fixed CSM take advantage of the 64-bit backed data space support. If the application program does not use the real address or if it does, but is capable of supporting the translation to 64-bit real addresses, CSM data space pools should be created as 64-bit backed. 64-bit backed CSM can be transferred to z/OS CS through the API or sockets.

z/OS CS now creates most CSM data space storage pools as 64-bit backed. This allows z/OS to couple fixed virtual storage to real storage frames on or above the 2-gigabyte bar. By allowing this coupling, contention for real storage below the 2-gigabyte bar is relieved. This leads to a reduction in z/OS paging activity, thus allowing more system resources to be applied to other tasks.

Note: With this support, the CSM data space names have changed. IBM has, in the past, recommended against hardcoding the data space names within CLISTS, but if you have done this, update any CLIST that references the CSM data space by name.

Procedures that gather the CSM data space information include IEASLPxx, IEADMCxx, and CLISTS. For example, to gather the 31- and 64-bit backed CSM data spaces, specify the following: DSPNAME=(0001.*CSM*).

You can determine what the new specific names should be by referring to *z/OS Communications Server: CSM Guide*.

Refer to *z/OS Communications Server: SNA Network Implementation Guide* and *z/OS Communications Server: CSM Guide* for more information.

Restrictions

64-bit real storage support is only enabled when the machine is executing in z/Architecture mode.

Note: Specifying ARCHLVL 2 in LOADxx in SYS1.PARMLIB enables z/Architecture mode.

Additional considerations

To exploit storage above the 2-gigabyte real storage bar, a zSeries processor is required.

CSM data space will be backed by 64-bit real storage when the machine is in z/Architecture mode. This storage may be passed to applications. If these applications attempt to issue the LRA (Load Real Address) instruction on this storage, a special operation exception program interrupt may occur. However, this is highly unlikely because LRA is primarily used to determine real addresses in preparation of structures used in I/O operations. There is no known application that performs I/O to or from received CSM data space storage. If an application accepts CSM data space and determines the data should be saved on external media, the data is usually copied to primary storage then passed to an access method. IBM recommends building a test environment that includes all applications to be used.

Migration procedures

Ensure that you have all the required maintenance applied, including APAR OW47492. Refer to the preventive service planning (PSP) bucket for a complete list of the IBM products to which you might need to apply PTFs, the conditions under which you might need to apply the PTFs, and the PTF numbers.

The 64-bit real addressing support function does not require any action to enable it; it is automatically enabled at initialization time for z/OS V1R2 Communications Server when the system is executing in z/Architecture mode. It cannot be disabled. However, you can control whether or not your application programs are passed 64-bit backed storage by using the new API64R start option; see the last task in Table 32 for details.

Optionally, perform the tasks in the following table.

Table 32. 64-bit real addressing support - Migration tasks

Task	Procedure	Reference
Increase the amount of fixed storage dedicated to CSM buffers. This is optional but recommended when running in z/Architecture mode. To determine how much fixed storage to dedicate, IBM suggests that you increase your existing limit proportionally to the increase in the size of real storage.	Code the desired amount of fixed storage in IVTPRM00.	<i>z/OS Communications Server: SNA Network Implementation Guide</i>
Update programs that parse the DISPLAY CSM response.	Alter parser code to accept the new response format.	<i>z/OS Communications Server: SNA Messages</i>
If you have hardcoded CSM data space names in the past, update any CLIST that references the CSM data space by name so that it will reference the new CSM data space name.	Determine what the new CSM data space name should be and correct the CLIST.	<i>z/OS Communications Server: CSM Guide</i>
Build a test environment that includes all applications to be used.	Start z/OS for CS and initiate application activity. Observe any 00D3 system abends that occur. If a 00D3 system abend occurs, determine if the OpCode causing the abend is X'B1'. If so, notify the applications support group of the abend. Until the applications are updated, code API64R=NO to alleviate the 00D3 system abends.	Refer to <i>z/OS Communications Server: SNA Resource Definition Reference</i> for information on coding VTAM start options.

New and changed interfaces that enable use of this function

Interfaces to both TCP/IP and VTAM application programs that accept CSM data space are affected by the 64-bit real addressing support function in that the applications will now receive CSM data space storage that is 64-bit backed. All users of fixed CSM are encouraged to code the BACK(64) option on the IVTCSM CREATE_POOL macro invocations if their programs either do not perform I/O directly from the data space storage or have been modified to detect z/Architecture mode and can build the 64-bit format channel programs.

New START option: API64R is a displayable and modifiable start option that controls the passing of 64-bit backed storage to the application programs across the TCP/IP or VTAM API. API64R=YES is the default and allows 64-bit backed storage to be passed to all applications. API64R=NO can be used to force all storage being passed to the application to be 31-bit backed. API64R=NO may cause a data move; therefore, use API64R=YES unless API64R=NO is required.

API64R is disabled when not in z/Architecture mode. This is indicated in the response to DISPLAY VTAMOPTS by API64R=***NA***.

Refer to *z/OS Communications Server: SNA Resource Definition Reference* for more information about the API64R start option.

Changed command output: The DISPLAY CSM command response is changed in z/OS V1R2 Communications Server to differentiate between 31-bit backed and 64-bit backed CSM data space pools.

In the following example, IVT5535I and IVT5536I are changed such that the 'TOTAL xxxxxx' field is moved left. The IVT5533I, IVT5534I, IVT5535I, and IVT5532I message group is repeated for 64-bit backed data space. IVT5535I and IVT5532I are again repeated to sum all data space. IVT5538I, IVT5539I, and IVT5541I are aligned to column 1. IVT5559I is not changed, but note the new data space names.

```
d net,csm
IVT5508I DISPLAY ACCEPTED
IVT5529I PROCESSING DISPLAY CSM COMMAND - OWNERID NOT SPECIFIED
IVT5530I BUFFER BUFFER
IVT5531I SIZE SOURCE INUSE FREE TOTAL
IVT5532I -----
IVT5533I 4K ECSA 0M 256K 256K
IVT5533I 16K ECSA 0M 0M 0M
IVT5533I 32K ECSA 0M 0M 0M
IVT5533I 60K ECSA 0M 0M 0M
IVT5534I 180K ECSA POOL DOES NOT EXIST
IVT5535I TOTAL ECSA 0M 256K 256K
IVT5532I -----
IVT5533I 4K DATA SPACE 31 0M 256K 256K
IVT5533I 16K DATA SPACE 31 0M 0M 0M
IVT5533I 32K DATA SPACE 31 0M 0M 0M
IVT5533I 60K DATA SPACE 31 0M 0M 0M
IVT5533I 180K DATA SPACE 31 0M 0M 0M
IVT5535I TOTAL DATA SPACE 31 0M 256K 256K
IVT5532I -----
IVT5533I 4K DATA SPACE 64 0M 256K 256K
IVT5533I 16K DATA SPACE 64 0M 0M 0M
IVT5533I 32K DATA SPACE 64 0M 0M 0M
IVT5533I 60K DATA SPACE 64 0M 0M 0M
IVT5534I 180K DATA SPACE 64 POOL DOES NOT EXIST
IVT5535I TOTAL DATA SPACE 64 0M 256K 256K
IVT5532I -----
IVT5535I TOTAL DATA SPACE 0M 512K 512K
IVT5532I -----
IVT5536I TOTAL ALL SOURCES 0M 768K 768K
IVT5538I FIXED MAXIMUM = 100M FIXED CURRENT = 400K
IVT5541I FIXED MAXIMUM USED = 400K
IVT5539I ECSA MAXIMUM = 100M ECSA CURRENT = 414K
IVT5541I ECSA MAXIMUM USED = 414K
IVT5559I CSM DATA SPACE 1 NAME: CSM64001
IVT5559I CSM DATA SPACE 2 NAME: CSM31002
IVT5599I END
```

In the following example, IVT5554I, IVT5556I, and IVT5557I are changed such that the text starts further left. Additional delimiter lines (IVT5532I messages) have been added.

```
d net,csm,ownerid=01f6
IVT5508I DISPLAY ACCEPTED
IVT5549I PROCESSING DISPLAY CSM COMMAND - OWNERID SPECIFIED
IVT5530I BUFFER BUFFER
IVT5551I SIZE SOURCE STORAGE ALLOCATED TO OWNER
IVT5532I -----
IVT5553I 4K ECSA 256K
IVT5554I TOTAL ECSA 256K
IVT5532I -----
IVT5553I 4K DATA SPACE 64 128K
```

```

IVT5554I TOTAL DATA SPACE 64 128K
IVT5532I -----
IVT5554I TOTAL DATA SPACE 128K
IVT5532I -----
IVT5556I TOTAL FOR OWNERID 384K
IVT5557I OWNERID: ASID = 01F6 JOBNAME = VTAMAPPL
IVT5599I END

```

The following example shows the appearance of the response with multiple owners:

```

d net,csm,ownerid=all
IVT5508I DISPLAY ACCEPTED
IVT5549I PROCESSING DISPLAY CSM COMMAND - OWNERID SPECIFIED
IVT5530I BUFFER BUFFER
IVT5551I SIZE SOURCE STORAGE ALLOCATED TO OWNER
IVT5532I -----
IVT5553I 4K ECSA 256K
IVT5554I TOTAL ECSA 256K
IVT5532I -----
IVT5553I 4K DATA SPACE 64 128K
IVT5554I TOTAL DATA SPACE 64 128K
IVT5532I -----
IVT5554I TOTAL DATA SPACE 128K
IVT5532I -----
IVT5556I TOTAL FOR OWNERID 384K
IVT5557I OWNERID: ASID = 001A JOBNAME = VTAMAPPL
IVT5532I -----
IVT5530I BUFFER BUFFER
IVT5551I SIZE SOURCE STORAGE ALLOCATED TO OWNER
IVT5532I -----
IVT5553I 4K DATA SPACE 64 128K
IVT5553I 16K DATA SPACE 64 1M
IVT5554I TOTAL DATA SPACE 64 1M
IVT5532I -----
IVT5554I TOTAL DATA SPACE 1M
IVT5532I -----
IVT5556I TOTAL FOR OWNERID 1M
IVT5557I OWNERID: ASID = 001B JOBNAME = VTAMAPPL
IVT5599I END

```

The API64R start option is now displayable by using the DISPLAY VTAMOPTS command. API64R is also displayed for DISPLAY VTAMOPTS,FUNCTION=STORAGE. The API64R start option is dynamically modifiable by using the MODIFY VTAMOPTS command. See “Sample display showing VTAM start options that are new to z/OS CS V1R2” on page 100 for a sample display. Refer to *z/OS Communications Server: SNA Operation* for details about the DISPLAY VTAMOPTS and the MODIFY VTAMOPTS commands and for more information on CSM Command Responses.

Changed parmlib member: **IVTPRM00** — IVTPRM00 (CSM parmlib member) FIXED MAX specification applies to the total above and below the 2-gigabyte bar.

See “Parmlib member for Communication Storage Manager (CSM)” on page 54 for more information about the IVTPRM00 parmlib member.

Changed messages: The display CSM response message groups IVT5529I and IVT5549I are changed to allow qualification of the data space output as 31- or 64-bit backed. This adds additional tokens that specify the backing of the storage to the messages within these groups, as well as altering alignment. This may affect you if you are using a parsing program. If so, alter your parser code to accept the new response format. Refer to *z/OS Communications Server: SNA Messages* for more information about message groups IVT5529I and IVT5549I. Also see the example displays in “Changed command output” on page 87.

Exit Parameter List (XPL): A new MAXinMEG bit is added to the ISTXPL exit parameter. The ISTXPL is used to pass data across the PMI to the Performance Monitor. Refer to *z/OS Communications Server: SNA Data Areas Volume 1* for complete details.

Changed VTAMMAP command output: The output for the VTAMMAP commands CSMALL, CSMOWNER, CSMBUF, and CSMPOOL are changed in z/OS V1R2 Communications Server. The output for the VTAMMAP CSM commands is altered to provide information from both the 31- and 64-bit backed CSM data space pools. Where necessary, the output will differentiate between the two pools by specifying either 31 or 64. For example, DSPACE becomes DSPACE31 or DSPACE64.

Refer to *z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures* for complete details.

Changed VIT records: The POOLID field of the VIT GTBF trace record now contains the new pool identifier code when storage is obtained from a 64-bit backed data space pool. Refer to *z/OS Communications Server: SNA Diagnosis Vol 2, FFST Dumps and the VIT* for more information.

Usability

The following include enhancements made to provide easier usability for z/OS V1R2 Communications Server.

- Device tuning statistics enhancements
- Generic Resource affinity management enhancements
- Model application trace enhancements
- DLC work unit tracking

Device tuning statistics enhancements

Device tuning statistics are intended to provide information for monitoring performance and measuring the effect of altering tuning parameters for real and simulated devices that transmit and receive data. Statistical information such as StartIO count, total packets, and total bytes can be recorded and a summary record can be submitted to SMF and/or it can be submitted to the system console. Previous releases restricted device tuning statistics to all or nothing; in other words, the statistics were gathered for either all devices or none of them. z/OS V1R2 Communications Server enhances device tuning statistics by allowing you to gather statistical data based on the set of devices defined in a TRLE group.

The z/OS V1R2 CS device tuning statistics enhancements alleviate other restrictions as well. TNSTAT need not be specified in the VTAM start list in order to initiate recording, nor must SMF be in the system. Prior to z/OS V1R2 Communications Server, if either TNSTAT was not specified in the VTAM start list or SMF was not available, the only way to initiate collection was to restart VTAM and add the TNSTAT option to the list or start SMF.

Restrictions

None.

Migration procedures

The device tuning statistics enhancements function does not require any action unless you want to take advantage of the function. If so, perform the tasks in the following table.

Table 33. Device tuning statistics enhancements - Migration tasks

Task	Procedure	Reference
Start the tuning statistics for a specific device.	Issue MODIFY procname,TNSTAT,TRLE=.	<i>z/OS Communications Server: SNA Operation</i>
Stop the tuning statistics for a specific device.	Issue MODIFY procname,NOTNSTAT,TRLE=.	<i>z/OS Communications Server: SNA Operation</i>
Display the tuning statistics that are in effect.	Issue DISPLAY NET,TNSTAT.	<i>z/OS Communications Server: SNA Operation</i>

New and changed interfaces that enable use of this function

New command: This function introduces a new DISPLAY TNSTAT command to display the tuning statistics that are in effect. The following shows sample output:

```
d net,tnstat
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TNSTAT
IST1450I GLOBAL TNSTAT = INACTIVE  CNSL = YES  TIME = 1
IST1451I TRLE = TRLE1A  TNSTAT = ACTIVE
IST314I END
```

New command operands: The device tuning statistics enhancements function introduces a TRLE operand to the MODIFY TNSTAT and the MODIFY NOTNSTAT commands. This controls tuning statistics for TRLE controlled devices. When the TRLE operand is specified, initiation and termination of statistical recording for only the TRLEs listed is performed.

The MODIFY TNSTAT command also has a new operand, ACTION. Use ACTION=UPDATE to control the CNSL and/or TIME values without initiating recording. Two examples follow:

- - f vtam,tnstat,cnsl=yes,time=2 (default ACTION=ACTIVATE) sends the output to the system console, changes the reporting interval to 2 minutes, and initiates recording of tuning statistics for all devices (GLOBAL TNSTAT).
- - f vtam,tnstat,cnsl=yes,time=2,action=update sends the output to the system console, changes the reporting interval to 2 minutes, but does *not* initiate tuning statistics recording.

The following are sample commands and their responses:

```
f vtam,tnstat,trle=trle1a
IST097I MODIFY ACCEPTED
IST1450I GLOBAL TNSTAT = INACTIVE  CNSL = NO  TIME = 60
IST1451I TRLE = TRLE1A  TNSTAT = ACTIVE
IST223I MODIFY TNSTAT COMMAND COMPLETED
IST314I END
```

```
f vtam,tnstat,action=update,cnsl=yes,time=1
IST097I MODIFY ACCEPTED
IST1450I GLOBAL TNSTAT = INACTIVE  CNSL = YES  TIME = 1
IST223I MODIFY TNSTAT COMMAND COMPLETED
IST314I END
```

```
f vtam,notnstat,trle=trle1a
IST097I MODIFY ACCEPTED
IST1450I GLOBAL TNSTAT = ACTIVE  CNSL = YES  TIME = 1
IST1451I TRLE = TRLE1A  TNSTAT = INACTIVE
IST223I MODIFY NOTNSTAT COMMAND COMPLETED
IST314I END
```

New and changed messages: The device tuning statistics enhancements function introduces a new message:

- IST1773I TNSTAT RECORDS CANNOT BE SENT TO SMF - SMF NOT IN SYSTEM

The following message is retired:

- IST432I TUNING STATISTICS NOT ACTIVE, SMF NOT IN SYSTEM

Refer to *z/OS Communications Server: SNA Messages* for complete information on the new and changed messages.

Generic Resource affinity management enhancements

z/OS V1R2 Communications Server adds a new API feature that allows application programs to control the ownership of the Generic Resource (GR) affinity on an individual LU session partner basis. Refer to the LUAFFIN topics in *z/OS Communications Server: SNA Programming*, *z/OS Communications Server: SNA Programmer's LU 6.2 Guide*, and *z/OS Communications Server: SNA Programmer's LU 6.2 Reference* for information.

Restrictions

None.

Migration procedures

There are no migration procedures for the Generic Resource affinity management enhancements.

New and changed interfaces that enable use of this function

RAPI and APPCCMD support: LUAFFIN = APPL | NOTAPPL is a new RAPI keyword. This option indicates that a specific LU Affinity is desired for a OPNDST/OPNSEC and is therefore specified in this NIB.

LUAFFIN = APPL | NOTAPPL is also a new parameter for two APPCCMD macros.

In addition to the enhancement to both RAPI and APPCCMD that allows LU level of control of affinity, the RAPI CHANGE macro (which is used by both RAPI and APPCCMD interfaces to support Generic Resources) now provides a new OPTCD that forces the affinity to terminate. The new CHANGE request is OPTCD = ENDAFFNF (End Affinity Force). The OPTCD causes VTAM to terminate the affinity regardless of session count and regardless of who (VTAM | APPL) currently owns the affinity. A sample invocation:

```
CHANGE ACB=IMS1,NIB=NIB01,OPTCD=ENDAFFNF
NIB01 NIB NAME=LUABC,NETID=NETA,GNAME=IMS,LISTEND=YES
```

In this example, the GR affinity will be terminated for LUABC (regardless of session count or ownership).

Model application trace enhancements

z/OS V1R2 Communications Server allows users to modify trace options on dynamic applications that were created by specifying the name of the model application on a MODIFY TRACE/NOTRACE command.

Restrictions

This function is only available if you are using model application definitions.

Migration procedures

The model application trace enhancements function does not require any action unless you want to take advantage of the function. If so, perform the task in the following table.

Table 34. Model application trace enhancements - Migration task

Task	Procedure	Reference
Activate/Terminate I/O or buffer trace for active dynamic applications.	Issue the F TRACE/NOTRACE command with a model application name specified on the ID operand. SCOPE=ONLY will change the trace option for the model only. SCOPE=ALL will change the trace option for the model and all the dynamic applications created using the model.	<i>z/OS Communications Server: SNA Operation</i>

New and changed interfaces that enable use of this function

Changed parameters for the MODIFY TRACE and MODIFY NOTRACE

commands: The SCOPE=ALL parameter for the MODIFY TRACE command and for the MODIFY NOTRACE command is modified for the I/O and buffer trace of a model application. In addition to its previous function, SCOPE=ALL on the MODIFY TRACE command also activates traces for all existing dynamic applications created using the model dynamic applications. Likewise, in addition to its previous function, SCOPE=ALL on the MODIFY NOTRACE command also turns off trace options for all existing dynamic applications created using the model application.

In other words, when SCOPE=ALL is coded, the trace options for existing dynamic applications created using the model application specified on the command will be turned on (if the command is MODIFY TRACE) or turned off (if the command is MODIFY NOTRACE). Prior to z/OS V1R2 Communications Server, when the ID operand specified a model application name, the SCOPE=ALL was treated exactly like SCOPE=ONLY, and the trace options for the existing dynamic applications created using the model were not affected by the commands (MODIFY TRACE or MODIFY NOTRACE).

The following is sample output using MODIFY TRACE SCOPE=ALL:

```
f vtam,trace,type=buf,id=mdl*,scope=all
IST097I MODIFY ACCEPTED
IST1515I BUFFER TRACE ACTIVE
IST1144I TRACE INITIATED FOR NETA.MDL*
IST1045I NODE TYPE = MODEL APPL
IST1767I TRACE INITIATED FOR 3 DYNAMIC APPLICATIONS
IST314I END

d net,trace,type=node,id=mdl*
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TRACES,TYPE=NODES
IST075I NAME = APPL1A, TYPE = APPL SEGMENT
IST1041I NETA.MDL*          MODEL APPL
IST1042I  BUF              = ON    - AMOUNT = PARTIAL - SAVED = NO
IST1041I NETA.MDL3          DYNAMIC APPL
IST1042I  BUF              = ON    - AMOUNT = PARTIAL - SAVED = NO
IST1041I NETA.MDL2          DYNAMIC APPL
IST1042I  BUF              = ON    - AMOUNT = PARTIAL - SAVED = NO
IST1041I NETA.MDL1          DYNAMIC APPL
IST1042I  BUF              = ON    - AMOUNT = PARTIAL - SAVED = NO
IST314I END
```

The following is sample output using MODIFY NOTRACE SCOPE=ONLY. In this example, note that the trace is only terminated for the model application and not for the dynamic applications.

```
f vtam,notrace,type=buf,id=mdl*,scope=only
IST097I MODIFY ACCEPTED
IST1143I TRACE TERMINATED FOR NETA.MDL*
IST1045I NODE TYPE = MODEL APPL
IST314I END

d net,trace,type=node,id=mdl*
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TRACES,TYPE=NODES
IST075I NAME = APPL1A, TYPE = APPL SEGMENT
IST1041I NETA.MDL3          DYNAMIC APPL
IST1042I  BUF              = ON    - AMOUNT = PARTIAL - SAVED = NO
IST1041I NETA.MDL2          DYNAMIC APPL
IST1042I  BUF              = ON    - AMOUNT = PARTIAL - SAVED = NO
IST1041I NETA.MDL1          DYNAMIC APPL
IST1042I  BUF              = ON    - AMOUNT = PARTIAL - SAVED = NO
IST314I END
```

The following is sample output using MODIFY NOTRACE SCOPE=ALL:

```
f vtam,notrace,type=buf,id=mdl*,scope=all
IST097I MODIFY ACCEPTED
IST1143I TRACE TERMINATED FOR NETA.MDL*
IST1045I NODE TYPE = MODEL APPL
IST1768I TRACE TERMINATED FOR 3 DYNAMIC APPLICATIONS
IST314I END

d net,trace,type=node,id=md*
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TRACES,TYPE=NODES
IST1313I NO TRACES ACTIVE FOR NETA.MDL*
IST314I END
```

The following is sample output using MODIFY TRACE SCOPE=ONLY. In this example, note that the trace is turned on for the model application and not for the dynamic applications.

```
f vtam,trace,type=buf,id=mdl*,scope=only
IST097I MODIFY ACCEPTED
IST1515I BUFFER TRACE ACTIVE
IST1144I TRACE INITIATED FOR NETA.MDL*
IST1045I NODE TYPE = MODEL APPL
IST314I END

d net,trace,type=node,id=mdl*
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TRACES,TYPE=NODES
IST075I NAME = APPL1A, TYPE = APPL SEGMENT
IST1041I NETA.MDL*          MODEL APPL
IST1042I  BUF              = ON    - AMOUNT = PARTIAL - SAVED = NO
IST314I END
```

Refer to *z/OS Communications Server: SNA Operation* for complete information on the MODIFY NOTRACE and the MODIFY TRACE commands.

New messages: There are two new messages for the model application trace enhancements function:

```
IST1767I TRACE INITIATED FOR %%%8 DYNAMIC APPLICATIONS
IST1768I TRACE TERMINATED FOR %%%8 DYNAMIC APPLICATIONS
```

Refer to *z/OS Communications Server: SNA Messages* for complete information on the new messages.

DLC work unit tracking

z/OS V1R2 Communications Server enhances the DISPLAY TRL command to provide a CONGESTED indicator to alert you when a specific I/O device has an excessive amount of queued outbound work. In addition, you can display current and historical count details for a specific device by using DISPLAY TRL,TRLE=trlename. Using this display along with other tools, such as tuning statistics, allows you to monitor a device and determine if this congestion is associated with system storage constraints or shortages.

Restrictions

None.

Migration procedures

The DLC work unit tracking function does not require any action unless you want to take advantage of the function. If so, perform the task in the following table.

Table 35. DLC work unit tracking - Migration task

Task	Procedure	Reference
Isolate a storage problem to a specific device to determine if a specific I/O device has an excessive amount of queued outbound work.	Issue the DISPLAY TRL command (or issue DISPLAY TRL,TRLE=trlename) to obtain more details about the device congestion. Reference message IST1802I.	Refer to <i>z/OS Communications Server: SNA Operation</i> for details on display commands. Refer to <i>z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures</i> for details on isolating storage problems to a specific I/O device. Refer to <i>z/OS Communications Server: SNA Messages</i> for information on messages.

New and changed interfaces that enable use of this function

Changed display output: The DISPLAY TRL command output is enhanced as follows:

```
d net,tr1
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = TRL
IST1314I TRLE = IUTSAMEH STATUS = ACTIV----E CONTROL = MPC
IST1314I TRLE = ML1A2A1 STATUS = NEVAC CONTROL = MPC
IST1314I TRLE = ML1A2A2 STATUS = NEVAC CONTROL = MPC
IST1800I TRLE = ML1A2A2 ** CONGESTED **
IST1314I TRLE = ML1A2A3 STATUS = NEVAC CONTROL = MPC
IST1314I TRLE = ISTT0001 STATUS = ACTIV----E CONTROL = XCF
IST1454I 6 TRLE(S) DISPLAYED
IST314I END
```

Note that the new message IST1800I will follow IST1314I for any device that is currently marked congested. The message will display the TRLE name and the text **** CONGESTED ****. Because QDIO devices already have a concept of congestion, that criteria will not be changed. The above display provides a quick means for the operator to view all devices for a potential storage problem.

When a device is flagged as ****CONGESTED****, the operator can obtain additional storage details about the element counts using the existing DISPLAY TRL,TRLE=trlename command, as shown below:


```

d net,trl,trle=trle1a
IST097I DISPLAY ACCEPTED
IST075I NAME = TRLE1A, TYPE = TRLE
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST087I TYPE = LEASED , CONTROL = MPC , HPDT = YES
IST1715I MPCLEVEL = HPDT MPCUSAGE = SHARE
IST1717I ULPID = AHHCPU7
IST1800I TRLE = TRLE1A ** CONGESTED **
IST1801I UNITS OF WORK FOR NCB AT ADDRESS X'02DEF010'
IST1802I CURRENT = 18K AVERAGE = 7 MAXIMUM = 18K
IST1577I HEADER SIZE = 4092 DATA SIZE = 60 STORAGE = ***NA***
IST1221I WRITE DEV = 0CE6 STATUS = ACTIVE STATE = ONLINE
IST1221I WRITE DEV = 0CE7 STATUS = ACTIVE STATE = ONLINE
IST1221I WRITE DEV = 0CE8 STATUS = ACTIVE STATE = ONLINE
IST1221I WRITE DEV = 0CE9 STATUS = ACTIVE STATE = ONLINE
IST1577I HEADER SIZE = 4092 DATA SIZE = 60 STORAGE = DATASPACE
IST1221I READ DEV = 0CC6 STATUS = ACTIVE STATE = ONLINE
IST1221I READ DEV = 0CC7 STATUS = ACTIVE STATE = ONLINE
IST1221I READ DEV = 0CC8 STATUS = ACTIVE STATE = ONLINE
IST314I END

```

The two new messages, IST1801I and IST1802I, will always be displayed when the TRLE is displayed. (It can be displayed by either issuing DISPLAY TRL,TRLE=trlename or DISPLAY ID=trlename) The new heading message and the new counts message provide the UNITS of WORK (current average and maximum) within this DLC.

The same display of an individual TRLE for a QDIO (or iQDIO) device will provide the details of each priority queue (using the same new message IST1802I, but with a variable text ("P1-4") displayed for the priority queue numbers). The following is an example of displaying an active OSA-Express TRL entry:

```

d net,trl,trle=of8geth
IST097I DISPLAY ACCEPTED
IST075I NAME = OF8GETH, TYPE = TRLE
IST486I STATUS= ACTIV, DESIRED STATE= ACTIV
IST087I TYPE = LEASED , CONTROL = MPC , HPDT = YES
IST1715I MPCLEVEL = QDIO MPCUSAGE = SHARE
IST1716I PORTNAME = OF8GETHP LINKNUM = 0 OSA CODE LEVEL = 0314
IST1577I HEADER SIZE = 4096 DATA SIZE = 0 STORAGE = ***NA***
IST1221I WRITE DEV = 2E81 STATUS = ACTIVE STATE = ONLINE
IST1577I HEADER SIZE = 4092 DATA SIZE = 0 STORAGE = ***NA***
IST1221I READ DEV = 2E80 STATUS = ACTIVE STATE = ONLINE
IST1221I DATA DEV = 2E82 STATUS = ACTIVE STATE = N/A
IST1724I I/O TRACE = OFF TRACE LENGTH = *NA*
IST1717I ULPID = TCPSVT
IST1757I PRIORITY1: UNCONGESTED PRIORITY2: UNCONGESTED
IST1757I PRIORITY3: UNCONGESTED PRIORITY4: UNCONGESTED
IST1801I UNITS OF WORK FOR NCB AT ADDRESS X'02DEF010'
IST1802I P1 CURRENT = 218 AVERAGE = 37 MAXIMUM = 218
IST1802I P2 CURRENT = 8 AVERAGE = 7 MAXIMUM = 15
IST1802I P3 CURRENT = 2 AVERAGE = 2 MAXIMUM = 2
IST1802I P4 CURRENT = 102 AVERAGE = 168 MAXIMUM = 267
IST1221I DATA DEV = 2E83 STATUS = RESET STATE = N/A
IST1724I I/O TRACE = OFF TRACE LENGTH = *NA*
IST1221I DATA DEV = 2E84 STATUS = RESET STATE = N/A
IST1724I I/O TRACE = OFF TRACE LENGTH = *NA*
IST1221I DATA DEV = 2E85 STATUS = RESET STATE = N/A
IST1724I I/O TRACE = OFF TRACE LENGTH = *NA*
IST314I END

```

Refer to *z/OS Communications Server: SNA Operation* for complete details on the DISPLAY TRL command.

New messages: The DLC work unit tracking function adds three new messages:

- IST1800I TRLE = %%%8 ** CONGESTED **
- IST1802I UNITS OF WORK FOR NCB AT ADDRESS X'%8'
- IST1803I %2 CURRENT = %%%4 AVERAGE = %%%4 MAXIMUM = %%%4

Refer to *z/OS Communications Server: SNA Messages* for complete information on the new messages.

Availability

The following is an enhancement made to provide greater availability for z/OS V1R2 Communications Server:

- Coupling Facility Duplexing

Coupling Facility duplexing

z/OS V1R2 Communications Server adds support for system-managed duplexing rebuilds to z/OS CS coupling facility structures. This support is called Coupling Facility (CF) duplexing and it provides robust failure recovery capability by allowing fall-back to the unaffected structure instance. The duplexed copy of the structure is created in advance of any failures and it is maintained in a synchronized duplexed state during normal operation.

Refer to *z/OS MVS Setting Up a Sysplex* for more information on duplexing setup requirements.

Restrictions

All z/OS CS images in a sysplex must be at CS for OS/390 V2R10 level or higher to support CF duplexing.

Migration procedures

The Coupling Facility duplexing function does not require any action unless you want to take advantage of the function. If so, perform the tasks in the following table.

Table 36. Coupling Facility duplexing - Migration tasks

Task	Procedure	Reference
Start a duplexing rebuild to create the duplex structure.	Issue SETXCF START,REBUILD,DUPLEX,STRNAME= for the z/OS CS structure that should be duplexed.	<i>z/OS Communications Server: SNA Network Implementation Guide</i> and <i>z/OS MVS System Commands</i>
Enable duplexing for CS structures.	Set up CFRM policy.	<i>z/OS MVS Setting Up a Sysplex</i>

New and changed interfaces that enable use of this function

There are no new or changed interfaces for CF Duplexing.

Serviceability

The following are enhancements to provide greater serviceability for z/OS V1R2 Communications Server:

- VIT analysis tool installation enhancement
- HPR route test support
- CP-CP diagnostic enhancements

Note: Enhancements to APPN topology traces will be available for z/OS V1R2 Communications Server and will be documented by FIN APAR OW51867. See “APPN topology traces enhancements” on page 14 for details of the enhancements.

VIT analysis tool installation enhancement

SISTDEBUG is no longer used. The last remaining module that used it, the VIT Analysis Tool module (ISTRAFT1), is now shipped in SYS1.MIGLIB instead of SISTDEBUG.

Restrictions

None.

Migration procedures

Perform the task in the following table if necessary.

Table 37. VIT analysis tool installation enhancement - Migration task

Task	Procedure	Reference
Stop using SISTDEBUG.	Change any JCL that references SISTDEBUG so that it references SYS1.MIGLIB instead. If you do not do this, you may incorrectly use an old copy of ISTRAFT1.	<i>z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures</i>

New and changed interfaces that enable use of this function

None.

HPR route test support

The HPR route test support function allows you to test the performance of an RTP connection. Any RTP connection that has an endpoint in a VTAM node (all the RTP connections that are displayed in response to a DISPLAY RTPS command) can be specified as the subject of an HPR route test. New operands, ID and TEST, on the DISPLAY RTP command initiate the HPR route test. When the test completes, the results are presented asynchronously to the operator console. These results show the time, in milliseconds, that it took for a test packet to traverse each internodal hop in the path for that RTP connection. You can use this information to identify links that are performing poorly and to assist in diagnostic action.

Restrictions

The VTAM host must be an APPN node with HPR=RTP.

Migration procedures

The HPR route test support function does not require any action unless you want to take advantage of the function. If so, perform the tasks in the following table.

Table 38. HPR route test support - Migration tasks

Task	Procedure	Reference
Identify RTP connections with an endpoint in this APPN host.	Issue D NET,RTPS. Each connection is identified by the PU NAME field in the console output.	<i>z/OS Communications Server: SNA Operation, z/OS Communications Server: SNA Messages, and z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures</i>
Request an HPR route test for any desired RTP connection by PU Name.	Issue D NET,RTPS,ID=puname,TEST=YES.	<i>z/OS Communications Server: SNA Operation and z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures</i>

Table 38. HPR route test support - Migration tasks (continued)

Task	Procedure	Reference
Identify any problem links in the path for the RTP connection.	Interpret the display output with the HPR route test results.	<i>z/OS Communications Server: SNA Messages</i> and <i>z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures</i>

New and changed interfaces that enable use of this function

New operands: The new operands, ID and TEST, on the DISPLAY RTP command initiate the HPR route test. The following is an example using the ID operand:

```
d net,rtps,id=cnr00004
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = RTPS
IST1695I PU NAME      CP NAME      COS NAME SWITCH CONGEST  SESSIONS
IST1696I CNR00004 NETA.SSCP2A      #INTER      NO      NO      1
IST1454I 1 RTP(S) DISPLAYED
IST314I END
```

The following is an example of using both the TEST and ID operands:

```
d net,rtps,id=cnr00004,test=yes
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = RTPS
IST1695I PU NAME      CP NAME      COS NAME SWITCH CONGEST  SESSIONS
IST1696I CNR00004 NETA.SSCP2A      #INTER      NO      NO      1
IST1786I HPR ROUTE TEST INITIATED FOR RTP PU
IST1454I 1 RTP(S) DISPLAYED
IST314I END
IST1787I HPR ROUTE TEST RESULTS FOR RTP PU CNR00004
IST1788I NODE CP NAME  TG NUMBER  PARTNER CP NAME  INTERNODAL TIME
IST1789I                                     (MILLISECONDS)
IST1790I NETA.SSCPAA   21          NETA.SSCP1A      67
IST1790I NETA.SSCP1A  21          NETA.SSCP2A      3
IST1792I TOTAL RTP TRAVERSAL TIME 70 MILLISECONDS
IST314I END
```

Refer to *z/OS Communications Server: SNA Operation* for more information about the DISPLAY RTP command.

New messages: The following are new messages for the HPR route test support function:

- IST1786I HPR ROUTE TEST INITIATED FOR RTP PU
- IST1787I HPR ROUTE TEST RESULTS FOR RTP PU %%%%%%%%%%8
- IST1788I NODE CP NAME TG NUMBER PARTNER CP NAME INTERNODAL TIME
- IST1789I (MILLISECONDS)
- IST1790I %%%%%%%%%%17 %%%%%%%%%%8
%%%%%%%%%17 %%%%%%%%%%15
- IST1791I HPR ROUTE TEST PACKET NOT RETURNED BY NODE
%%%%%%%%%17
- IST1792I TOTAL RTP TRAVERSAL TIME %%%%%%%%%%15
MILLISECONDS
- IST1793I HPR ROUTE TEST NOT INITIATED - RTP PU NOT IN PROPER STATE
- IST1794I HPR ROUTE TEST NOT INITIATED - TEST ALREADY IN PROGRESS
- IST1795I HPR ROUTE TEST NOT INITIATED - INSUFFICIENT STORAGE

- IST1809I HPR ROUTE TEST NOT INITIATED - INSUFFICIENT PATH INFORMATION

Refer to *z/OS Communications Server: SNA Messages* for complete information on messages.

CP-CP diagnostic enhancements

z/OS V1R2 Communications Server allows operators to issue display commands to obtain detailed CP-CP session status for adjacent nodes. The information displayed can be used for problem determination on CP-CP session related problems.

Restrictions

None.

Incompatibilities

The CP-CP diagnostic enhancements function is not functional on VTAM nodes that do not support APPN functions.

Migration procedures

The CP-CP diagnostic enhancements function does not require any action unless you want to take advantage of the function. If so, perform the task in the following table.

Table 39. CP-CP diagnostic enhancements - Migration task

Task	Procedure	Reference
Obtain detailed CP-CP session status for adjacent nodes.	Issue the new DISPLAY CPCP command.	<i>z/OS Communications Server: SNA Operation</i>

New and changed interfaces that enable use of this function

New operator command: DISPLAY CPCP —This new operator command is introduced to display the CP-CP session status to adjacent nodes.

The following is an example of displaying CP-CP session status for all adjacent nodes when no CP-CP sessions exist:

```
d net,cpcp
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = CP-CP SESSION STATUS
IST1763I NO ACTIVE CP-CP SESSION-CAPABLE TGS EXIST
IST1454I 0 ADJCP(S) DISPLAYED
IST314I END
```

The following is an example of displaying CP-CP session status for all adjacent nodes:

```
d net,cpcp
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = CP-CP SESSION STATUS
IST1765I ADJACENT CP      WINNER  LOSER  STATE  NODE  ANDCB
IST1766I NETA.SSCPCA      ACT     ACT   UP     NN   06F2B358
IST1766I NETA.SSCPBA      ACT     ACT   UP     EN   06F2B240
IST1766I NETA.SSCPAA      ACT     ACT   UP     EN   06F2B128
IST1766I NETA.SSCP2A      PACT    INACT  UP     NN   06F2B010
IST1454I 4 ADJCP(S) DISPLAYED
IST314I END
```

The following is an example of displaying CP-CP status for all adjacent network nodes:

```

d net,cpcp,list=nn
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = CP-CP SESSION STATUS
IST1765I ADJACENT CP          WINNER  LOSER  STATE      NODE ANDCB
IST1766I NETA.SSCPBA         ACT     ACT    UP          NN   06F2B358
IST1766I NETA.SSCP2A         PACT    INACT  UP          NN   06F2B010
IST1454I 2 ADJCP(S) DISPLAYED
IST314I END

```

The following is an example of displaying pending CP-CP session status for all adjacent network nodes:

```

d net,cpcp,list=nn,scope=pending
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = CP-CP SESSION STATUS
IST1765I ADJACENT CP          WINNER  LOSER  STATE      NODE ANDCB
IST1766I NETA.SSCP2A         PACT    INACT  UP          NN   06F2B010
IST1454I 1 ADJCP(S) DISPLAYED
IST314I END

```

The following is an example of displaying active CP-CP session status for all adjacent end nodes:

```

d net,cpcp,list=en,scope=act
IST097I DISPLAY ACCEPTED
IST350I DISPLAY TYPE = CP-CP SESSION STATUS
IST1765I ADJACENT CP          WINNER  LOSER  STATE      NODE ANDCB
IST1766I NETA.SSCPBA         ACT     ACT    UP          EN   06F2B240
IST1766I NETA.SSCPAA         ACT     ACT    UP          EN   06F2B128
IST1454I 2 ADJCP(S) DISPLAYED
IST314I END

```

Refer to *z/OS Communications Server: SNA Operation* for complete details of the DISPLAY CPCP command.

New messages: The CP-CP diagnostic enhancements function changes two existing messages, IST1454I and IST1315I. The message IST1454I count ADJCP(S) DISPLAYED will be issued to show the number of CP-CP session status displayed for the D CPCP command (ADJCP(S) is a new type). Message IST1315I DISPLAY TRUNCATED AT keyword = number can now be issued for DISPLAY CPCP in addition to other commands.

Several new messages are introduced:

- IST1763I NO ACTIVE CP-CP SESSION-CAPABLE TGS EXIST
- IST1764I NO ACTIVE CP-CP SESSION-CAPABLE TG TO cpname
- IST1765I ADJACENT CP WINNER LOSER STATE NODE ANDCB
- IST1766I adjacent_cp cw_state cl_state state node address

Refer to *z/OS Communications Server: SNA Messages* for complete information on the new and changed messages.

Sample display showing VTAM start options that are new to z/OS CS V1R2

The following is a sample display that shows the VTAM start options that are new to z/OS CS V1R2. These start options include CNNRTMSG, IQDCHPID, and API64R.

```

d net,vtamopts
IST097I DISPLAY ACCEPTED
IST1188I VTAM CSV1R2 STARTED AT 08:57:09 ON 05/02/01 817
IST1349I COMPONENT ID IS 5695-11701-120

```

```

IST1348I VTAM STARTED AS INTERCHANGE NODE
IST1189I AFFDELAY = 600                ALSREQ = NO
IST1189I API64R = ***NA***            APPNCOS = NONE
IST1189I ASIRFMSG = OLUSSCP           ASYDE = TERM
IST1189I AUTHLEN = YES                AUTORTRY = AUTOCAP
IST1189I AUTOTI = 0                   BN = YES
IST1189I BNDYN = LIMITED              BNORD = PRIORITY
IST1189I BSCMDRS = (STATS,INOPS)     BSCTMOUT = 286
IST1189I CACHETI = 8                 CDRDYN = YES
IST1189I CDRSCTI = 480S             CDSERVR = NO
IST1189I CDSREFER = 1                CINDXSIZ = 8176
IST1189I CMPMIPS = 100               CMPVTAM = 0
IST1189I CNMTAB = ISTMGC00           CNNRTMSG = SUPPRESS
IST1189I COLD = YES                  CONFIG = 1A
IST1189I CONNTYPE = APPN             CPCDRSC = NO
IST1189I CPCP = YES                  CSALIMIT = 62586K
IST1189I CSA24 = NOLIMIT             DATEFORM = MDY
IST1189I DIALRTRY = YES              DIRSIZE = 0
IST1189I DIRTIME = 691200S          DISCNTIM = (15,0)
IST1189I DLRORDER = STATNID         DLRTCB = 4
IST1189I DLURSAW = YES               DSPLYDEF = 65535
IST1189I DSPLYMAX = 65535           DSPLYWLD = FULLWILD
IST1189I DUPDEFS = ALL              DYNADJCP = YES
IST1189I DYNASSCP = YES             DYNDLGMD = NONE
IST1189I DYNHPPFX = CNR            DYNLU = YES
IST1189I DYNMODTB = NONE           DYNPUPFX = CN
IST1189I DYNVNPFX = CNV            ENCRPREF = NONE
IST1189I ENCRYPTN = 31              ENHADDR = YES
IST1189I ESIRFMSG = ALLSSCP         FLDTAB = ISTMSFLD
IST1189I FSIRFMSG = OLUSSCP         GWSSCP = YES
IST1189I HNTSIZE = 4080            HOSTPU = ISTPUS
IST1189I HOSTSA = 1                HOTIOTRM = 0
IST1189I HPR = (RTP,RTP)           HPRARB = RESPMODE
IST1189I HPRNCPBF = NO              HPRPST = LOW          480S
IST1189I HPRPST = MEDIUM           HPRPST = HIGH        120S
IST1189I HPRPST = NETWRK           HSRTSIZE = 9973
IST1189I INITDB = ALL              INOPDUMP = OFF
IST1189I IOINT = 180              IOMSGLIM = 100
IST1189I IOPURGE = 0              IPADDR = 0.0.0.0
IST1189I IQDCHPID = ***NA***       IRNSTRGE = 0
IST1189I ISTCOSDF = INDLU          LIMINTCP = ***NA***
IST1189I LIST = 1A                 MAINTLVL = *BLANKS*
IST1189I MAXLOCAT = 5000           MAXLURU = 6144
IST1189I MAXSSCPS = 10            MAXSUBA = 255
IST1189I MIHTMOUT = 1800          MSGLEVEL = BASE
IST1189I MSGMOD = NO              MXSAWBUF = 10000
IST1189I MXSSCPRU = 4096          MXSUBNUM = 511
IST1189I NCPBUFSZ = 512           NETID = NETA
IST1189I NMVTLOG = NPDA           NNSPREF = ***NA***
IST1189I NODELST = *BLANKS*       NODETYPE = NN
IST1189I NQNMODE = NAME           NSRTSIZE = *BLANKS*
IST1189I NUMTREES = 100          OSIEVENT = PATTERNS
IST1189I OSIMGMT = NO            OSITOP0 = ILUCDRSC
IST1189I OSRTSIZE = 43           PDTRCBUF = 2
IST1189I PIUMAXDS = 200          PLUALMSG = NOSUPP
IST1189I PPOLOG = NO             PSRETRY = LOW        0S
IST1189I PSRETRY = MEDIUM         PSRETRY = HIGH      0S
IST1189I PSRETRY = NETWRK        PSSTRACE = NORB
IST1189I PSWEIGHT = LESSTHAN     RESUSAGE = 100
IST1189I ROUTERES = 1           SACONNS = YES
IST1189I SAVERSCV = (NO,KEEP)     SAWMAXDS = 100
IST1189I SAWMXQPK = 0            SDLCMDRS = (STATS,INOPS)
IST1189I SECLVLCP = ***NA***     SIRFMSG = ALLSSCP
IST1189I SLOWVAL = (0,0)         SLUALMSG = NOSUPP
IST1189I SMEAUTH = DISCARD       SNAPREQ = 1000
IST1189I SNVC = 3                SONLIM = (60,30)
IST1189I SORDER = APPN           SRCHRED = OFF

```

```
IST1189I SRCOUNT = 10
IST1189I SSCPDYN = YES
IST1189I SSCPNAME = SSCP1A
IST1189I SSDTMOUT = 30
IST1189I STRGR = ***NA***
IST1189I SUPP = NOSUP
IST1189I TCPNAME = TCPCS
IST1189I TRANSLAT = (0,1,2,3,4,5,6,7)
IST1189I USSTAB = *BLANKS*
IST1189I VERIFYCP = NONE
IST1189I VFYREDTI = OFF
IST1189I VRTG = NO
IST1189I VTAMEAS = 32001
IST1189I XCFINIT = ***NA***
IST314I END

SRTIMER = 30S
SSCPID = 1
SSCPORD = PRIORITY
SSEARCH = YES
STRMNPS = ***NA***
SWNORDER = CPNAME
TNSTAT = OFF
UPDDELAY = 60S
VARYWLD = FULLWILD
VFYRED = YES
VOSDEACT = NO
VRTGCPCP = YES
WARM = NO
XNETALS = NO
```

Appendix B. Storage estimate worksheets

This appendix describes how to estimate the virtual storage required to run z/OS Communications Server on the z/OS operating system. From the following list, select and review the applicable worksheets:

- APPN
 - Interchange node (ICN) or network node (NN)
 - Migration data host (MDH) and end node (EN)
- Subarea
 - Communication management configuration (CMC)
 - Data host (DH)

Users of APPC will notice an increase in storage utilization because VTAM will now allocate an additional 160 bytes (for a mini-VIT trace) per control block representing a single APPC conversation. Refer to *z/OS Communications Server: SNA Diagnosis Vol 2, FFST Dumps and the VIT* for information on VTAM Internal Trace (VIT) tracing.

Users of APPN will notice an increase in storage utilization because VTAM will now allocate additional storage for TRS (Topology and Routing Services) topology traces. To calculate the increase, add the following:

- For the TRS topology trace where topology record deletions are recorded, one to ten 4K pages of storage will be allocated. One 4K page will be allocated at VTAM initialization. When that page is full of trace entries, another page will be allocated, up to a maximum of ten 4K pages.
- For the NDREC (node record) traces, 110 bytes of storage will be allocated for each node in the network or sub-network.
 - In a network node, this would include:
 - All network nodes
 - All served end nodes (the network node has acted as the NNS or DLUS for the end node)
 - All virtual nodes
 - In an end node, this would include:
 - Network nodes with which the end node has established connections
 - End nodes with which the end node has established connections
 - Virtual nodes through which the end node has established connections
- For the TGREC (TG record) traces, 180 bytes of storage will be allocated for each TG in the network or subnetwork.
 - In a network node, this would include:
 - Two TGs for every link between network nodes (one TGREC represents the connection in one direction and one TGREC represents the connection in the reverse direction)
 - One TG for every connection that a VTAM end node served by this network node server has with any other network node, end node, or virtual node
 - One TG for every connection that a DLUR end node served by this DLUS has with any other network node, end node, or virtual node
 - Two TGs for every connection between network nodes and virtual nodes (one TGREC represents the connection in one direction and one TGREC represents the connection in the reverse direction)

- | - One TG for every connection to an adjacent end node or an adjacent
- | DLUR end node
- | - In an end node, this would include:
- | - One TG for every link from this end node to any other network node, end
- | node, or virtual node.

General information

These worksheets address z/OS Communications Server storage above 16MB; storage below 16MB is allocated as 150KB common storage, and 64KB private storage.

The heading “DISPLAY STATS ID” refers to the particular statistic identifier issued by the **D NET,STATS** command; this statistic identifier is used in the corresponding step of the worksheet. There are some statistics that **D NET,STATS** does not capture; they are indicated by N/A.

“Dynamic storage” refers to storage created in response to a need, and required only so long as the process using it stays active. Dynamic storage can be used to establish normal sessions, and for error recovery. Dynamic storage usage varies by configuration; it is related to the number of sessions being established. The worksheet yields an approximation of dynamic storage needed for a given configuration, assuming worst case system recovery.

Estimation of z/OS Communications Server storage is based on the following assumptions. (These assumptions reflect no implied or expressed recommendation.)

- All PUs and LUs defined in the configuration are active.
- Tables and user exit routines are not used.
- Default buffer pool values, dynamic buffer expansion, and default start options are used.
- Dynamic storage requirements are based on full system recovery.

APPN interchange node or network node

For APPN interchange node (ICN) or network node (NN) configurations, use the following worksheet:

Table 40. Worksheet for APPN interchange node or network node storage

Step	Description	Formulas (decimal)	Common	Private	DISPLAY STATS ID
1	Number of 4KB pages allocated for the SNA internal trace table	$(\text{trace tab} + 4) * 4096$	= _____		2
2	Determine the size of the IOBUF parameter. This value is defined in the SNA start list. These buffers hold data transmitted to and from SNA.	Used in questions 4 & 12			3
3	Number of channel-attached communication controllers (NCPs) activated and owned by this SNA.	COMMON STORAGE: $(\text{NCPs} * 1200)$	= _____		5

Table 40. Worksheet for APPN interchange node or network node storage (continued)

Step	Description	Formulas (decimal)	Common	Private	DISPLAY STATS ID
4	Sum value of MAXBFRU parameters for all channel-attached communications controllers activated by this SNA. MAXBFRU is defined in the HOST definition statement of the NCP channel-attached major node definition.	COMMON STORAGE: ((IOBUF size + 98) * 2 * maxbftru NCPs)	= _____		3 & 6
5	Number of PUs defined in this SNA. Include all PUs defined to SNA in PU definition statements, and controllers defined in CLUSTER definition statements. Include locally attached, remotely attached, dynamically added, switched, ICA and NCP (including NTRI) PUs.	PRIVATE STORAGE: (defined PUs * 850)		= _____	48 & 67
6	Number of device type LUs defined in this SNA. Include the locally attached LUs, and LUs attached through an NCP. In addition, include LUs that are defined to SNA in LU definition statements, and those devices defined in TERMINAL statements. Do not include applications.	PRIVATE STORAGE: (defined LUs * 820)		= _____	50
7	Number of independent LUs defined locally, remotely or by way of CDRSC. Include all independent LUs for which SNA provides boundary function services, and all NTRI independent LUs.	COMMON STORAGE: (indep LUs * 270) PRIVATE STORAGE: (indep LUs * 400 [®])	= _____	= _____	80
8	Number of LU 6.2 sessions with application LUs owned by this SNA. LU 6.2 sessions are valid only for applications where APPC=YES is specified in the APPL major node definition. Include all same domain, cross domain, and cross network LU 6.2 sessions.	COMMON STORAGE: (LU6.2 ses * 840)	= _____		58
9	Number of device type LUs owned by this SNA, and in session with an application program owned by this SNA.	COMMON STORAGE: (LUs w/appls * 500) PRIVATE STORAGE: (LUs w/appls * 420)	= _____	= _____	71
10	Number of device type LUs owned by this SNA, and in session with an application program owned by another SNA.	PRIVATE STORAGE: (cross node LU ses * 420)		= _____	73

Table 40. Worksheet for APPN interchange node or network node storage (continued)

Step	Description	Formulas (decimal)	Common	Private	DISPLAY STATS ID
11	Number of LU 6.2 sessions with both LUs owned by this SNA.	PRIVATE STORAGE: (LU6.2 ses * 450)		= _____	77
12	Number of device type (nonapplication) LUs in session with a TSO application.	COMMON STORAGE: (TSO LUs) * (2300 + IOBUF size)	= _____		55 & 3
13	Number of ENs that establish CP-CP sessions with this SNA.	PRIVATE STORAGE: (adj end node * 3170) COMMON STORAGE: (adj end node * 920)	= _____	= _____	104
14	Number of transmission groups used between this node and attached, or served, end nodes.	PRIVATE STORAGE: (end node TGs * 690)		= _____	142
15	Number of transmission groups used between this node and other network nodes.	PRIVATE STORAGE: (network node TGs * 690)		= _____	143
16	If the SNA topology agent is being used, enter the number of resources being monitored.	PRIVATE STORAGE: (num res * 3500)		= _____	N/A
		Total Common = _____	= _____	KB (<i>totcom</i>)	
		1024			
		Total Private = _____		= _____	KB (<i>totpri</i>)
		1024			

Table 41. Summary of worksheet, APPN interchange node or network node storage

Calculated COMMON storage for ICN/NN configuration above	= _____ KB	
	(<i>totcom</i>)	
DYNAMIC COMMON STORAGE (4 x <i>totcom</i>)	= _____ KB	
SNA TOPOLOGY AGENT STORAGE (if used)	+ 2000KB	
SNA SYSPLEX STORAGE (if used)	+100KB	
SNA BASE STORAGE (COMMON)	+ 3002KB	
TOTAL SNA COMMON STORAGE	= _____ KB	
Calculated PRIVATE storage for ICN/NN configuration above		= _____ KB
		(<i>totpri</i>)
DYNAMIC PRIVATE STORAGE (2 x <i>totpri</i>)		= _____ KB
SNA SYSPLEX STORAGE (if used)	+750KB	
SNA BASE STORAGE (PRIVATE)		+ 7057KB
TOTAL SNA PRIVATE STORAGE		= _____ KB

APPN migration data host and end node

For an APPN migration data host (MDH) or end node (EN) configuration, use the following worksheet:

Table 42. Worksheet for APPN migration data host and end node

Step	Description	Formulas (decimal)	Common	Private	DISPLAY STATS ID
1	Number of 4KB pages allocated for the SNA internal trace table.	(trace tab + 4) * 4096	= _____		2
2	Number of device-type LUs owned by this SNA in session with an application program owned by this SNA.	PRIVATE: (LUs w/appls * 420) COMMON STORAGE: (LUs w/appls * 500)	= _____	= _____	71
3	Number of cross node sessions between an application program in this SNA and a device type LU owned by another node or SNA.	PRIVATE: (cross node appl * 980) COMMON STORAGE: (cross node appl * 540)	= _____	= _____	112
		Total Common = _____ 1024	= _____ KB (totcom)		
		Total Private = _____ 1024		= _____ KB (totpri)	

Table 43. Summary of APPN migration data host and end node

Calculated COMMON storage for MDH/EN configuration from above	= _____ KB (totcom)		
DYNAMIC COMMON STORAGE (2 x totcom)	= _____ KB		
SNA SYSPLEX STORAGE (if used)	+100KB		
SNA BASE STORAGE (COMMON)	+ 3002KB		
TOTAL SNA COMMON STORAGE	= _____ KB		
Calculated PRIVATE storage for MDH/EN configuration from above			= _____ KB (totpri)
DYNAMIC PRIVATE STORAGE (2 x totpri)			= _____ KB
SNA SYSPLEX STORAGE (if used)	+750KB		
SNA BASE STORAGE (PRIVATE)			+ 7057KB
TOTAL SNA PRIVATE STORAGE			= _____ KB

Subarea data host

For a subarea data host (DH) configuration, use the following worksheet:

Table 44. Worksheet for subarea data host

Step	Description	Formulas (decimal)	Common	Private	DISPLAY STATS ID
1	Number of 4KB pages allocated for the SNA internal trace table.	(trace tab + 4) * 4096	= _____		2
2	Number of device type LUs owned by this SNA in session with an application program owned by this SNA.	PRIVATE: (LUs w/appls * 420) COMMON STORAGE: (LUs w/appls * 500)	= _____	= _____	71
3	Number of cross domain sessions between an application program in this SNA and a device type LU owned by another SNA.	PRIVATE: (cross node appl * 910) COMMON STORAGE: (cross node appl * 540)	= _____	= _____	112

Table 44. Worksheet for subarea data host (continued)

Step	Description	Formulas (decimal)	Common	Private	DISPLAY STATS ID
		Total Common = $\frac{\quad}{1024}$	= \quad KB (<i>totcom</i>)		
		Total Private = $\frac{\quad}{1024}$		= \quad KB (<i>totpri</i>)	

Table 45. Summary of subarea data host

Calculated COMMON storage for DH configuration from above		= \quad KB (<i>totcom</i>)			
	DYNAMIC COMMON STORAGE (2 x <i>totcom</i>)	= \quad KB			
	SNA BASE STORAGE (COMMON)	+2953KB			
	TOTAL SNA COMMON STORAGE	= \quad KB			
Calculated PRIVATE storage for DH configuration from above				= \quad KB (<i>totpri</i>)	
	DYNAMIC PRIVATE STORAGE (2 x <i>totpri</i>)			= \quad KB	
	SNA SYSPLEX STORAGE (if used)	+150KB			
	SNA BASE STORAGE (PRIVATE)			+ 5507KB	
	TOTAL SNA PRIVATE STORAGE			= \quad KB	

Subarea communication management configuration

For a subarea communication management configuration (CMC), use the following worksheet:

Table 46. Worksheet for subarea communication management configuration

Step	Description	Formulas (decimal)	Common	Private	DISPLAY STATS ID
1	Number of 4KB pages allocated for the SNA internal trace table.	(trace tab + 4) * 4096	= \quad		2
2	Determine the size of the IOBUF parameter. This value is defined in the SNA start list. These buffers hold data transmitted to and from SNA.	Used in questions 4 & 10			3
3	Number of channel-attached communication controllers (NCP) activated and owned by this SNA.	COMMON STORAGE: (NCPs * 1200)	= \quad		5
4	Sum value of MAXBFRU parameters for all channel-attached communications controllers activated by this SNA. MAXBFRU is defined in the HOST definition statement of the NCP channel-attached major node definition.	COMMON STORAGE: ((IOBUF size + 98) * 2 * maxbfu NCPs)	= \quad		3 & 6

Table 46. Worksheet for subarea communication management configuration (continued)

Step	Description	Formulas (decimal)	Common	Private	DISPLAY STATS ID
5	Number of PUs defined in this SNA. Include all PUs defined to SNA in PU definition statements, and those controllers defined in CLUSTER definition statements. Include locally attached, remotely attached, dynamically added, switched, ICA, and NCP (including NTRI) PUs.	PRIVATE STORAGE: (defined PUs * 850)		= _____	48 + 67
6	Number of device type LUs defined in this SNA. Include the locally attached LUs, and the LUs attached through an NCP. In addition, include the LUs defined to SNA in LU definition statements, and those devices defined in TERMINAL statements. Do not include applications.	PRIVATE STORAGE: (defined LUs * 820)		= _____	50
7	Number of independent LUs either locally, remotely, or CDRSC defined. Include all independent LUs for which SNA provides boundary function services and all NTRI independent LUs.	COMMON STORAGE: (indep Lus * 270) PRIVATE STORAGE: (indep Lus * 400)	= _____	= _____	80
8	Number of device type LUs owned by this SNA in session with an application program owned by this SNA.	COMMON STORAGE: (LUs w/appls * 500) PRIVATE STORAGE: (LUs w/appls * 420)	= _____	= _____	71
9	Number of device type LUs owned by this SNA in session with an application program in another SNA.	PRIVATE STORAGE: (cross node LU ses * 400)		= _____	73
10	Number of device type (nonapplication) LUs in session with a TSO application.	COMMON STORAGE: (TSO LUs) * (2300 + IOBUF size)	= _____		55 & 3
11	If the SNA topology agent is being used, enter the number of resources being monitored.	PRIVATE STORAGE: (num res * 3500)		= _____	N/A
		Total Common = _____ 1024	= _____	KB (<i>totcom</i>)	
		Total Private = _____ 1024		= _____	KB (<i>totpri</i>)

Table 47. Summary of subarea communication management configuration

Calculated COMMON storage for CMC configuration from above	= _____KB (<i>totcom</i>)
DYNAMIC COMMON STORAGE (4 x <i>totcom</i>)	= _____KB
SNA TOPOLOGY AGENT STORAGE (if used)	+ 2000KB
SNA BASE STORAGE (COMMON)	+ 2953KB
TOTAL SNA COMMON STORAGE	= _____KB

Table 47. Summary of subarea communication management configuration (continued)

Calculated PRIVATE storage for CMC configuration from above		= _____KB
		(<i>totpri</i>)
DYNAMIC PRIVATE STORAGE (2 x <i>totpri</i>)		= _____KB
SNA SYSPLEX STORAGE (if used)	+150KB	
SNA BASE STORAGE (PRIVATE)		+ 5507KB
TOTAL SNA PRIVATE STORAGE		= _____KB

Appendix C. Architectural specifications

This appendix lists documents that provide architectural specifications for the SNA Protocol.

The APPN Implementers' Workshop (AIW) architecture documentation includes the following architectural specifications for SNA APPN and HPR:

- APPN Architecture Reference (SG30-3422-04)
- APPN Branch Extender Architecture Reference Version 1.1
- APPN Dependent LU Requester Architecture Reference Version 1.5
- APPN Extended Border Node Architecture Reference Version 1.0
- APPN High Performance Routing Architecture Reference Version 4.0
- SNA Formats (GA27-3136-19)
- SNA Technical Overview (GC30-3073-04)

For more information, refer to the AIW documentation page at <http://nhdidd.raleigh.ibm.com/app/aiwdoc.htm>.

The following RFC also contains SNA architectural specifications:

- RFC 2353 *APPN/HPR in IP Networks APPN Implementers' Workshop Closed Pages Document*

RFCs can be obtained from:

Government Systems, Inc.
Attn: Network Information Center
14200 Park Meadow Drive
Suite 200
Chantilly, VA 22021

Many RFCs are available online. Hardcopies of all RFCs are available from the NIC, either individually or by subscription. Online copies are available using FTP from the NIC at <http://www.rfc-editor.org/rfc.html>.

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For more information, contact nic@nic.ddn.mil.

Appendix D. Information APARs

This appendix lists information APARs for IP and SNA documents.

Notes:

1. Information APARs contain updates to previous editions of the manuals listed below. Documents updated for V1R4 are complete except for the updates contained in the information APARs that may be issued after V1R4 documents went to press.
2. Information APARs are predefined for z/OS V1R4 Communications Server and may not contain updates.
3. Information APARs for OS/390 documents are in the document called *OS/390 DOC APAR and PTF ++HOLD Documentation*, which can be found at http://publibz.boulder.ibm.com/cgi-bin/bookmgr_OS390/BOOKS/IDDOCMST/CCONTENTS.
4. Information APARs for z/OS documents are in the document called *z/OS and z/OS.e DOC APAR and PTF ++HOLD Documentation*, which can be found at http://publibz.boulder.ibm.com:80/cgi-bin/bookmgr_OS390/BOOKS/ZIDOCMST/CCONTENTS.

Information APARs for IP documents

Table 48 lists information APARs for IP documents.

Table 48. IP information APARs

Title	z/OS CS V1R4	z/OS CS V1R2	CS for OS/390 2.10 and z/OS CS V1R1	CS for OS/390 2.8
IP API Guide	ii13255	ii12861	ii12371	ii11635
IP CICS Sockets Guide	ii13257	ii12862		ii11626
IP Configuration				ii11620 ii12068 ii12353 ii12649 ii13018
IP Configuration Guide	ii13244	ii12498 ii13087	ii12362 ii12493 ii13006	
IP Configuration Reference	ii13245	ii12499	ii12363 ii12494 ii12712	
IP Diagnosis	ii13249	ii12503	ii12366 ii12495	ii11628
IP Messages Volume 1	ii13250	ii12857 ii13229	ii12367	ii11630 13230
IP Messages Volume 2	ii13251	ii12858	ii12368	ii11631
IP Messages Volume 3	ii13252	ii12859	ii12369 12990	ii11632 ii12883
IP Messages Volume 4	ii13253	ii12860		
IP Migration	ii13242	ii12497	ii12361	ii11618

Table 48. IP information APARs (continued)

Title	z/OS CS V1R4	z/OS CS V1R2	CS for OS/390 2.10 and z/OS CS V1R1	CS for OS/390 2.8
IP Network and Application Design Guide	ii13243			
IP Network Print Facility		ii12864		ii11627
IP Programmer's Reference	ii13256	ii12505		ii11634
IP and SNA Codes	ii13254	ii12504	ii12370	ii11917
IP User's Guide			ii12365 ii13060	ii11625
IP User's Guide and Commands	ii13247	ii12501	ii12365 ii13060	ii11625
IP System Admin Guide	ii13248	ii12502		
Quick Reference	ii13246	ii12500	ii12364	

Information APARs for SNA documents

Table 49 lists information APARs for SNA documents.

Table 49. SNA information APARs

Title	z/OS CS V1R4	z/OS CS V1R2	CS for OS/390 2.10 and z/OS CS V1R1	CS for OS/390 2.8
Anynet SNA over TCP/IP				ii11922
Anynet Sockets over SNA				ii11921
CSM Guide				
IP and SNA Codes	ii13254	ii12504	ii12370	ii11917
SNA Customization	ii13240	ii12872	ii12388	ii11923
SNA Diagnosis	ii13236	ii12490 ii13034	ii12389	ii11915
SNA Messages	ii13238	ii12491	ii12382 ii12383	ii11916
SNA Network Implementation Guide	ii13234	ii12487	ii12381	ii11911
SNA Operation	ii13237	ii12489	ii12384	ii11914
SNA Migration	ii13233	ii12486	ii12386	ii11910
SNA Programming	ii13241	ii13033	ii12385	ii11920
Quick Reference	ii13246	ii12500	ii12364	ii11913
SNA Resource Definition Reference	ii13235	ii12488	ii12380 ii12567	ii11912 ii12568
SNA Resource Definition Samples				
SNA Data Areas	ii13239	ii12492	ii12387	ii11617

Other information APARs

Table 50 on page 115 lists information APARs not related to documents.

Table 50. Non-document information APARs

Content	Number
OMPROUTE	ii12026
iQDIO	ii11220
index of recommended maintenace for VTAM	ii11220
CSM for VTAM	ii12657
CSM for TCP/IP	ii12658
AHHC, MPC, and CTC	ii01501
DLUR/DLUS for z/OS V1R2	ii12986
Enterprise Extender	ii12223
Generic resources	ii10986
HPR	ii10953
MNPS	ii10370
Performance	ii11710 ii11711 ii11712

Appendix E. Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS enable users to:

- Use assistive technologies such as screen-readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size

Using assistive technologies

Assistive technology products, such as screen-readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using it to access z/OS interfaces.

Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to *z/OS TSO/E Primer*, *z/OS TSO/E User's Guide*, and *z/OS ISPF User's Guide Volume I* for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

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DFSMShsm	RACF
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ESCON	S/370
eServer	S/390
ES/3090	SAA
ES/9000	SecureWay
ES/9370	Slate
EtherStreamer	SP
Extended Services	SP2
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FFST/2	System/390
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IBMLINK	VM/XA
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IMS/ESA	VTAM
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	3090
	3890

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