

z/OS Communications Server
3.2

New Function Summary



Note:

Before using this information and the product it supports, be sure to read the general information under [“Notices” on page 77](#).

This edition applies to 3.2 of z/OS® (5655-ZOS), and to subsequent releases and modifications until otherwise indicated in new editions.

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Summary of changes for New Function Summary

This document contains terminology, maintenance, and editorial changes, including changes to improve consistency and retrievability. Technical changes or additions to the text and illustrations for the current edition are indicated by a vertical line to the left of the change.

Summary of changes for z/OS 3.2

The following content is new, changed, or no longer included in z/OS 3.2.

New

The following content is new.

December 2025 refresh

- [“AI-powered network outbound packet batching” on page 25](#)

September 2025 release

- [“FTP client configuration statements” on page 35](#)
- [“Samples provided in z/OS UNIX TCPIP directory” on page 47](#)

Changed

The following content is changed.

December 2025 refresh

Changes for AI-powered network outbound packet batching:

- [“PROFILE.TCPIP statement and parameter changes” on page 34](#)
- [“TCP/IP callable NMI \(EZBNMIFR\)” on page 43](#)
- [“TCPIP subcommand” on page 45](#)
- [“Netstat operator commands \(DISPLAY TCPIP,,NETSTAT\)” on page 37](#)
- [“NETSTAT TSO commands” on page 39](#)
- [“Netstat UNIX commands” on page 40](#)
- [“General updates of z/OS UNIX commands” on page 41](#)

September 2025 release

- [“General updates for the non-PROFILE.TCPIP IP configuration files” on page 36](#)
- [“TCPIP subcommand” on page 45](#)
- [“Samples provided in MVS data set SEZAINST” on page 47](#)

Chapter 1. Planning to use new functions

These topics help you plan to use new functions:

- [“Introduction to z/OS Communications Server” on page 1](#)
- [“Determining which documents to use when upgrading” on page 1](#)
- [“IP encryption features” on page 2](#)
- [“Planning checklist” on page 3](#)
- [“TCP/IP packaging process” on page 4](#)
- [“Defining SNA data sets” on page 7](#)

Introduction to z/OS Communications Server

z/OS Communications Server is a network communication access method. It provides both Systems Network Architecture (SNA) and Transmission Control Protocol/Internet Protocol (TCP/IP) networking protocols for z/OS.

The TCP/IP protocol suite (also called *stack*), includes associated applications, transport- and network-protocol layers, and connectivity and gateway functions. See [z/OS Communications Server: IP Configuration Guide](#) for more information about z/OS Communications Server IP protocols.

The SNA protocols are provided by VTAM® and include Subarea, Advanced Peer-to-Peer Networking (APPN), and High Performance Routing protocols. z/OS Communications Server provides the interface between application programs residing in a host processor, and resources residing in an SNA network; it also links peer users in the network. See [z/OS Communications Server: SNA Network Implementation Guide](#) for more information about z/OS Communications Server SNA protocols.

For the purposes of this library, the following descriptions apply:

- The IBM Z® product line consists of the IBM® z13® (z13), IBM z13s® (z13s), IBM z14 (z14), IBM z15® (z15), IBM z16 (z16), and IBM z17 (z17).

The IBM z17, IBM z16, IBM z15, IBM z14®, IBM z13s®, IBM z13 servers are also known as z/Architecture® servers. z/OS 3.2 Communications Server runs only in z/Architecture mode on IBM Z.

Determining which documents to use when upgrading

This table helps you determine which documents to use as you upgrade.

Table 1. Comparing documents used in upgrade	
Document name	Descriptions
z/OS Planning for Installation	This document helps you prepare to install z/OS by giving you information that you need to write an installation plan. To install means to perform the tasks necessary to make the system operational, starting with a decision to either install for the first time or upgrade, and ending when the system is ready for production. An installation plan is a record of the actions you need to take to install z/OS. Recommendation: It is recommended that you read this document. Use this document as you prepare to install z/OS.

Table 1. Comparing documents used in upgrade (continued)	
Document name	Descriptions
z/OS Upgrade Workflow	This document provides a list of the upgrade actions (or migration actions) that you need to perform for z/OS Communications Server. IBM provides the z/OS Upgrade Workflow as part of the z/OS product. As you complete the steps in the z/OS Upgrade Workflow, you are performing all of the upgrade actions that are required for a specific release of z/OS.
z/OS Introduction and Release Guide	This document provides an overview of z/OS and lists the enhancements in each release. Use this document to determine whether to obtain a new release and to decide which new functions to implement.
z/OS Release Upgrade Reference Summary	This document contains summaries of new, changed, and no longer issued messages, codes, SMF records, and selected system-level data set (SYS1) interfaces. Use this document as a reference to the new and changed messages, SMF records, and selected system-level data set (SYS1) interfaces of z/OS.
z/OS Communications Server: New Function Summary	This document includes function summary topics to describe all the functional enhancements for the IP and SNA components of Communications Server, including task tables that identify the actions necessary to exploit new function. It also includes z/OS Communications Server interface changes. Use this document as a reference to using all the enhancements and identifying interface changes of z/OS Communications Server.

For an overview and map of the documentation available for z/OS, see the [z/OS Information Roadmap](#).

IP encryption features

Encryption features are available for IP at no additional cost. As of z/OS 3.1, Communications Server Security Level 3 is included in the z/OS Security Level 3 feature. z/OS Security Level 3 is an optional unpriced feature that must be ordered.

The encryption features include these capabilities:

Level 1

This level of encryption is included in the base of z/OS Communications Server.

Level 2

This level of encryption is included in the base of z/OS Communications Server and offers IP security protocol (IPSec) DES and SNMPv3 56-bit DES.

Level 3

This level of encryption is included in the z/OS Security Level 3 optional unpriced feature and offers IPSec Triple Data Encryption Standard (DES) and Advanced Encryption Standard (AES). AES includes the AES cipher-block chaining (AES-CBC) and AES Galois Counter (AES-GCM) modes.

Planning checklist

Upgrading a z/OS Communications Server system from a previous release involves considerable planning. To familiarize yourself with the upgrade process, review this checklist. Tailor the checklist to meet the specific requirements of your installation.

Procedure

1. Understand your network topology, including the hardware and software in your network and your network configuration.
2. Understand that z/OS Communications Server is a base element of z/OS.
Use the appropriate documents as you plan, upgrade, and install:
 - For information about upgrade and writing an installation plan, see [“Determining which documents to use when upgrading”](#) on page 1.
 - For information about installation, see these documents:
 - *z/OS Program Directory*
 - Preventative Service Planning (PSP) bucket (available by using IBMLINK)
 - *ServerPac: Installing Your Order*, if you use the ServerPac method to install z/OS
 - For information about storage requirements, see *z/OS Program Directory*, IBMLINK, or [z/OS Communications Server Support](#). You can also see the storage estimate worksheets in [z/OS Communications Server: SNA Network Implementation Guide](#).
3. Develop your education plan.
 - a) Evaluate the z/OS 3.2 Communications Server features and enhancements by reading the new function summary topics in this document.
 - b) Plan which new functions will be incorporated into your system.
4. Review and apply the Program Temporary Fixes (PTFs), including Recommended Service Upgrades (RSUs), for the current-minus-3 month plus all hipers and PEs. The PTFs are available monthly through the period for which the release is current and can be obtained by using IBMLINK. RSU integration testing for a release will be performed for five quarters after the general availability date for that release.
5. In writing a test plan for z/OS, include test cases for these items:
 - TCP/IP applications
 - Key or critical SNA applications and Original Equipment Manufacturer (OEM) software products.
 - User-written applications such as: Customer Information Control System (CICS®) sockets, Information Management System (IMS) sockets, REXX sockets, Sockets Extended, UNIX System Services sockets, and Macro Sockets
 - Operator commands
 - Your terminal and printer types
6. Back up your user exits and user modifications for later restore.
7. Install z/OS Communications Server with the other elements and features of z/OS. IBM has defined the appropriate product enablement settings in the IFAPRD00 member of SYS1.IBM.PARMLIB. For information about dynamic enablement, see [z/OS Planning for Installation](#).
8. Complete post-installation activities:
 - Use [z/OS Communications Server: IP Configuration Guide](#) to customize your TCP/IP system.
 - Use the following information to customize your SNA system:
 - [z/OS Communications Server: SNA Customization](#)
 - [z/OS Communications Server: SNA Network Implementation Guide](#)
 - [z/OS Communications Server: SNA Resource Definition Reference](#)

- Use *z/OS Upgrade Workflow* to determine upgrade actions.
- Reinstall user exits.
- Reinstall user modifications.
- Update operating procedures and automation routines.
- Activate new functions.

9. Complete functional and stress tests.

TCP/IP packaging process

As a result of the installation process for z/OS 3.2 Communications Server, the product is installed in both traditional MVS data sets and in files in the z/OS UNIX file system. For details on changes in the MVS data sets, see “MVS data sets” on page 4. For details on requirements for hierarchical file system files, see “File system files” on page 6.

MVS data sets

Table 2 on page 4 lists the distribution library data sets required by z/OS 3.2 Communications Server.

<i>Table 2. Distribution library data sets</i>	
Data set	Description
AEZADBR1	Database Request Module (DBRM) members
AHELP	TSO help files
AEZAMAC1	Assembler macros
AEZAMAC2	C header files
AEZAMAC3	Pascal include files
AEZAMODS	Distribution library for base link-edit modules
AEZARNT1	Reentrant object module for SEZAX11L, SEZAXTLB, SEZAOLDX, and SOCKETS
AEZARNT2	Reentrant object module for SEZAXAWL
AEZARNT3	Reentrant object module for SEZAXMLB
AEZAROE2	Reentrant object module for SEZAXAWL (z/OS UNIX support)
AEZAROE3	Reentrant object module for SEZAXMLB (z/OS UNIX support)
AEZARNT4	Reentrant object modules for RPC
AEZAROE1	Reentrant object module for SEZAX11L, SEZAXTLB, and SEZAOLDX (z/OS UNIX support)
AEZASMP1	Sample source programs, catalog procedures, CLIST, and installation jobs
AEZAXLTD	Translated default tables
AEZAXLTK	Translated Kanji, Hangeul, and Traditional Chinese DBCS tables and codefiles
AEZAXLT1	Translation table SBCS source and DBCS source for Hangeul and Traditional Chinese
AEZAXLT2	TELNET client translation tables
AEZAXLT3	Kanji DBCS translation table source
ABLSCIO	clists, execs, IPCS clists, execs; IPCS messages; IPCS panels, IPCS tables

<i>Table 2. Distribution library data sets (continued)</i>	
Data set	Description
ABLSMSG0	messages, IPCS clists, execs; IPCS messages; IPCS panels, IPCS tables
ABLSPNLO	panels, IPCS clists, execs; IPCS messages; IPCS panels, IPCS tables
ABLSTBL0	tables, IPCS clists, execs; IPCS messages; IPCS panels, IPCS tables

Table 3 on page 5 lists the target library data sets required by z/OS 3.2 Communications Server.

<i>Table 3. Target library data sets</i>	
Data set	Description
SEZACMAC	Client Pascal macros, C headers, and assembler macros
SEZACMTX	Load library for linking user modules and programs
SEZADBCX	Source for the Kanji, Hangeul, and Traditional Chinese DBCS translation tables
SEZADBRM	DBRM members
SEZADPIL	SNMP Distributed Programming Interface library
SEZADSIL	SNMP command processor and SNMPIUCV subtask for the NetView program, and the SQESERV module for the SNMP query engine
SEZADSIM	SNMP messages for the NetView program
SEZADSIP	SNMPIUCV initialization parameters for the NetView program
SEZAEXEC	CLISTs and REXX programs
SEZAINST	Installation samples and related members
SEZALIBN	NCS library system library
SEZALOAD	Executable load modules for concatenation to LINKLIB
SEZALNK2	LB@ADMIN for the NCS administrator
SEZALPA	Executable load modules for concatenation to LPALST
SEZAMENU	ISPF messages
SEZANCLS	NetView SNMP CLISTs
SEZANMAC	C headers and assembler macros for z/OS UNIX and TCP/IP Services APIs
SEZANPNL	NetView SNMP panels
SEZAOLDX	X Window System library (X10 compatibility routines)
SEZAPENU	ISPF panels
SEZARNT1	Reentrant object module for SEZAX11L, SEZAXTLB, SEZAOLDX, and SOCKETS
SEZARNT2	Reentrant object module for SEZAXAWL
SEZARNT3	Reentrant object module for SEZAXMLB
SEZARNT4	Reentrant object modules for RPC
SEZAROE1	Reentrant object module for SEZAX11L, SEZAXTLB, and SEZAOLDX (z/OS UNIX support)
SEZAROE2	Reentrant object module for SEZAXAWL (z/OS UNIX support)

<i>Table 3. Target library data sets (continued)</i>	
Data set	Description
SEZAROE3	Reentrant object module for SEZAXMLB (z/OS UNIX support)
SEZARPCL	Remote procedure call library
SEZATCP	Executable load modules for STEPLIB or LNKLIST concatenation
SEZATCPX	Source for the country SBCS translation tables
SEZATELX	Source for the TELNET country translation tables
SEZAXAWL	Athena widget set
SEZAXLD1	Translated default tables
SEZAXLD2	Translated Kanji, Hangeul, and Traditional Chinese DBCS default tables and DBCS codefiles for TELNET transform mode
SEZAXMLB	Motif widget set
SEZAXTLB	X Window System Toolkit library
SEZAX11L	X Window System library

Table 4 on page 6 lists the shared distribution and target library data sets required by z/OS 3.2 Communications Server.

<i>Table 4. Shared distribution and target library data sets</i>	
Data set	Description
SYS1.CSSLIB	Interface routines for accessing callable services
SYS1.HELP	TSO help files
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
SYS1.MSGENU / SYS1.AMSGENU	English-language message tables used by the MVS message service (MMS)
SYS1.NUCLEUS	Resident SVCs, callable services tables, and abnormal termination modules
SYS1.PARMLIB / SYS1.APARMLIB	IBM-supplied and installation-created members, which contain lists of system parameter values
SYS1.SAXREXEC	Contains system REXX programs
SYS1.SBLSCLI0	IPCS REXX execs and CLISTs
SYS1.SBLSKELO	ISPF skeletons for the IPCS dialog
SYS1.SBLSMSG0	ISPF messages for the IPCS dialog
SYS1.SBLSPNLO	ISPF panels for the IPCS dialog
SYS1.SBLSTBLO	ISPF tables for the IPCS dialog

File system files

See [z/OS UNIX System Services Planning](#) and [z/OS UNIX System Services User's Guide](#) for a description of the file system files.

Defining SNA data sets

This section describes z/OS data sets that you need to define or modify for z/OS 3.2 Communications Server. [Table 5 on page 7](#) shows the z/OS data sets that contain information for z/OS 3.2 Communications Server, and [Table 6 on page 9](#) shows the z/OS data sets that contain information for VTAM.

Enterprise Extender requires IP data set definitions in addition to the SNA data sets. See [z/OS Communications Server: IP Configuration Guide](#) for more information.

These tables show the data sets and the approximate storage requirements for any new data sets and for any existing data sets whose requirements might have changed since your last installation.

Tip: The data sets referenced in this section are not necessarily under the SYS1 HLQ. In fact, the entire name for some data sets can be different.

Table 5. 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. In a sysplex, this data set must be unique for each system; it may not be shared.
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. In a sysplex, this data set must be unique for each system; it may not be shared.
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. In a sysplex, this data set must be unique for each system; it may not be shared.
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.

<i>Table 5. z/OS data sets containing information for z/OS Communications Server (continued)</i>		
Name of data set	Contents	Comments
SYS1.MACLIB	z/OS Communications Server application program interface macros	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, ISTRFT1, which is used for problem diagnosis	Required.
SYS1.NUCLEUS	z/OS Communications Server resident SVCs and abnormal termination modules	Required.
SYS1.PARMLIB	IBM-supplied and installation-created members, which contain lists of system parameter values	Required. This may also be a data set in the logical parmlib concatenation.
SYS1.PROCLIB	JCL for started tasks	Required for logon manager.
SYS1.SBLSCLI0	IPCS REXX execs and CLISTs	Required for z/OS Communications Server dump analysis enhancements and VIT analysis. See z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures for more information.
SYS1.SBLSKELO	ISPF skeletons for the IPCS dialog	Required for z/OS Communications Server dump analysis enhancements and VIT analysis. See z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures for more information.
SYS1.SBLMSG0	ISPF messages for the IPCS dialog	Required for z/OS Communications Server dump analysis enhancements and VIT analysis. See z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures for more information.
SYS1.SBLSPNLO	ISPF panels for the IPCS dialog	Required for z/OS Communications Server dump analysis enhancements and VIT analysis. See z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures for more information.
SYS1.SBLSTBLO	ISPF tables for the IPCS dialog	Required for z/OS Communications Server dump analysis enhancements and VIT analysis.
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.SISTDAT1	Online tools	Optional. Use this library only if you intend to use the online information tools included with z/OS Communications Server.
SYS1.SISTDAT2	Message skeleton file for translation	Required. See z/OS Communications Server: SNA Network Implementation Guide .

Table 5. z/OS data sets containing information for z/OS Communications Server (continued)		
Name of data set	Contents	Comments
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, see the z/OS MVS Diagnosis: Tools and Service Aids .
SYS1.TRSDDB	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. In a sysplex, this data set must be unique for each system; it may not be shared.
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. In a sysplex, these data sets must be unique for each system; it may not be shared.

Table 6 on page 9 shows the z/OS data sets that contain VTAM information.

Table 6. z/OS data sets containing information for VTAM		
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.VTAMLIB	- Load modules for z/OS Communications Server - User-defined tables, default tables, and exit routines	Only z/OS Communications Server load modules are required. 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.
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. In a sysplex, these data sets must be unique for each system; it may not be shared.

Table 6. z/OS data sets containing information for VTAM (continued)		
Name of data set	Contents	Comments
SYS1.NODELST	z/OS Communications Server status of major nodes	Required if restart of all previously active major nodes is desired. In a sysplex, this data set must be unique for each system; it may not be shared.

Data sets containing information for z/OS 3.2 Communications Server

This section describes data sets that contain information for z/OS 3.2 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 these steps:

1. Allocate the SYS1.SISTCLIB data set using a utility program, and catalog the data set before SMP/E installation. See 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.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 these 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 these steps:

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. See [z/OS Communications Server: SNA Network Implementation Guide](#) for more information about start options.
2. Specify the DD name for SYS1.VTAMLST as VTAMLST. You should specify these 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 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. Three sets of IBM-supplied COS definitions are available to enable z/OS Communications Server to select an optimal route for a session:
 - COSAPPN
The definitions in COSAPPN are appropriate for most sessions.
 - ISTACST2

The definitions in ISTACST2 are most useful for multiple types of connections with different TG characteristics. For example, the definitions are useful when channel-to-channel, token ring network, FDDI LAN, or ATM are used in the network.

- **ISTACST3**

The definitions in ISTACST3 are designed to enable z/OS Communications Server to select an optimal route for a session when connections used in the network include those with high speed link characteristics such as FICON®, Gigabit Ethernet, and HiperSockets.

One of these three sets of APPN COS definitions is required if z/OS Communications Server is configured as an APPN node. To use COSAPPN, ISTACST2, or ISTACST3, 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 more than one set of definitions into SYS1.VTAMLST, but you can have only one set active at any time. For additional information about selecting and activating the best APPN COS definitions for your network, see [What are the IBM-supplied default Classes of Service? in z/OS Communications Server: SNA Network Implementation Guide](#).

The IBM-supplied TG profiles are in IBMTGPS in ASAMPLIB. IBMTGPS is not required, but you should include it. You can copy IBMTGPS into SYS1.VTAMLST; it is automatically activated when z/OS Communications Server is initialized.

Guidelines:

- Because CP-CP session paths might 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.
- You can modify SYS1.VTAMLST.

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.

SYS1.VTAMLIB is used to store these user tables:

- Class of service (COS) table
- Communication network management (CNM) routing table

Restriction: 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

Code the DD name for SYS1.VTAMLIB as VTAMLIB. You should specify these 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=
```

Define SYS1.VTAMLIB as an authorized library (a library listed in the currently used IEAAPFxx).

Parmlib member for communications storage manager (CSM)

Communications storage manager (CSM) supports storage above the 64-bit address bar.

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 this format:

column | ...+....1....+....2....+....3....+....4....+....

FIXED MAX(*maxfixK* | M)

ECSA MAX(*maxecsaK* | M)

HVCOMM MAX(*maxhvcommM*)

[POOL (*bufsize*, *bufsource*, *initbuf*, *minfree*, *expbuf*)]

Rules:

- Each line in IVTPRM00 must start in column one.
- 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 three lines in the CSM parmlib member define the maximum amount of storage to be dedicated to fixed, ECSA, and HVCOMM buffers in CSM. Note that the fixed maximum represents the total fixed storage above and below the 2 GB 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.

This 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 1024 KB to 30720 MB. The default value is 512 MB.

maxecsa

A decimal integer specifying the maximum bytes of ECSA storage to be dedicated for use by CSM. The range is from 1024 KB to 2048 MB. The default is 100 MB.

Restriction: The *maxecsa* value should be less than 90% of the ECSA available on the z/OS system. CSM adjusts the *maxecsa* value to 90% of the system ECSA value and issues the message IVT5590I when the *maxecsa* value configured is larger than 90% of the ECSA available on the system.

maxhvcomm

A decimal integer specifying the maximum bytes of HVCOMM storage to be dedicated for use by CSM. The range is from 100 MB to 999999 MB. The default value is 2000 MB.

KB

Denotes size in kilobytes

MB

Denotes size in megabytes.

bufsize

Specifies the size of the buffers in the pool to be created. Valid pool sizes are 4 KB, 16 KB, 32 KB, 60 KB, and 180 KB. *bufsize* is required for each POOL definition.

bufsource

Specifies the storage source from which buffers are allocated. The values for *bufsource* are:

ECSA

Buffers are allocated from ECSA storage.

DSPACE

Buffers are allocated from data space storage.

HVCOMM

Buffers are allocated from high virtual common storage.

The *bufsource* variable is required for each POOL definition.

expbuf

Specifies the number of buffers by which the pool is expanded when the number of free buffers falls below the *minfree* value. The valid ranges for each CSM buffer pool size are as follows:

Bufsize**Range for Expbuf for ECSA and data space pools****4 KB**

1 - 256

16 KB

1 - 256

32 KB

1 - 128

60 KB

1 - 68

180 KB

1 - 22

Bufsize**Range for Expbuf for HVCOMM pools****4 KB**

1 - 1024

16 KB

1 - 512

32 KB

1 - 256

60 KB

1 - 136

180 KB

1 - 45

The *expbuf* variable is required for each POOL definition.

initbuf

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 *expbuf*. The pool will not contract below the level specified by either *initbuf* or *expbuf*, whichever is higher.

The range for *initbuf* is 0 - 9999. If *initbuf* is omitted, the IBM-supplied default value is used unless overridden by an application's CREATE_POOL request.

minfree

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 *minfree* is 0 - 9999. If *minfree* is omitted, the IBM-supplied default value is used unless overridden by an application's CREATE_POOL request.

Table 7 on page 14 and Table 8 on page 14 show the IBM-supplied default values for *expbuf*, *initbuf*, and *minfree* for the CSM buffer pools.

Table 7. IBM-supplied default values for CSM buffer pools for ECSA and data space					
Bufsize	4 KB	16 KB	32 KB	60 KB	180 KB
<i>EXPBUF</i>	16	8	4	4	2
<i>INITBUF</i>	64	32	16	16	2
<i>MINFREE</i>	8	4	2	2	1

Table 8. IBM-supplied default values for CSM buffer pools for HVCOMM					
Bufsize	4 KB	16 KB	32 KB	60 KB	180 KB
<i>EXPBUF</i>	256	64	32	17	5
<i>INITBUF</i>	256	64	32	17	5
<i>MINFREE</i>	32	8	4	4	2

z/OS system symbols can be used in IVTPRM00. See [z/OS Communications Server: SNA Network Implementation Guide](#) for more information about this function.

IBM Health Checker for z/OS can be used to check whether appropriate values are defined for the maximum amount of storage to be dedicated to fixed buffers and ECSA buffers in CSM. For more details about IBM Health Checker for z/OS, see [IBM Health Checker for z/OS User's Guide](#).

Table 9. 64 bit enablement of CSM	
Task	Reference
Optionally update the IVTPRM00 parmlib member to specify the parameters to use when you allocate storage for CSM buffer use above the bar.	z/OS Communications Server: New Function Summary
Issue the D CSM command to monitor the use of storage above the bar that is managed by CSM.	z/OS Communications Server: SNA Operation
Issue the MODIFY CSM command to update values for storage above the bar that is managed by CSM.	z/OS Communications Server: SNA Operation

APPN checkpointing data sets

These 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 satisfy these requirements:

- Targeted by a search
- Have a dynamic entry type that is not registered
- 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 3.2 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 these tasks:

- 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 these DCB subparameters for SYS1.DSDB1, SYS1.DSDB2, and SYS1.TRSDDB:

```
RECFM=FB,LRECL=1000,BLKSIZE=any multiple of 1000,DSORG=PS
```

- Specify these DCB subparameters for SYS1.DSDBCTRL:

```
RECFM=FB,LRECL=20,BLKSIZE=20,DSORG=PS
```

Rule: Do not modify any of the foregoing data sets.

Guidelines:

- 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.

- 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.

Using configuration restart data sets

To use the z/OS Communications Server configuration restart facility, define configuration restart Virtual Storage Access Method (VSAM) data sets.

Procedure

To set up data sets for the major nodes that you will be using with configuration restart, perform the following steps. See [z/OS Communications Server: SNA Network Implementation Guide](#) for a description of the configuration restart support.

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 CONFGDS 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 *ddname* must match the *ddname* on the CONFGDS operand of the VBUILD definition statement for the associated major node.

This 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.) 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.

Dynamically configuring data sets for channel-attached devices

You can dynamically configure channel-attached devices in your network.

Procedure

To prepare your system to support dynamic configuration of channel-attached devices, perform the following steps during your installation. See [z/OS Communications Server: SNA Network Implementation Guide](#) for a full description of this support.

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

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

Defining a 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.

Procedure

To define a NODELST data set, perform the following steps. See [z/OS Communications Server: SNA Network Implementation Guide](#) for more information on how NODELST is used.

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.

Results

You can use defaults for all other data characteristics.

Chapter 2. 3.2 new function summary

This information contains topics about every function or enhancement introduced in z/OS 3.2 Communications Server. The topics describe each function and present the following information, if applicable:

- Restrictions, dependencies, and coexistence considerations for the function
- A task table that identifies the actions necessary to use the function
- References to the documents that contain more detailed information

See Chapter 3, “Communications Server interface changes for z/OS 3.2,” on page 33 for information about new and changed interfaces.

See [z/OS Upgrade Workflow](#) for a list of the upgrade actions (or migration actions) that you need to perform for z/OS Communications Server. As you complete the steps in the z/OS Upgrade Workflow, you perform all of the upgrade actions that are required for a specific release of z/OS.

See [z/OS Release Upgrade Reference Summary](#) for information about new, changed, and no longer issued messages, codes, SMF records, and selected system-level data set (SYS1) interfaces.

Support considerations in 3.2

z/OS 3.2 Communications Server removes support for the following functions:

- Common Information Model (CIM)

For more information about z/OS 3.2 Communications Server support considerations, see [z/OS Upgrade Workflow](#).

Hardware support

The following topics describe enhancements for hardware support:

- [“z/OS Communications Server support for the Network Express feature on IBM z17” on page 19](#)

z/OS Communications Server support for the Network Express feature on IBM z17

z/OS 3.2 Communications Server supports the Network Express feature on the z17 platform.

IBM Network Express

The Network Express feature provides both the latest Enhanced QDIO (EQDIO) architecture for reliable high-speed Ethernet transport and RoCEv2 support for optimized TCP connectivity using RDMA technology with Shared Memory Communications (SMC-R).

Restriction: SNMP is not supported for the Network Express (OSH) interface.

Dependencies: The Network Express feature is only available when running on the IBM z17 or higher machine.

Coexistence requirements: PTFs for the following APAR are required for z/OS 3.2, z/OS 3.1, and z/OS V2R5:

OA63265 for the I/O Supervisor (IOS)

When change was introduced: z/OS 3.2 and with APARs OA64896 and PH54596 for z/OS 3.1 and z/OS V2R5.

Communications Server support for Network Express features

To use Communications Server support for Network Express features, perform the tasks in [Table 10 on page 20](#).

<i>Table 10. Task topics to enable Communications Server support for Network Express features</i>	
Task/Procedure	Reference
Understand how to use the Network Express feature	Network Express feature in EQDIO mode in z/OS Communications Server: IP Configuration Guide
Configure an EQENET or EQENET6 INTERFACE statement to define the OSA for Network Express	INTERFACE statement in z/OS Communications Server: IP Configuration Reference
Configure DEVNUM on an existing IPAQENET or IPAQENET6 INTERFACE statement to enable the interface to be used on either IBM z17 or an earlier machine.	INTERFACE statement in z/OS Communications Server: IP Configuration Reference
Display information, including storage usage, about the dynamic EQENET TRLE by issuing the D NET,ID=trle or D NET,TRL,TRLE=trle commands.	DISPLAY TRL command in z/OS Communications Server: SNA Operation
Enable INOPDUMP for EQDIO TRLEs by issuing the MODIFY VTAMOPTS,INOPDUMP=(ON,EQDIO) command.	MODIFY VTAMOPTS command in z/OS Communications Server: SNA Operation
Enable INOPDUMP for EQDIO TRLEs by specifying INOPDUMP=(ON,EQDIO) on the START command.	START command in z/OS Communications Server: SNA Operation
Enable INOPDUMP for EQDIO TRLEs by specifying INOPDUMP=(ON,EQDIO) in a VTAM start list.	VTAM Start Options in z/OS Communications Server: SNA Resource Definition Reference
Enable AIMON for EQDIO devices by issuing the Modify VTAMOPTS,AIMON=EQDIO command.	MODIFY VTAMOPTS command in z/OS Communications Server: SNA Operation
Enable AIMON for EQDIO devices by specifying AIMON=EQDIO on the START command.	START command in z/OS Communications Server: SNA Operation
Enable AIMON for EQDIO devices by specifying AIMON=EQDIO in a VTAM start list.	VTAM Start Options in z/OS Communications Server: SNA Resource Definition Reference
Display information about the EQENET/EQENET6 interface by issuing the Netstat DEVLINKS/-d command.	Netstat DEVLINKS/-d report in z/OS Communications Server: IP System Administrator's Commands
Use the DISPLAY TCPIP,,OSAINFO command to retrieve information directly from the Network Express (OSH) adapter.	DISPLAY TCPIP,,OSAINFO in z/OS Communications Server: IP System Administrator's Commands
Enable SMCRv2 when using EQENET interfaces.	INTERFACE statement in z/OS Communications Server: IP Configuration Reference
Enable SMCDv2 when using EQENET/EQENET6 interfaces.	INTERFACE statement in z/OS Communications Server: IP Configuration Reference
Enable HSCI when using EQENET/EQENET6 interfaces.	GLOBALCONFIG statement in z/OS Communications Server: IP Configuration Reference
Enable QDIO Accelerator when using EQENET interfaces.	IPCONFIG statement in z/OS Communications Server: IP Configuration Reference
Enable Tuning Stats for EQDIO TRLEs	MODIFY TNSTAT command in z/OS Communications Server: SNA Operation

Table 10. Task topics to enable Communications Server support for Network Express features (continued)	
Task/Procedure	Reference
Enable Packet trace for EQDIO devices	VARY TCPIP,,PKTTRACE in <i>z/OS Communications Server: IP System Administrator's Commands</i>

Enhancing security

The following topics describe enhancements for security:

- [“Transport Layer Security \(TLS\) default changes”](#) on page 21
- [“zERT monitoring enhancements”](#) on page 22
- [“SMTP AUTH support for CSSMTP”](#) on page 23
- [“zERT support for z/OS 3.1 OpenSSH upgrade”](#) on page 24

Transport Layer Security (TLS) default changes

In z/OS 3.2, Communications Server and System SSL updated TLS default values to provide a more secure set of defaults. Use the following steps in the z/OS Upgrade Workflow to understand the changes and the necessary steps:

- IP Services: Prepare for more secure TLS defaults in System SSL and AT-TLS
- IP Services: Prepare for more secure TLS defaults for the FTP client
- IP Services: Prepare for more secure TLS defaults for the Policy Agent client

When change was introduced: z/OS 3.2 .

To find all related topics about TLS default values for z/OS 3.2, see [Table 11](#) on page 21.

Table 11. All related topics about TLS default changes	
Book name	Topics
z/OS Communications Server: IP Configuration Reference	• General syntax rules for Policy Agent in z/OS Communications Server: IP Configuration Reference • TTLSEnvironmentAdvancedParms statement in z/OS Communications Server: IP Configuration Reference • TTLSConnectionAdvancedParms statement in z/OS Communications Server: IP Configuration Reference • TTLSSignatureParms statement in z/OS Communications Server: IP Configuration Reference • TTLSGskAdvancedParms statement in z/OS Communications Server: IP Configuration Reference • ServerConnection in z/OS Communications Server: IP Configuration Reference • summary of FTP client and server configuration statements in z/OS Communications Server: IP Configuration Reference

Table 11. All related topics about TLS default changes (continued)	
Book name	Topics
z/OS Communications Server: IP Configuration Guide	• summary of FTP client and server configuration statements in z/OS Communications Server: IP Configuration Reference • the steps for customizing the FTP client for TLS in z/OS Communications Server: IP Configuration Guide • Steps for migrating the FTP server and client to use AT-TLS in z/OS Communications Server: IP Configuration Guide • Add TLS/SSL to Policy Agent connections in z/OS Communications Server: IP Configuration Guide • Protocol versions in z/OS Communications Server: IP Configuration Guide
z/OS Communications Server: IP System Administrator's Commands	• Report field descriptions in z/OS Communications Server: IP System Administrator's Commands • pasearch in z/OS Communications Server: IP System Administrator's Commands

zERT monitoring enhancements

z/OS Encryption Readiness Technology (zERT) is enhanced to recognize and report on failed TLS and SSH handshakes, preventing the associated connections from being reported as unprotected.

zERT is also updated to provide TLS and IPsec certificate serial numbers and expiration dates in the SMF zERT summary record (SMF 119, subtype 12).

When change was introduced: z/OS 3.2 and with APAR PH63197 for z/OS V2R5 and z/OS 3.1.

Using zERT monitoring enhancements

To use zERT monitoring enhancements, complete the appropriate tasks in [Table 12 on page 22](#).

Table 12. Task topics to enable zERT monitoring enhancements	
Task	Reference
If you collect zERT connection detail SMF records (type 119, subtype 11), you can use the following new data: • TCP Client / server flags • TLS failed handshake indication • SSH failed handshake indication	zERT connection detail record (subtype 11) in z/OS Communications Server: IP Programmer's Guide and Reference
If you collect zERT summary records (SMF 119, subtype 12), you can use the following new data: • Count of failed TLS or SSH handshakes • TLS certificate serial number and expiration information • IPsec certificate serial number and expiration information	zERT Summary record (subtype 12) in z/OS Communications Server: IP Programmer's Guide and Reference

To find all related topics about zERT support for z/OS 3.2 OpenSSH upgrade, see [Table 17 on page 25](#).

Table 13. All related topics about zERT monitoring enhancements	
Book name	Topics
z/OS Communications Server: IP Programmer's Guide and Reference	• zERT connection detail record (subtype 11) in z/OS Communications Server: IP Programmer's Guide and Reference • zERT Summary record (subtype 12) in z/OS Communications Server: IP Programmer's Guide and Reference
z/OS Communications Server: IP Configuration Guide	• How does zERT discovery provide the information? in z/OS Communications Server: IP Configuration Guide • How does zERT enforcement work? in z/OS Communications Server: IP Configuration Guide

SMTP AUTH support for CSSMTP

For z/OS 3.2, the Communication Server SMTP (CSSMTP) enables SMTP AUTH support with username/password using the PLAIN and LOGIN Authentication methods.

Restrictions:

To use SMTP AUTH support with a configured target server, the Secure Yes parameter must be configured for the TargetServer statement. This ensures that the client connection to the target server is protected by TLS.

Most mail servers will only include AUTH LOGIN/PLAIN in the EHLO response after a TLS session has been established. To ensure that CSSMTP receives this notification, configure the global option TLSEHLO YES in the configuration.

If the configuration option Undeliverable ReturnToMailFrom is set to Yes, ReportMailFrom must be configured. The email address configured on ReportMailFrom is used to authenticate the undeliverable mail if the target server AuthEntity is set to <MAILFROM>. If ReportMailFrom is not configured, undeliverable mail goes to the DeadLetterDirectory.

Dependencies:

The username and password used for SMTP AUTH are stored in a SAF LDAPBIND entity. This entity name is provided in the configuration with the AuthEntity parameter on the TargetServer statement.

RACF supports encrypting the LDAPBIND entity with AES-256 protection beginning in z/OS V2R5 with RACF APAR OA66458.

When change was introduced: z/OS 3.2 and with TCP/IP APAR PH61015 for z/OS V2R5 and z/OS 3.1.

Using SMTP AUTH support for CSSMTP

Table 14. SMTP AUTH support for CSSMTP	
Task/Procedure	Reference
To enable SMTP AUTH support for : • Create an LDAPBIND entity using RACF or another SAF provider. • Configure the AuthEntity parameter on the TargetServer statement in the configuration file.	• Steps for CSSMTP AUTH configuration in z/OS Communications Server: IP Configuration Guide • TargetServer statement in z/OS Communications Server: IP Configuration Reference

Table 14. SMTP AUTH support for CSSMTP (continued)	
Task/Procedure	Reference
Determine the Auth Status for a target server.	MODIFY command: Communications Server SMTP application (CSSMTP) in z/OS Communications Server: IP System Administrator's Commands

To find all related topics about SMTP AUTH support for CSSMTP, see table below.

Table 15. All related topics about SMTP AUTH support for CSSMTP	
Book name	Topics
z/OS Communications Server: IP System Administrator's Commands	• Configuring the CSSMTP application in z/OS Communications Server: IP System Administrator's Commands
z/OS Communications Server: IP Configuration Guide	• Steps for CSSMTP AUTH configuration in z/OS Communications Server: IP Configuration Guide • Terms and concepts in z/OS Communications Server: IP Configuration Guide
z/OS Communications Server: IP Configuration Reference	• CSSMTP configuration statements in z/OS Communications Server: IP Configuration Reference • TargetServer statement in z/OS Communications Server: IP Configuration Reference
z/OS Communications Server: IP Diagnosis Guide	• Resolving mail problems smtp auth in z/OS Communications Server: IP Diagnosis Guide • Target server problems in z/OS Communications Server: IP Diagnosis Guide

zERT support for z/OS 3.1 OpenSSH upgrade

z/OS Encryption Readiness Technology (zERT) is updated to recognize and report new SSH cryptographic attributes. zERT supports the following new SSH key exchange methods: gss-group14-sha256-, gss-group16-sha512-, gss-curve25519-sha256-, and gss-nistp256-sha256-. zERT supports the following new SSH key types: sk-ecdsa-sha2-nistp256@openssh.com, sk-ecdsa-sha2-nistp256-cert-v01@openssh.com, sk-ssh-ed25519@openssh.com, and sk-ssh-ed25519-cert-v01@openssh.com.

SSH cryptographic attributes

The new attributes can be recognized and reported in the zERT SMF 119 connection detail (subtype 11) and summary (subtype 12) records. The IBM zERT Network Analyzer supports the new key exchange methods and key types in SMF zERT summary records.

You can use the new key exchange methods for zERT policy enforcement. You can configure the new key exchange methods for zERT enforcement in the IBM Network Configuration Assistant for z/OS Communications Server.

When change was introduced: z/OS 3.2 and with TCP/IP APAR PH58110 for z/OS 3.1

Using zERT support for z/OS 3.1 OpenSSH upgrade

To use zERT support for z/OS 3.1 OpenSSH upgrade, complete the appropriate tasks in [Table 16 on page 25](#).

Table 16. Task topics to enable zERT support for z/OS 3.1 OpenSSH upgrade	
Task	Reference
If you want to configure a new SSH key exchange method in a zERT enforcement policy, configure the value on the ZERTKeyExchange SSHKeyExchange parameter.	- Online help of IBM Configuration Assistant for z/OS Communications Server - SSHKeyExchange parameter on ZERTKeyExchange statement statement in z/OS Communications Server: IP Configuration Reference
Display zERT enforcement policy using the z/OS UNIX pasearch command to query information from the Policy Agent.	pasearch in z/OS Communications Server: IP System Administrator's Commands

Related information

To find all related topics about zERT support for z/OS 3.1 OpenSSH upgrade, see [Table 17 on page 25](#).

Table 17. All related topics about zERT support for z/OS 3.1 OpenSSH upgrade	
Book name	Topics
z/OS Communications Server: IP Configuration Reference	ZERTKeyExchange statement General syntax rules for Policy Agent
z/OS Communications Server: IP Programmer's Guide and Reference	zERT connection detail record (subtype 11) zERT Summary record (subtype 12)

Application modernization

The following topics describe enhancements for application modernization:

- [“AI-powered network outbound packet batching” on page 25](#)
- [“Multiple VIPA ranges for z/OS Container Platform” on page 27](#)
- [“Sysplex Distributor support for IBM z/OS Control Plane Appliances” on page 27](#)
- [“Network support for IBM z/OS Container Platform” on page 29](#)

AI-powered network outbound packet batching

z/OS 3.2 Communications Server is enhanced to support AI-powered network outbound packet batching. This functionality optimizes communication with the OSA-Express interface when sending outbound packets. This is accomplished by using AI to predictably and dynamically batch multiple packets together before presenting them to the interface. This reduces CPU usage and minimizes network latency.

Dependencies:

The z/OS Communications Server enhancement to use AI-powered network outbound packet batching has dependencies:

- AI Base (AIB - OA67784)
- AI Control Interface (AICI - PH66976)
- AI System Services 1.2 (AISS - OA67865)

Note: The AI Framework must be configured and started, the MLz services must be configured and started, the AIB component must be configured and active. VSAM RLS is required for the EzNoSQL database that is configured in the z/OSMF workflow.

When change was introduced: z/OS 3.2 with APAR PH67239

Using AI-powered network outbound packet batching

To use AI-powered network outbound packet batching, complete the appropriate tasks.

Table 18. Task topics to use AI-powered network outbound packet batching

Task	Reference
Use the z/OSMF workflows to configure network outbound packet batching on the z/OS AI Framework.	- Workflow file: /usr/lpp/tcpip/ai/packetbatching/workflow/AI_Packet_Batching_Config.xml - GLOBALCONFIG statement in <i>z/OS Communications Server: IP Configuration Reference</i> - AI-powered Network outbound packet batching in <i>z/OS Communications Server: IP Configuration Guide</i>
Use the AI Control Interface (AICI) to view the listed TCP/IP instance and network interface pairs in the network outbound packet batching use case for the configured system. Note: Wait for at least 28 days of collecting training data before attempting to train the model.	See "AI Control Interface" in <i>Infusing AI into IBM z/OS</i>
Use AICI to train the AI model.	See "AI Control Interface" in <i>Infusing AI into IBM z/OS</i>
Use AICI to enable AI-powered Network Outbound Packet Batching for the desired TCP/IP instance and network interface pairs.	See "AI Control Interface" in <i>Infusing AI into IBM z/OS</i>
Review the z/OS system console for the message EZZ4701I.	See "AI Control Interface" in <i>Infusing AI into IBM z/OS</i>

Related information

Table 19. All related topics about AI-powered network outbound packet batching

Book name	Topics
z/OS Communications Server: IP Programmer's Guide and Reference	TCP/IP profile record Global configuration section
z/OS Communications Server: IP System Administrator's Commands	Not IPv6 enabled (SHORT format) IPv6 enabled or request for LONG format Report field description Not IPv6 enabled (SHORT format) IPv6 enabled or request for LONG format Report field descriptions
z/OS Communications Server: IP Messages Volume 4 (EZZ, SNM)	EZZ4700E EZZ4701I EZZ4702I EZZ4703E
z/OS Communications Server: IP Configuration Reference	GLOBALCONFIG statement
z/OS Communications Server: IP Configuration Guide	AI-powered Network outbound packet batching

Multiple VIPA ranges for z/OS Container Platform

z/OS 3.2 Communications Server is enhanced to enable the configuration and use of multiple VIPARANGE ZCONTAINER statements for use by containers started with IBM z/OS Container Platform (zOSCP). Previously, the TCP/IP stack could only dynamically request Dynamic Virtual IP Addresses (DVIPAs) from a single configured range of addresses per stack. This new feature expands this functionality to allow users to configure more than one of these ranges for address creation in the TCP/IP profile. This alleviates the restriction where users would need to ensure they had enough available contiguous addresses.

Dependencies:

The z/OS Communications Server enhancement to use multiple VIPARANGE ZCONTAINER statements has dependencies. Here is the list of APARs:

- APAR PH39613 is required for base network support for z/OS Containers for 3.1.
- APARs PH39613 and OA63289 are required for base network support for z/OS Containers for 2.5.

When change was introduced: z/OS 3.2 and with APAR PH63940 for z/OS 3.1 and z/OS V2R5

Using Multiple VIPA ranges for IBM z/OS Container Platform

To use multiple VIPA ranges for IBM z/OS Container Platform, complete the appropriate tasks.

Table 20. Task topics to use multiple VIPA ranges for IBM z/OS Container Platform	
Task	Reference
Configure one or more VIPARANGE statements with the ZCONTAINER keyword to be used by z/OS Container Platform.	VIPADYNAMIC – VIPARANGE statement in z/OS Communications Server: IP Configuration Reference
Issue Netstat VIPADCFG/-F command to display dynamic VIPA configuration for a local host.	Netstat VIPADCFG/-F report in z/OS Communications Server: IP System Administrator's Commands
Issue Netstat VIPADYN/-V command to display information about active ZCONTAINER dynamic VIPAs that have been created via IBM z/OS Container Platform.	Netstat VIPADyn/-v report in z/OS Communications Server: IP System Administrator's Commands

Table 21. All related topics about multiple VIPA ranges for IBM z/OS Container Platform	
Book name	Topics
z/OS Communications Server: IP Configuration Reference	VIPADYNAMIC – VIPARANGE statement in z/OS Communications Server: IP Configuration Reference
z/OS Communications Server: IP Messages Volume 2 (EZB, EZD)	• EZD2074I VIPARANGE in z/OS Communications Server: IP Messages Volume 2 (EZB, EZD) • EZD2075I VIPARANGE in z/OS Communications Server: IP Messages Volume 2 (EZB, EZD)

Sysplex Distributor support for IBM z/OS Control Plane Appliances

z/OS 3.2 Communications Server is enhanced to support z/OS Sysplex Distributor for non-z/OS targets that run co-located with a z/OS TCP/IP stack in a sysplex.

For example, Sysplex Distributor can be used to provide highly available Kubernetes clusters on z/OS with multiple z/OS Control Plane Appliances. For more information about the IBM z/OS Control Plane Appliance (IBM zCPA) and Kubernetes, see [IBM z/OS Container Platform](#).

Dependencies:

- APAR PH39613 is required for base network support for IBM z/OS Container Platform for z/OS 3.1 and z/OS V2R5.

When change was introduced: z/OS 3.2 and with APAR PH49323 for z/OS 3.1 and z/OS V2R5.

Using Sysplex Distributor support for IBM z/OS Control Plane Appliances

To use Sysplex Distributor support for IBM z/OS Control Plane Appliances, complete the appropriate tasks in [Table 22 on page 28](#).

<i>Table 22. Task topics to enable Sysplex Distributor support for IBM z/OS Control Plane Appliances</i>	
Task	Reference
Review documentation on Kubernetes control plane nodes and running in an HA environment	IBM z/OS Container Platform
Configure VIPADISTRIBUTE with the new EXTARG keyword and specify one or more external target addresses on the DESTIP keyword.	• VIPADISTRIBUTE in z/OS Communications Server: IP Configuration Reference • VIPARANGE statement in z/OS Communications Server: IP Configuration Reference
Issue Netstat VIPADCFG/-F report to display the dynamic VIPA configuration for a local host.	Netstat VIPADCFG/-F report in z/OS Communications Server: IP System Administrator's Commands
Use the z/OSMF workflows to configure the z/OS Control Plane Appliance with the Distributor dynamic VIPA address.	Provisioning IBM z/OS Control Plane Appliance instances
Issue Netstat VDPT/-O report to view the dynamic VIPA destination port table information and confirm you have at least one ready target for distribution.	Netstat VDPT/-O report in z/OS Communications Server: IP System Administrator's Commands

To find all related topics about Sysplex Distributor support for IBM z/OS Control Plane Appliances, see [Table 23 on page 28](#).

<i>Table 23. All related topics about Sysplex Distributor support for IBM z/OS Control Plane Appliances</i>	
Book name	Topics
z/OS Communications Server: IP Configuration Reference	• VIPADISTRIBUTE • SRCIP statement
z/OS Communications Server: IP System Administrator's Commands	• Netstat VDPT/-O report • Netstat VCRT/-V report • Netstat VIPADCFG/-F report • Parameters under VARY TCPIP,,SYSPLEX
z/OS Communications Server: IP Programmer's Guide and Reference	TCP/IP profile record distributed dynamic VIPA (DVIPA) section
z/OS Communications Server: IP Messages Volume 2 (EZB, EZD)	• EZD2065I • EZD2071E • EZD2072I • EZD2073I
z/OS Communications Server: IP Messages Volume 4 (EZZ, SNM)	• EZZ0326I • EZZ2397I

Table 23. All related topics about Sysplex Distributor support for IBM z/OS Control Plane Appliances (continued)

Book name	Topics
z/OS Release Upgrade Reference Summary	New and changed System Management Facilities (SMF) records for z/OS 3.2

Network support for IBM z/OS Container Platform

Communications Server has added network support for IBM z/OS Container Platform.

IBM z/OS Container Platform is an enterprise-ready platform for running containerized applications on z/OS. It provides the ability to build and deploy z/OS applications as containers on z/OS.

Communications Server provides network support for IBM z/OS Container Platform workloads by introducing a new type of VIPARANGE dynamic VIPA (DVIPA) called ZCONTainer. A ZCONTainer DVIPA provides network access for a Pod or a container when a container image is started on z/OS. To reserve ports for applications running in IBM z/OS Container Platform environments, a new jobname (BCZ-CNTR) specification can be defined on the PORT and PORTRANGE statements in the TCP/IP profile.

Communications Server also enhances support for LE and UNIX System Services (USS) Callable Services APIs, as well as System Resolver APIs and the Netstat application.

- The `getsockopt()` and `setsockopt()` LE APIs and BPX1OPT and BPX4OPT USS APIs are enhanced to support a new option to retrieve and set the time-to-live field in the IP header that is used for every packet sent from the TCP or UDP socket connection.
- New support is added for the `clone()`, `unshare()` and `setns()` LE APIs and BPX1CLN, BPX1UNS, and BPX1SNS USS APIs to create/join a UNIX Time Sharing (UTS) namespace for a USS process.
- The `gethostname()` LE API, BPX1HST and BPX4HST USS APIs and System Resolver APIs are enhanced to support the UTS namespace and to retrieve the hostname associated with that namespace.
- New support is added for the `sethostname()` LE API and BPX1HST and BPX4HST USS APIs to set a new hostname in the UTS namespace associated with a z/OS Container.
- System Resolver is enhanced to change the search order for resolver configuration for USS processes running in an IBM z/OS Container Platform environment.
- Netstat is enhanced to display network information specific to a z/OS container when called from within an IBM z/OS Container Platform environment.

Restriction: IBM z/OS Container Platform support is added for LE APIs, USS Callable Services APIs, and System Resolver APIs only.

Dependencies:

The z/OS 3.1 and V2R5 Communication Server support for IBM z/OS Container Platform has dependencies on LE, USS and the IBM z/OS Container Platform function. Here's a list of LE and USS APARs:

- IP_TTL and `gethostname()/sethostname()` dependencies - USS OA61799 and LE PH42264
- UTS namespace, `clone()/unshare()/setns()` support - USS APAR OA61972, USS APAR OA62757 and LE APAR PH40094
- Container ID support - USS APAR OA62281

Note: The Network Configuration Assistant (NCA) cannot be used to update the TCP/IP profile. If you are currently using NCA to manage your TCP/IP profile, the recommended method to configure these new VIPARANGE DVIPAs is to create a new TCP/IP profile data set that has an INCLUDE statement for the NCA-generated TCP/IP profile data set, followed by an INCLUDE statement for a second TCP/IP profile data set with the VIPARANGE DVIPA ZCONTainer definitions. See [z/OS Communications Server: IP Configuration Reference](#) for more information about the INCLUDE statement.

Using APIs and System Resolver support for IBM z/OS Container Platform

To use APIs and System Resolver support for IBM z/OS Container Platform, complete the appropriate tasks in [Table 24 on page 30](#).

Table 24. Task topics to enable APIs and System Resolver support for IBM z/OS Container Platform	
Task	Reference
To set or retrieve the time-to-live value for a socket, issue the setsockopt()/getsockopt() API with the new IP_TTL option	• See getsockopt and setsockopt in z/OS C/C++ Runtime Library Reference • See BPX1OPT and BPX4OPT in z/OS UNIX System Services Programming Tools
To create/join a UTS namespace for an IBM z/OS Container Platform environment or a USS process, issue the clone(), unshare() or setns() API	• See clone(), unshare() and setns() in z/OS C/C++ Runtime Library Reference • See BPX1CLN, BPX1UNS, and BPX1SNS in z/OS UNIX System Services Programming Tools
To obtain the hostname for an IBM z/OS Container Platform environment or a USS process with a UTS namespace, issue the gethostname() API	• See gethostname() in z/OS C/C++ Runtime Library Reference • See BPX1HST and BPX4HST in z/OS UNIX System Services Programming Tools
To set a new hostname for an IBM z/OS Container Platform environment or a USS process with a UTS namespace, issue the sethostname() API	• See sethostname() in z/OS C/C++ Runtime Library Reference • See BPX1HST and BPX4HST in z/OS UNIX System Services Programming: Assembler Callable Services Reference
Review the files used to obtain resolver configuration information for IBM z/OS Container Platform environments	• z/OS Communications Server: IP Configuration Reference: – Resolver setup statements – Resolver configuration statements for environments • z/OS Communications Server: IP Configuration Guide: – search orders used in the z/OS UNIX environment – z/OS XL C/C++ environment variables for configuration files • z/OS C/C++ Runtime Library Reference: – __iptcpn() – __iphost() • z/OS C/C++ Runtime Library Reference and z/OS UNIX System Services Programming: Assembler Callable Services Reference – gethostbyaddr(), gethostbyname(), getaddrinfo(), getnameinfo(), freeaddrinfo(), sethostent(), gethostent(), and endhostent() resolver calls • z/OS Communications Server: IP Diagnosis Guide: – diagnosing resolver problems

Table 24. Task topics to enable APIs and System Resolver support for IBM z/OS Container Platform (continued)	
Task	Reference
Use the netstat command to obtain information relevant to a z/OS container environment	z/OS Communications Server: IP System Administrator's Commands : • Netstat command • The Netstat parameter overview • Netstat report details and examples

Using network support for IBM z/OS Container Platform workloads

To use network support for IBM z/OS Container Platform workloads, complete the appropriate tasks in [Table 25 on page 31](#).

Table 25. Task topics to enable network support for IBM z/OS Container Platform workloads	
Task	Reference
Configure a range of dynamic VIPAs per address family to be assigned to IBM z/OS Container Platform environments • Define a VIPARANGE for IPv4 and/or IPv6 with the new ZCONTAINER keyword	VIPARANGE statement in z/OS Communications Server: IP Configuration Reference
Display VIPARANGE configuration settings for IBM z/OS Container Platform environments • Issue the Netstat VIPADCFG/-F command	Netstat VIPADCFG/-F report in z/OS Communications Server: IP System Administrator's Commands
Display the current dynamic VIPA information for IBM z/OS Container Platform environments • Issue the Netstat VIPADyn/-V command	Netstat VIPADyn/-v report in z/OS Communications Server: IP System Administrator's Commands
Reserve ports for IBM z/OS Container Platform environments with the PORT or PORTRANGE statement and the new jobname value BCZ-CNTR	z/OS Communications Server: IP Configuration Reference : • PORT statement • PORTRANGE
Display the list of reserved ports for IBM z/OS Container Platform environments • Issue the Netstat PORTLIST/-o command	Netstat PORTList/-o report in z/OS Communications Server: IP System Administrator's Commands
Use the z/OS UNIX netstat command from within an IBM z/OS Container Platform environment to obtain information relevant to this container/Pod. The following netstat report options are supported: netstat -? -A -a -b -c -d -h -r -s	z/OS Communications Server: IP System Administrator's Commands : • Netstat command • The Netstat parameter overview • Netstat report details and examples

Chapter 3. Communications Server interface changes for z/OS 3.2

This topic includes the Communications Server interface changes for z/OS 3.2.

In addition to the interface changes included in this topic, refer to the following topics in the z/OS 3.2 Release Upgrade Reference Summary for additional information.

- *New and changed members in SYS1.MACLIB for z/OS 3.2*
- *New and changed SYS1.PARMLIB members for z/OS 3.2*
- *New and changed System Management Facilities (SMF) records for z/OS 3.2*

The Communications Server interface changes described in this topic are:

- [“Communications Server IP interface changes” on page 33](#)
- [“Communications Server SNA interface changes” on page 48](#)

The tables in this topic contain a **Reason for change** column that provides the name of the related functional enhancement.

Communications Server IP interface changes

This topic describes the following Communications Server IP interfaces:

- [“PROFILE.TCPIP configuration file” on page 34](#)
 - [“PROFILE.TCPIP statement and parameter changes” on page 34](#)
- [“Configuration files” on page 35 \(other than PROFILE.TCPIP\)](#)
 - [“FTP client configuration statements” on page 35](#)
 - [“FTP server configuration statements” on page 35](#)
 - [“TN3270E Telnet server PROFILE configuration file” on page 35](#)
 - [“BEGINVTAM information block” on page 36](#)
 - [“TELNETGLOBALS information block” on page 36](#)
 - [“TELNETPARMS information block” on page 36](#)
 - [“General updates for the non-PROFILE.TCPIP IP configuration files” on page 36](#)
- [“RACF interfaces” on page 37](#)
- [“Operator commands” on page 37](#)
 - [“Netstat operator commands \(DISPLAY TCPIP,,NETSTAT\)” on page 37](#)
 - [“TN3270E Telnet server operator commands” on page 38](#)
 - [“General updates of IP operator commands” on page 38](#)
- [“TSO commands” on page 38](#)
 - [“NETSTAT TSO commands” on page 39](#)
 - [“FTP TSO and z/OS UNIX commands” on page 39](#)
 - [“FTP subcommands” on page 40](#)
 - [“General updates of TSO commands” on page 40](#)
- [“z/OS UNIX commands” on page 40](#)
 - [“Netstat UNIX commands” on page 40](#)
 - [“General updates of z/OS UNIX commands” on page 41](#)

- [“Application programming interfaces and network management interfaces” on page 41](#)
 - [“FTP client API FCAI control block” on page 42](#)
 - [“FTP client API for REXX predefined variables” on page 42](#)
 - [“Local IPsec NMI” on page 42](#)
 - [“Network security services NMI” on page 42](#)
 - [“Real-time application-controlled TCP/IP trace NMI \(EZBRCIFR\)” on page 42](#)
 - [“Real-time network monitoring TCP/IP NMI” on page 42](#)
 - [“Resolver callable NMI \(EZBREIFR\)” on page 43](#)
 - [“SNMP manager API” on page 43](#)
 - [“Syslog daemon name/token pair” on page 43](#)
 - [“TCP/IP callable NMI \(EZBNMIFR\)” on page 43](#)
 - [“Trace formatting NMI \(EZBCTAPI\)” on page 44](#)
 - [“Trusted TCP connections API for Java” on page 44](#)
- [“Environment variables” on page 44](#)
- [“Socket APIs” on page 44](#)
 - [“General updates of socket APIs” on page 45](#)
- [“IPCS subcommands” on page 45](#)
 - [“CTRACE COMP\(SYSTCPDA\) subcommand” on page 45](#)
 - [“CTRACE COMP\(SYSTCPIS\) subcommand” on page 45](#)
 - [“CTRACE COMP\(SYSTCPOT\) subcommand” on page 45](#)
 - [“CTRACE COMP\(SYSTCPRE\) subcommand” on page 45](#)
 - [“TCPIPCS subcommand” on page 45](#)
 - [“General updates to IPCS subcommands” on page 46](#)
- [“SNMP MIB modules” on page 46](#)
- [“User exits” on page 46](#)
- [“Application data” on page 46](#)
- [“FTP client error codes” on page 47](#)
- [“SMF record type 119 enhancements” on page 47](#)
- [“z/OS UNIX ” on page 47](#)
- [“General updates of IP interfaces” on page 47](#)
- [“Samples provided in MVS data set SEZAINST” on page 47](#)
- [“Samples provided in z/OS UNIX TCPIP directory” on page 47](#)

PROFILE.TCPIP configuration file

This topic contains the PROFILE.TCPIP statement and parameter changes.

PROFILE.TCPIP statement and parameter changes

Table 26 on page 35 lists the new and updated Communications Server PROFILE.TCPIP configuration statements and parameters. See [z/OS Communications Server: IP Configuration Reference](#) for more detailed information.

Table 26. New and changed Communications Server PROFILE.TCPIP configuration statements and parameters for z/OS 3.2

Statement	Description	Reason for change
GLOBALCONFIG	New parameter AIASSIST with subparameters BATCHOUTBOUND and NOBATCHOUTBOUND	AI-powered network outbound packet batching
EQENET	New INTERFACE statement to specify a Network Express Enhanced QDIO Ethernet interface for IPv4.	Support for Network Express feature on IBM z17
EQENET6	New INTERFACE statement to specify a Network Express Enhanced QDIO Ethernet interface for IPv6.	Support for Network Express feature on IBM z17
IPAQENET	New DEVNUM keyword added to this IPv4 statement to allow for a migration case where a profile can be used on either z17 or an earlier machine.	Support for Network Express feature on IBM z17
IPAQENET6	New DEVNUM keyword added to this IPv6 statement to allow for a migration case where a profile can be used on either z17 or an earlier machine.	Support for Network Express feature on IBM z17

Configuration files

This topic includes information about the following configuration statements and files:

- [“FTP client configuration statements” on page 35](#)
- [“FTP server configuration statements” on page 35](#)
- [“TN3270E Telnet server PROFILE configuration file” on page 35](#)
- [“General updates for the non-PROFILE.TCPIP IP configuration files” on page 36](#)

The Communications Server PROFILE.TCPIP configuration file updates are in a separate topic; see [“PROFILE.TCPIP configuration file” on page 34](#).

See [z/OS Communications Server: IP Configuration Reference](#) for more detailed information about all of the Communications Server IP configuration files and statements.

FTP client configuration statements

Table 27. New and changed Communications Server FTP client configuration statements for z/OS 3.2

Statement	Description	Reason for change
TLSV1	New statement for the FTP client when TLSMECHANISM FTP	TLS default update

FTP server configuration statements

There are no new and changed FTP server configuration statements for this release.

TN3270E Telnet server PROFILE configuration file

During initialization of the TN3270E Telnet server (Telnet) address space, configuration parameters are read from a configuration PROFILE data set. The PROFILE data set is used to configure Telnet to accept or

reject connection requests. You can update the PROFILE data set to change or add statements to support new functions, or to change or add usage rules.

This topic includes tables with the descriptions of the new and changed Telnet PROFILE configuration statements. See [z/OS Communications Server: IP Configuration Reference](#) for complete information on configuration statements and the PROFILE statement.

BEGINVTAM information block

There is no new and changed BEGINVTAM information block for this release.

TELNETGLOBALS information block

There is no new and changed TELNETGLOBALS information block for this release.

TELNETPARMS information block

There is no new and changed TELNETPARMS information block for this release.

General updates for the non-PROFILE.TCPIP IP configuration files

Table 28 on page 36 lists the general updates for the Communications Server IP configuration files.

<i>Table 28. New and changed non-PROFILE.TCPIP configuration files for z/OS3.2</i>			
File	Statement / Entry	Description	Reason for change
CSSMTP	Options	A new parameter ReplaceSubjectAtSign is added.	ReplaceSubjectAtSign configuration option for CSSMTP
CSSMTP	TargetServer	A new optional parameter AuthEntity is added	SMTP AUTH support for CSSMTP
Policy agent configuration	TTLSGskAdvancedParms	New parameter CrISigAlgPairs	TLS default update
	- TTLSEnvironmentAdvancedParms - TTLSConnectionAdvancedParms	Change to default for the following parameters: • TLSv1 • TLSv1.1 • TLSv1.2	
	TTLSSignatureParms	Change to default for the following parameters: • ClientECurves • SignaturePairs	
	ServerConnection	New parameters: • ServerTLSv1 • ServerTLSv1.1 • ServerTLSv1.2	
	ZERTKeyExchange	New values defined for SSHKeyExchange parameter	zERT support for z/OS 3.2 OpenSSH upgrade

RACF interfaces

Table 29 on page 37 lists the functions for which new or changed RACF® support is available. Sample RACF commands to change the RACF configuration can be found in one of the following members of the installation data set, SEZAINST:

- EZARACF - Contains sample commands for environments where multilevel security is not configured.
- EZARACFM - Contains sample commands for environments where multilevel security is configured.

You can use the function name from the table to search EZARACF for all the commands necessary for the function. See [z/OS Communications Server: IP Configuration Guide](#) for more information for each function.

Table 29. New and changed Communications Server RACF interfaces for z/OS 3.2		
Function name	Description	Reason for change
CSSMTP	RACF sample is updated to include the instructions to configure the username and the password for the AuthEntity option configured on the CSSMTP TargetServer statement.	SMTP AUTH support for CSSMTP
MVS.SERVMgr.DMD	New SAF resource defined in the OPERCMDS class	Control users allowed to start DMD

Operator commands

This topic includes information about the following Communications Server IP operator commands:

- “Netstat operator commands (DISPLAY TCPIP,,NETSTAT)” on page 37
- “TN3270E Telnet server operator commands” on page 38
- “General updates of IP operator commands” on page 38

See [z/OS Communications Server: IP System Administrator's Commands](#) for more detailed information.

Netstat operator commands (DISPLAY TCPIP,,NETSTAT)

Table 30 on page 37 lists the new and updated Communications Server IP Netstat operator command DISPLAY TCPIP,,NETSTAT. See “General updates of IP operator commands” on page 38 for the other Communications Server IP operator command entries.

See [z/OS Communications Server: IP System Administrator's Commands](#) for more detailed information about the Communications Server IP operator commands.

All parameters in the following table are for the DISPLAY TCPIP,,NETSTAT operator command.

Table 30. New and changed Communications Server Netstat operator commands (DISPLAY TCPIP,,NETSTAT) for z/OS 3.2		
Parameters	Description	Reason for change
ARP	Displays information about ARP entries for the EQENET interfaces	Support for Network Express feature on IBM z17
CONFIG	Displays an AIAssist section with “BatchOut: Yes” or “BatchOut: No” depending on what is configured on the GLOBALCONFIG statement.	AI-powered network outbound packet batching
DEVLINKS	Displays if AI-powered network outbound packet batching is enabled and whether training is required for the AI model.	AI-powered network outbound packet batching

Table 30. New and changed Communications Server Netstat operator commands (DISPLAY TCPIP,,NETSTAT) for z/OS 3.2 (continued)

Parameters	Description	Reason for change
DEVLINKS	Displays information about the EQENET/ EQENET6 interfaces.	Support for Network Express feature on IBM z17
ND	Displays information about Neighbor Discovery entries for the EQENET6 interfaces.	Support for Network Express feature on IBM z17
TTLS CONN DETAIL	New parameter CrlSigAlgPairs is displayed for the environment action, if configured.	TLS default update
VCRT	The "XCF Address" and "DestXCF" text has been changed to "Target" in the short and long format displays.	Sysplex Distributor support for IBM z/OS Control Plane Appliances
VDPT	This display will now show a new flag for the new Sysplex Distributor support for external targets (EXT for long format or X for short). The "XCF Address" and "DestXCF" text has been changed to "Target" in the short and long format displays.	Sysplex Distributor support for IBM z/OS Control Plane Appliances
VIPADCFG	This display will now show a flag (EXT for long format or X for short) for the new EXTARG keyword on the VIPADISTRIBUTE configuration statement related to external target distribution. The "XCF Address" and "DestXCF" text has been changed to "Target" in the short and long format displays.	Sysplex Distributor support for IBM z/OS Control Plane Appliances

TN3270E Telnet server operator commands

There are no new or changed TN3270E Telnet server operator commands for this release.

General updates of IP operator commands

Table 31 on page 38 lists the new and updated Communications Server IP operator commands, **except** the Netstat operator command DISPLAY TCPIP,,NETSTAT and the Telnet operator commands. See the following tables for those commands:

- [Table 30 on page 37](#), IP Netstat operator commands (DISPLAY TCPIP,,NETSTAT)
- [“TN3270E Telnet server operator commands” on page 38](#), Telnet operator commands

Table 31. New and changed Communications Server operator commands for z/OS 3.2

Command	Parameters	Description	Reason for change
DISPLAY TCPIP,,OSAINFO	OSAINFO	Displays information retrieved directly from the Network Express (OSH) adapter.	Support for Network Express feature on IBM z17

TSO commands

This topic includes information about the following TSO commands:

- [“NETSTAT TSO commands” on page 39](#)
- [“FTP TSO and z/OS UNIX commands” on page 39](#)

See [z/OS Communications Server: IP System Administrator's Commands](#) for more detailed information about the Communications Server TSO commands.

NETSTAT TSO commands

Table 32 on page 39 lists the new and updated Communications Server NETSTAT TSO command.

See [z/OS Communications Server: IP System Administrator's Commands](#) for more detailed information about the Communications Server TSO commands.

Table 32. New and changed Communications Server NETSTAT TSO commands for z/OS 3.2		
Parameter	Description	Reason for change
ARP	Display information about ARP entries for the EQENET interfaces	Support for Network Express feature on IBM z17
CONFIG	Displays an AIAssist section with “BatchOut: Yes” or “BatchOut: No” depending on what is configured on the GLOBALCONFIG statement.	AI-powered network outbound packet batching
DEVLINKS	Displays if AI-powered network outbound packet batching is enabled and whether training is required for the AI model.	AI-powered network outbound packet batching
DEVLINKS	Display information about the EQENET/ EQENET6 interfaces.	Support for Network Express feature on IBM z17
ND	Display information about Neighbor Discovery entries for the EQENET6 interfaces.	Support for Network Express feature on IBM z17
TTLS CONN DETAIL	New parameter CrlSigAlgPairs is displayed for the environment action, if configured.	TLS default update
VCRT	The "XCF Address" and "DestXCF" text has been changed to "Target" in the short and long format displays.	Sysplex Distributor support for IBM z/OS Control Plane Appliances
VDPT	This display will now show a new flag for the new Sysplex Distributor support for external targets (EXT for long format or X for short). The "XCF Address" and "DestXCF" text has been changed to "Target" in the short and long format displays.	Sysplex Distributor support for IBM z/OS Control Plane Appliances
VIPADCFG	This display will now show a flag (EXT for long format or X for short) for the new EXTARG keyword on the VIPADISTRIBUTE configuration statement related to external target distribution. The "XCF Address" and "DestXCF" text has been changed to "Target" in the short and long format displays.	Sysplex Distributor support for IBM z/OS Control Plane Appliances

FTP TSO and z/OS UNIX commands

There are no new or changed FTP TSO and z/OS UNIX commands for this release.

FTP subcommands

There are no new or changed FTP subcommands for this release.

General updates of TSO commands

There are no general updates of TSO commands for this release.

z/OS UNIX commands

“General updates of z/OS UNIX commands” on page 41 lists the new and updated z/OS UNIX commands, except the z/OS UNIX FTP commands, and the z/OS UNIX netstat commands. See the following tables for those commands:

- “FTP subcommands” on page 40, FTP TSO and z/OS UNIX commands
- Table 33 on page 40, z/OS UNIX netstat commands

See [z/OS Communications Server: IP System Administrator's Commands](#) for more detailed information about the Communications Server UNIX commands.

Netstat UNIX commands

Table 33 on page 40 lists the new and updated Communications Server z/OS UNIX netstat command. See “General updates of z/OS UNIX commands” on page 41 for the other (the non-netstat) z/OS UNIX command entries.

See [z/OS Communications Server: IP System Administrator's Commands](#) for more detailed information about the z/OS UNIX commands.

All parameters in the following table are for the z/OS UNIX netstat command.

Table 33. New and changed Communications Server z/OS UNIX netstat commands for z/OS 3.2		
Parameter	Description	Reason for change
-F	This display will now show a flag (EXT for long format or X for short) for the new EXTARG keyword on the VIPADISTRIBUTE configuration statement related to external target distribution. The "XCF Address" and "DestXCF" text has been changed to "Target" in the short and long format displays.	Sysplex Distributor support for IBM z/OS Control Plane Appliances
-O	This display will now show a new flag for the new Sysplex Distributor support for external targets (EXT for long format or X for short). The "XCF Address" and "DestXCF" text has been changed to "Target" in the short and long format displays.	Sysplex Distributor support for IBM z/OS Control Plane Appliances
-R	Display information about ARP entries for the EQENET interfaces	Support for Network Express feature on IBM z17
-V	The "XCF Address" and "DestXCF" text has been changed to "Target" in the short and long format displays.	Sysplex Distributor support for IBM z/OS Control Plane Appliances
-d	Display information about the EQENET/EQENET6 interfaces.	Support for Network Express feature on IBM z17

Table 33. New and changed Communications Server z/OS UNIX netstat commands for z/OS 3.2 (continued)		
Parameter	Description	Reason for change
-d	Displays if AI-powered network outbound packet batching is enabled and whether training is required for the AI model.	c
-f	Displays an AIAssist section with “BatchOut: Yes” or “BatchOut: No” depending on what is configured on the GLOBALCONFIG statement.	AI-powered network outbound packet batching
-n	Display information about Neighbor Discovery entries for the EQENET6 interfaces.	Support for Network Express feature on IBM z17
-x CONN DETAIL	New parameter CrlSigAlgPairs is displayed for the environment action, if configured.	TLS default update

General updates of z/OS UNIX commands

Table 34 on page 41 lists the new and updated Communications Server z/OS UNIX non-netstat command.

See [z/OS Communications Server: IP System Administrator's Commands](#) for more detailed information about the z/OS UNIX commands.

All parameters in the following table are for the z/OS UNIX non-netstat command.

Table 34. New and changed Communications Server z/OS UNIX commands for z/OS 3.2			
Command	Parm	Description	Reason for change
pasearch	-t	The new parameter CrlSigAlgPairs is displayed for the environment action, if configured	TLS default update
	-z	New values is displayed for the SSH key exchange methods	zERT support for z/OS 3.2 OpenSSH upgrade

Application programming interfaces and network management interfaces

This topic includes updates made to the application programming interfaces (APIs) and network management interfaces (NMIs) documented in [z/OS Communications Server: IP Programmer's Guide and Reference](#). The following programming interfaces were updated:

- [“FTP client API FCAI control block” on page 42](#)
- [“FTP client API for REXX predefined variables” on page 42](#)
- [“Local IPsec NMI” on page 42](#)
- [“Network security services NMI” on page 42](#)
- [“Real-time application-controlled TCP/IP trace NMI \(EZBRCIFR\)” on page 42](#)
- [“Real-time network monitoring TCP/IP NMI” on page 42](#)
- [“Resolver callable NMI \(EZBREIFR\)” on page 43](#)
- [“SNMP manager API” on page 43](#)
- [“Syslog daemon name/token pair” on page 43](#)
- [“TCP/IP callable NMI \(EZBNMIFR\)” on page 43](#)

- [“Trace formatting NMI \(EZBCTAPI\)” on page 44](#)
- [“Trusted TCP connections API for Java” on page 44](#)

See [z/OS Communications Server: IP Programmer's Guide and Reference](#) for more detailed API information.

FTP client API FCAI control block

There is no new or changed FTP client API FCAI control block for this release.

FTP client API for REXX predefined variables

There is no new or changed FTP client API for REXX predefined variable for this release.

Local IPsec NMI

There is no new or changed local IPsec NMI for this release.

Network security services NMI

There is no new or changed Network security services NMI for this release.

Real-time application-controlled TCP/IP trace NMI (EZBRCIFR)

There is no new or changed Real-time application-controlled TCP/IP trace NMI (EZBRCIFR) for this release.

Real-time network monitoring TCP/IP NMI

Table 35 on page 42 lists the updates to the Communications Server real-time TCP/IP network monitoring NMI. For changes to SMF 119 records provided by SYSTCPSP, SYSTPCPN, SYSTCPEP, and SYSTCPES real-time NMIs, see [“SMF record type 119 enhancements” on page 47](#).

Table 35. New Communications Server real-time TCP/IP NMI for z/OS 3.2			
NMI	Request/response	Description	Reason for change
Real-time zERT detail SMF NMI (SYSTCPEP)	zERT connection detail record (subtype 11)	New values for SMF119SC_SSH_Kex_Method, SMF119SC_SSH_SKey_Type, and SMF119SC_SSH_CKey_Type	zERT support for z/OS 3.2 OpenSSH upgrade
Real-time zERT summary SMF NMI (SYSTCPES)	zERT summary record (subtype 12)	New values for SMF119SS_SSH_Kex_Method, SMF119SS_SSH_SKey_Type, and SMF119SS_SSH_CKey_Type	zERT support for z/OS 3.2 OpenSSH upgrade
Real-time SMF NMI (SYSTCPSP)	SMF type 119, subtype 48	New flag, SMF119ML_CF_MailbxCmptblty added. New field SMF119ML_CF_RptSysoutCls added. New variable-length configuration options added as CSSMTP configuration data sections with the following key values (SMF119ML_CD_Key): • SMF119ML_CD_RptMIFrom • SMF119ML_CD_AuthEnty1 • SMF119ML_CD_AuthEnty2 • SMF119ML_CD_AuthEnty3 • SMF119ML_CD_AuthEnty4	SMTP AUTH support for CSSMTP

Table 35. New Communications Server real-time TCP/IP NMI for z/OS 3.2 (continued)			
NMI	Request/response	Description	Reason for change
Real-time zERT detail SMF NMI (SYSTCPR)	zERT connection detail record (subtype 11)	- New flags in SMF119SC_SAFIags - New value for SMF119SC_TLS_Neg_Cipher - New value for SMF119SC_SSH_Prot_Ver - New value for SMF119SC_TLS_Handshake_Type - New flags SMF119SC_SSH_Flags	zERT monitoring enhancements
Real-time zERT summary SMF NMI (SYSTCPES)	zERT summary record (subtype 12)	New fields: - SMF119SS_SAIInitFailedHsConnCnt - SMF119SS_SAEEndFailedHsConnCnt - SMF119SS_TLS_SCert_Serial_Len - SMF119SS_TLS_SCert_Serial - SMF119SS_TLS_SCert_Time_Type - SMF119SS_TLS_SCert_Time - SMF119SS_TLS_CCert_Serial_Len - SMF119SS_TLS_CCert_Serial - SMF119SS_TLS_CCert_Time_Type - SMF119SS_TLS_CCert_Time - SMF119SS_IPSec_LclCert_Serial_Len - SMF119SS_IPSec_LclCert_Serial - SMF119SS_IPSec_LclCert_Time_Type - SMF119SS_IPSec_LclCert_Time - SMF119SS_IPSec_RmtCert_Serial_Len - SMF119SS_IPSec_RmtCert_Serial - SMF119SS_IPSec_RmtCert_Time_Type - SMF119SS_IPSec_RmtCert_Time	zERT monitoring enhancements

Resolver callable NMI (EZBREIFR)

There is no new or changed Resolver callable NMI (EZBREIFR) for this release.

SNMP manager API

There is no new or changed SNMP manager API for this release.

Syslog daemon name/token pair

There is no new or changed syslog daemon name/token pair for this release.

TCP/IP callable NMI (EZBNMIFR)

Table 36 on page 43 lists the updates to the Communications Server TCP/IP callable NMI.

Table 36. New Communications Server TCP/IP callable NMI (EZBNMIFR) for z/OS 3.2.			
Request	Parameter/output	Description	Reason for change
GetProfile	NMTP_GBCFAIAssist	A new flag is added: NMTP_GBCFBatchOutbound If set, AI-powered network outbound packet batching is configured	AI-powered network outbound packet batching

Table 36. New Communications Server TCP/IP callable NMI (EZBNMIFR) for z/OS 3.2. (continued)			
Request	Parameter/output	Description	Reason for change
GetProfile		New value or flags added: NMTP_INTFTYPE, NMTP_INTFFlags, and NMTP_INTFChpIDType Updates to existing fields documented as valid for an EQIO interface.	Support for Network Express feature on IBM z17
GetIfs		New value added: NWMIfType New field added: NWMIfEQEOsaCodeLevel Updates to existing fields documented as valid for an EQDIO interface.	Support for Network Express feature on IBM z17
GetIfStats		New value added: NWMIfStType New field added: NWMIfStTotReadStor Updates to existing fields documented as valid for an EQDIO interface.	Support for Network Express feature on IBM z17
GetRnics		New value added: NWMRnicBGenNExp Updates to existing fields documented as valid for an EQDIO interface.	Support for Network Express feature on IBM z17
Getsmclinks		Updates to existing fields documented as valid for an EQDIO interface.	Support for Network Express feature on IBM z17
GetIsms		Updates to existing fields documented as valid for an EQDIO interface.	Support for Network Express feature on IBM z17
GetDVIPAList	NWMDvListFlags	A new flag, NMTP_DVCFZCONTSet is added. If set, the ZCONTAINER parameter is specified on the VIPARANGE statement.	Network support for IBM z/OS Container Platform
GetProfile	NMTP_DDVSFlags	A new flag, NMTP_DDVSEXTTARG, is added. If set, the DVIPA is used to distribute requests to non-z/OS (external) targets.	Sysplex Distributor support for IBM z/OS Control Plane Appliances

Trace formatting NMI (EZBCTAPI)

There is no new or changed trace formatting NMI (EZBCTAPI) for this release.

Trusted TCP connections API for Java

There is no new or changed trusted TCP connections API for Java™ for this release.

General updates of other NMI or API

There is no new or changed general update for other NMI or API for this release.

Environment variables

There is no new or changed general update for environment variables for this release.

Socket APIs

This topic includes information about Communications Server socket APIs.

Refer to the following documents for more information about socket APIs:

- For complete documentation of the z/OS UNIX C sockets APIs, refer to [z/OS C/C++ Runtime Library Reference](#)
- For information about z/OS UNIX Assembler Callable Services, refer to [z/OS UNIX System Services Programming: Assembler Callable Services Reference](#)

- For information about TCP/IP socket APIs, refer to [z/OS Communications Server: IP Sockets Application Programming Interface Guide and Reference](#)
- For information about TCP/IP CICS sockets, refer to [z/OS Communications Server: IP CICS Sockets Guide](#)

General updates of socket APIs

There are no general updates of socket APIs for this release.

IPCS subcommands

This topic includes information about these IPCS subcommands:

- [“CTTRACE COMP\(SYSTCPDA\) subcommand” on page 45](#)
- [“CTTRACE COMP\(SYSTCPIS\) subcommand” on page 45](#)
- [“CTTRACE COMP\(SYSTCPOT\) subcommand” on page 45](#)
- [“CTTRACE COMP\(SYSTCPRE\) subcommand” on page 45](#)
- [“TCPIPCS subcommand” on page 45](#)
- [“General updates to IPCS subcommands” on page 46](#)

See [z/OS Communications Server: IP Diagnosis Guide](#) for more detailed IPCS subcommands information.

CTTRACE COMP(SYSTCPDA) subcommand

There are no new or changed CTRACE COMP(SYSTCPDA) subcommand options for this release.

CTTRACE COMP(SYSTCPIS) subcommand

There are no new or changed CTRACE COMP(SYSTCPIS) subcommand options for this release.

CTTRACE COMP(SYSTCPOT) subcommand

There are no new or changed CTRACE COMP(SYSTCPOT) subcommand options for this release.

CTTRACE COMP(SYSTCPRE) subcommand

There are no new or changed CTRACE COMP(SYSTCPRE) subcommand options for this release.

TCPIPCS subcommand

This topic describes the Communications Server TCPIPCS subcommand option changes for z/OS 3.2.

[Table 37 on page 45](#) lists the TCPIPCS subcommand options.

<i>Table 37. New and changed Communications Server TCPIPCS subcommand options for z/OS 3.2</i>		
Subcommand	Description	Reason for change
TCPIPCS PROFILE	Indicates AIASSIST BATCHOUTBOUND is configured on the GLOBALCONFIG statement of the TCP/IP profile.	AI-powered network outbound packet batching

<i>Table 37. New and changed Communications Server TCIPCS subcommand options for z/OS 3.2 (continued)</i>		
Subcommand	Description	Reason for change
PROFILE	Displays the new ZCONTAINER keyword for the VIPARANGE statement.	Network support for IBM z/OS Container Platform
	Indicates EXTTARG when configured in the TCP/IP profile. Indicates EXTTARG for dynamically created SRCIP when using external target distribution with local targets.	Sysplex Distributor support for IBM z/OS Control Plane Appliances
	INTERFACE statement to specify a Network Express Enhanced QDIO Ethernet interface for IPv4.	Support for Network Express feature on IBM z17
	INTERFACE statement to specify a Network Express Enhanced QDIO Ethernet interface for IPv6.	Support for Network Express feature on IBM z17
	DEVNUM keyword added to this IPv4 statement to allow for a migration case where a profile can be used on either z17 or an earlier machine.	Support for Network Express feature on IBM z17
	DEVNUM keyword added to this IPv6 statement to allow for a migration case where a profile can be used on either z17 or an earlier machine.	Support for Network Express feature on IBM z17
HASH (ZCDV	Displays the structure of the ZCONTAINER DVIPA hash tables	Network support for IBM z/OS Container Platform
HASH (UTS	Displays the structure of the UTS namespace hash tables	Network support for IBM z/OS Container Platform
TTLS	The new parameter CrlSigAlgPairs is formatted in a dump of the TCP/IP address space	TLS default update
XCF	Display DVIPA port hash table information for external target distribution.	Sysplex Distributor support for IBM z/OS Control Plane Appliances

General updates to IPCS subcommands

There are no general updates to IPCS subcommands for this release.

SNMP MIB modules

There are no new or changed SNMP MIB modules for this release.

User exits

There are no new or changed user exits for this release.

Application data

There are no new or changed application data for this release.

FTP client error codes

There are no new or changed FTP client error codes for this release.

SMF record type 119 enhancements

See [New and changed System Management Facilities \(SMF\) records for z/OS 3.2](#) in [New and changed System Management Facilities \(SMF\) records for z/OS 3.2](#) in [z/OS Release Upgrade Reference Summary](#) for information on new and changed SMF type 119 records.

See the [Type 119 SMF records](#) topic in [z/OS Communications Server: IP Programmer's Guide and Reference](#) for more information.

z/OS UNIX

Changes to z/OS UNIX /etc files are listed in [z/OS Upgrade Workflow](#).

General updates of IP interfaces

There are no general updates of IP interface for this release.

Samples provided in MVS data set SEZAINST

[Table 38 on page 47](#) lists the changes to the samples that are provided in MVS data set SEZAINST.

Table 38. IP samples provided in MVS data set SEZAINST for z/OS 3.2		
Member	Description	Reason for change
CSSMTPCF	This CSSMTP sample configuration file is updated to add information about the AuthEntity parameter.	SMTP AUTH support for CSSMTP
EZAFTPAC	The sample is updated with the new TLSV1 parameter.	TLS default update
EZARACF	This RACF sample file is updated to include the instructions to configure the username and the password for the AuthEntity configured on the CSSMTP TargetServer statement.	SMTP AUTH support for CSSMTP
	New SAF resource, MVS.SERVMGR.DMD, defined in the OPERCMDS class	Control users allowed to start DMD
EZBAINSQ	New sample RACF job for securing EzNoSQL database	AI-powered network outbound packet batching

Samples provided in z/OS UNIX TCPIP directory

[Table 39 on page 47](#) lists the changes to the samples that are provided in z/OS UNIX directory /usr/lpp/tcpip/samples.

Table 39. IP samples provided in z/OS UNIX directory /usr/lpp/tcpip/samples for z/OS 3.2		
File name	Description	Reason for change
pagent.conf	The policy agent configuration file is updated with the new ServerTLSv1, ServerTLSv1.1, and ServerTLSv1.2 parameters	TLS default update

Communications Server SNA interface changes

This topic describes the following Communications Server SNA interfaces:

- [“Start options” on page 48](#)
- [“Start option behavior changes” on page 48](#)
- [“Definition statements” on page 48](#)
- [“Commands” on page 48](#)
- [“Command behavior changes” on page 49](#)
- [“VTAM internal trace entries” on page 49](#)
- [“VTAMMAP Formatted Dump changes” on page 49](#)
- [“Tuning statistics reports” on page 50](#)

Start options

Table 40 on page 48 lists the new or changed SNA start options.

Refer to [z/OS Communications Server: SNA Resource Definition Reference](#) for more information on start options.

Table 40. New and changed Communications Server start options for z/OS 3.2		
Start option	Description of update	Reason for change
INOPDUMP	Produce dumps for INOPs of EQDIO devices.	Support for Network Express feature on IBM z17
AIMON	Monitor EQDIO interfaces for missing interrupts.	Support for Network Express feature on IBM z17

Start option behavior changes

Table 41 on page 48 lists the SNA start options that have changed behavior.

For complete information about all SNA start options, refer to [z/OS Communications Server: SNA Resource Definition Reference](#).

Table 41. New and changed Communications Server start option behavior changes for z/OS 3.2		
Start option with changed behavior	Description of update	Reason for change
AIMON	Default changed from NONE to ALL.	Support for Network Express feature on IBM z17

Definition statements

There are no new or changed definition statements for this release.

Commands

Table 42 on page 49 lists the new and changed SNA commands.

For complete information about SNA commands, refer to the [z/OS Communications Server: SNA Operation](#).

Table 42. New and changed Communications Server commands in z/OS 3.2		
Command	Description	Reason for change
D NET,ID	Display dynamically created EQDIO TRLEs.	Support for Network Express feature on IBM z17
D NET,TRL	Display dynamically created EQDIO TRLEs with detailed information.	Support for Network Express feature on IBM z17
F PROCNAME,TNSTATS	Display tuning stats for EQDIO TRLEs.	Support for Network Express feature on IBM z17
MODIFY VTAMOPTS	You can modify the values for DSACTION, DSCOUNT, DSMONITR, and DSTRUST start options.	Support for Network Express feature on IBM z17
DISPLAY TCPIP, OSAINFO	Displays information retrieved directly from the Network Express (OSH) adapter.	Support for Network Express feature on IBM z17

Command behavior changes

Table 43 on page 49 lists the SNA commands that have changed behavior.

For complete information about SNA commands, refer to the [z/OS Communications Server: SNA Operation](#).

Table 43. New and changed Communications Server commands with changed behavior for z/OS 3.2		
Command	Description of behavior change	Reason for change
MODIFY procname,TRACE,TYPE=QDIOSYNC	Not supported for EQDIO TRLEs.	Support for Network Express feature on IBM z17
MODIFY procname,TRACE,TYPE=IO	Not supported for EQDIO TRLEs.	Support for Network Express feature on IBM z17
DISPLAY NET, EE command	When LIST=DETAIL is specified, message IST2029I is now issued for each of the five EE ports. Previously, IST2029I was displayed once per command.	Support for Network Express feature on IBM z17

VTAM internal trace entries

For complete information about VIT entries, see [z/OS Communications Server: SNA Diagnosis Vol 2, FFST Dumps and the VIT](#).

Table 44 on page 49 lists the new and changed VIT entries.

Table 44. New and changed Communications Server VTAM internal trace (VIT) entries for z/OS 3.2		
VIT entry	Description	Reason for change
BPT/BPT2, ECPQ/SCPQ, EIRC, ODP1, RING, SPBT/SPB2, STAI/STA2/STA3	New: These entries are new.	Support for Network Express feature on IBM z17
AFSM, ASN2, ATTx, FIX2, FRB2, HIOx, IDXx, INTx, MPDU, ODPK, PAG2, PCIx, QAPL, QSRB, RDVx, SIOx, IUTx	Updated: These entries are updated.	Support for Network Express feature on IBM z17

VTAMMAP Formatted Dump changes

Table 45 on page 50 lists the new and changed VTAMMAP formatted dump functions.

<i>Table 45. New and changed Communications Server VTAMMAP Formatted Dump changes for z/OS 3.2</i>	
VTAMMAP function	Description
VTAMMAP SMCROCE	Supports RoCE devices defined using the Network Express feature.

Tuning statistics reports

There are no new and changed tuning statistics reports for this release.

Appendix A. Related protocol specifications

This appendix lists the related protocol specifications (RFCs) for TCP/IP. The Internet Protocol suite is still evolving through requests for comments (RFC). New protocols are being designed and implemented by researchers and are brought to the attention of the Internet community in the form of RFCs. Some of these protocols are so useful that they become recommended protocols. That is, all future implementations for TCP/IP are recommended to implement these particular functions or protocols. These become the *de facto* standards, on which the TCP/IP protocol suite is built.

RFCs are available at <http://www.rfc-editor.org/rfc.html>.

Draft RFCs that have been implemented in this and previous Communications Server releases are listed at the end of this topic.

Many features of TCP/IP Services are based on the following RFCs:

RFC

Title and Author

RFC 652

Telnet output carriage-return disposition option D. Crocker

RFC 653

Telnet output horizontal tabstops option D. Crocker

RFC 654

Telnet output horizontal tab disposition option D. Crocker

RFC 655

Telnet output formfeed disposition option D. Crocker

RFC 657

Telnet output vertical tab disposition option D. Crocker

RFC 658

Telnet output linefeed disposition D. Crocker

RFC 698

Telnet extended ASCII option T. Mock

RFC 726

Remote Controlled Transmission and Echoing Telnet option J. Postel, D. Crocker

RFC 727

Telnet logout option M.R. Crispin

RFC 732

Telnet Data Entry Terminal option J.D. Day

RFC 733

Standard for the format of ARPA network text messages D. Crocker, J. Vittal, K.T. Pogran, D.A. Henderson

RFC 734

SUPDUP Protocol M.R. Crispin

RFC 735

Revised Telnet byte macro option D. Crocker, R.H. Gumpertz

RFC 736

Telnet SUPDUP option M.R. Crispin

RFC 749

Telnet SUPDUP—Output option B. Greenberg

RFC 765

File Transfer Protocol specification J. Postel

- RFC 768**
User Datagram Protocol J. Postel
- RFC 779**
Telnet send-location option E. Killian
- RFC 791**
Internet Protocol J. Postel
- RFC 792**
Internet Control Message Protocol J. Postel
- RFC 793**
Transmission Control Protocol J. Postel
- RFC 820**
Assigned numbers J. Postel
- RFC 823**
DARPA Internet gateway R. Hinden, A. Sheltzer
- RFC 826**
Ethernet Address Resolution Protocol: Or converting network protocol addresses to 48.bit Ethernet address for transmission on Ethernet hardware D. Plummer
- RFC 854**
Telnet Protocol Specification J. Postel, J. Reynolds
- RFC 855**
Telnet Option Specification J. Postel, J. Reynolds
- RFC 856**
Telnet Binary Transmission J. Postel, J. Reynolds
- RFC 857**
Telnet Echo Option J. Postel, J. Reynolds
- RFC 858**
Telnet Suppress Go Ahead Option J. Postel, J. Reynolds
- RFC 859**
Telnet Status Option J. Postel, J. Reynolds
- RFC 860**
Telnet Timing Mark Option J. Postel, J. Reynolds
- RFC 861**
Telnet Extended Options: List Option J. Postel, J. Reynolds
- RFC 862**
Echo Protocol J. Postel
- RFC 863**
Discard Protocol J. Postel
- RFC 864**
Character Generator Protocol J. Postel
- RFC 865**
Quote of the Day Protocol J. Postel
- RFC 868**
Time Protocol J. Postel, K. Harrenstien
- RFC 877**
Standard for the transmission of IP datagrams over public data networks J.T. Korb
- RFC 883**
Domain names: Implementation specification P.V. Mockapetris
- RFC 884**
Telnet terminal type option M. Solomon, E. Wimmers

- RFC 885**
Telnet end of record option J. Postel
- RFC 894**
Standard for the transmission of IP datagrams over Ethernet networks C. Hornig
- RFC 896**
Congestion control in IP/TCP internetworks J. Nagle
- RFC 903**
Reverse Address Resolution Protocol R. Finlayson, T. Mann, J. Mogul, M. Theimer
- RFC 904**
Exterior Gateway Protocol formal specification D. Mills
- RFC 919**
Broadcasting Internet Datagrams J. Mogul
- RFC 922**
Broadcasting Internet datagrams in the presence of subnets J. Mogul
- RFC 927**
TACACS user identification Telnet option B.A. Anderson
- RFC 933**
Output marking Telnet option S. Silverman
- RFC 946**
Telnet terminal location number option R. Nedved
- RFC 950**
Internet Standard Subnetting Procedure J. Mogul, J. Postel
- RFC 952**
DoD Internet host table specification K. Harrenstien, M. Stahl, E. Feinler
- RFC 959**
File Transfer Protocol J. Postel, J.K. Reynolds
- RFC 961**
Official ARPA-Internet protocols J.K. Reynolds, J. Postel
- RFC 974**
Mail routing and the domain system C. Partridge
- RFC 1001**
Protocol standard for a NetBIOS service on a TCP/UDP transport: Concepts and methods NetBios Working Group in the Defense Advanced Research Projects Agency, Internet Activities Board, End-to-End Services Task Force
- RFC 1002**
Protocol Standard for a NetBIOS service on a TCP/UDP transport: Detailed specifications NetBios Working Group in the Defense Advanced Research Projects Agency, Internet Activities Board, End-to-End Services Task Force
- RFC 1006**
ISO transport services on top of the TCP: Version 3 M.T. Rose, D.E. Cass
- RFC 1009**
Requirements for Internet gateways R. Braden, J. Postel
- RFC 1011**
Official Internet protocols J. Reynolds, J. Postel
- RFC 1013**
X Window System Protocol, version 11: Alpha update April 1987 R. Scheifler
- RFC 1014**
XDR: External Data Representation standard Sun Microsystems
- RFC 1027**
Using ARP to implement transparent subnet gateways S. Carl-Mitchell, J. Quarterman

- RFC 1032**
Domain administrators guide M. Stahl
- RFC 1033**
Domain administrators operations guide M. Lottor
- RFC 1034**
Domain names—concepts and facilities P.V. Mockapetris
- RFC 1035**
Domain names—implementation and specification P.V. Mockapetris
- RFC 1038**
Draft revised IP security option M. St. Johns
- RFC 1041**
Telnet 3270 regime option Y. Rekhter
- RFC 1042**
Standard for the transmission of IP datagrams over IEEE 802 networks J. Postel, J. Reynolds
- RFC 1043**
Telnet Data Entry Terminal option: DODIIS implementation A. Yasuda, T. Thompson
- RFC 1044**
Internet Protocol on Network System's HYPERchannel: Protocol specification K. Hardwick, J. Lekashman
- RFC 1053**
Telnet X.3 PAD option S. Levy, T. Jacobson
- RFC 1055**
Nonstandard for transmission of IP datagrams over serial lines: SLIP J. Romkey
- RFC 1057**
RPC: Remote Procedure Call Protocol Specification: Version 2 Sun Microsystems
- RFC 1058**
Routing Information Protocol C. Hedrick
- RFC 1060**
Assigned numbers J. Reynolds, J. Postel
- RFC 1067**
Simple Network Management Protocol J.D. Case, M. Fedor, M.L. Schoffstall, J. Davin
- RFC 1071**
Computing the Internet checksum R.T. Braden, D.A. Borman, C. Partridge
- RFC 1072**
TCP extensions for long-delay paths V. Jacobson, R.T. Braden
- RFC 1073**
Telnet window size option D. Waitzman
- RFC 1079**
Telnet terminal speed option C. Hedrick
- RFC 1085**
ISO presentation services on top of TCP/IP based internets M.T. Rose
- RFC 1091**
Telnet terminal-type option J. VanBokkelen
- RFC 1094**
NFS: Network File System Protocol specification Sun Microsystems
- RFC 1096**
Telnet X display location option G. Marcy
- RFC 1101**
DNS encoding of network names and other types P. Mockapetris

- RFC 1112**
Host extensions for IP multicasting S.E. Deering
- RFC 1113**
Privacy enhancement for Internet electronic mail: Part I — message encipherment and authentication procedures J. Linn
- RFC 1118**
Hitchhikers Guide to the Internet E. Krol
- RFC 1122**
Requirements for Internet Hosts—Communication Layers R. Braden, Ed.
- RFC 1123**
Requirements for Internet Hosts—Application and Support R. Braden, Ed.
- RFC 1146**
TCP alternate checksum options J. Zweig, C. Partridge
- RFC 1155**
Structure and identification of management information for TCP/IP-based internets M. Rose, K. McCloghrie
- RFC 1156**
Management Information Base for network management of TCP/IP-based internets K. McCloghrie, M. Rose
- RFC 1157**
Simple Network Management Protocol (SNMP) J. Case, M. Fedor, M. Schoffstall, J. Davin
- RFC 1158**
Management Information Base for network management of TCP/IP-based internets: MIB-II M. Rose
- RFC 1166**
Internet numbers S. Kirkpatrick, M.K. Stahl, M. Recker
- RFC 1179**
Line printer daemon protocol L. McLaughlin
- RFC 1180**
TCP/IP tutorial T. Socolofsky, C. Kale
- RFC 1183**
New DNS RR Definitions C.F. Everhart, L.A. Mamakos, R. Ullmann, P.V. Mockapetris
- RFC 1184**
Telnet Linemode Option D. Borman
- RFC 1186**
MD4 Message Digest Algorithm R.L. Rivest
- RFC 1187**
Bulk Table Retrieval with the SNMP M. Rose, K. McCloghrie, J. Davin
- RFC 1188**
Proposed Standard for the Transmission of IP Datagrams over FDDI Networks D. Katz
- RFC 1190**
Experimental Internet Stream Protocol: Version 2 (ST-II) C. Topolcic
- RFC 1191**
Path MTU discovery J. Mogul, S. Deering
- RFC 1198**
FYI on the X window system R. Scheifler
- RFC 1207**
FYI on Questions and Answers: Answers to commonly asked “experienced Internet user” questions G. Malkin, A. Marine, J. Reynolds
- RFC 1208**
Glossary of networking terms O. Jacobsen, D. Lynch

RFC 1213

Management Information Base for Network Management of TCP/IP-based internets: MIB-II K. McCloghrie, M.T. Rose

RFC 1215

Convention for defining traps for use with the SNMP M. Rose

RFC 1227

SNMP MUX protocol and MIB M.T. Rose

RFC 1228

SNMP-DPI: Simple Network Management Protocol Distributed Program Interface G. Carpenter, B. Wijnen

RFC 1229

Extensions to the generic-interface MIB K. McCloghrie

RFC 1230

IEEE 802.4 Token Bus MIB K. McCloghrie, R. Fox

RFC 1231

IEEE 802.5 Token Ring MIB K. McCloghrie, R. Fox, E. Decker

RFC 1236

IP to X.121 address mapping for DDN L. Morales, P. Hasse

RFC 1256

ICMP Router Discovery Messages S. Deering, Ed.

RFC 1267

Border Gateway Protocol 3 (BGP-3) K. Lougheed, Y. Rekhter

RFC 1268

Application of the Border Gateway Protocol in the Internet Y. Rekhter, P. Gross

RFC 1269

Definitions of Managed Objects for the Border Gateway Protocol: Version 3 S. Willis, J. Burruss

RFC 1270

SNMP Communications Services F. Kastenholz, ed.

RFC 1285

FDDI Management Information Base J. Case

RFC 1315

Management Information Base for Frame Relay DTEs C. Brown, F. Baker, C. Carvalho

RFC 1321

The MD5 Message-Digest Algorithm R. Rivest

RFC 1323

TCP Extensions for High Performance V. Jacobson, R. Braden, D. Borman

RFC 1325

FYI on Questions and Answers: Answers to Commonly Asked "New Internet User" Questions G. Malkin, A. Marine

RFC 1327

Mapping between X.400 (1988)/ISO 10021 and RFC 822 S. Hardcastle-Kille

RFC 1340

Assigned Numbers J. Reynolds, J. Postel

RFC 1344

Implications of MIME for Internet Mail Gateways N. Bornstein

RFC 1349

Type of Service in the Internet Protocol Suite P. Almquist

RFC 1351

SNMP Administrative Model J. Davin, J. Galvin, K. McCloghrie

- RFC 1352**
SNMP Security Protocols J. Galvin, K. McCloghrie, J. Davin
- RFC 1353**
Definitions of Managed Objects for Administration of SNMP Parties K. McCloghrie, J. Davin, J. Galvin
- RFC 1354**
IP Forwarding Table MIB F. Baker
- RFC 1356**
Multiprotocol Interconnect[®] on X.25 and ISDN in the Packet Mode A. Malis, D. Robinson, R. Ullmann
- RFC 1358**
Charter of the Internet Architecture Board (IAB) L. Chapin
- RFC 1363**
A Proposed Flow Specification C. Partridge
- RFC 1368**
Definition of Managed Objects for IEEE 802.3 Repeater Devices D. McMaster, K. McCloghrie
- RFC 1372**
Telnet Remote Flow Control Option C. L. Hedrick, D. Borman
- RFC 1374**
IP and ARP on HIPPI J. Renwick, A. Nicholson
- RFC 1381**
SNMP MIB Extension for X.25 LAPB D. Throop, F. Baker
- RFC 1382**
SNMP MIB Extension for the X.25 Packet Layer D. Throop
- RFC 1387**
RIP Version 2 Protocol Analysis G. Malkin
- RFC 1388**
RIP Version 2 Carrying Additional Information G. Malkin
- RFC 1389**
RIP Version 2 MIB Extensions G. Malkin, F. Baker
- RFC 1390**
Transmission of IP and ARP over FDDI Networks D. Katz
- RFC 1393**
Traceroute Using an IP Option G. Malkin
- RFC 1398**
Definitions of Managed Objects for the Ethernet-Like Interface Types F. Kastenholtz
- RFC 1408**
Telnet Environment Option D. Borman, Ed.
- RFC 1413**
Identification Protocol M. St. Johns
- RFC 1416**
Telnet Authentication Option D. Borman, ed.
- RFC 1420**
SNMP over IPX S. Bostock
- RFC 1428**
Transition of Internet Mail from Just-Send-8 to 8bit-SMTP/MIME G. Vaudreuil
- RFC 1442**
Structure of Management Information for version 2 of the Simple Network Management Protocol (SNMPv2) J. Case, K. McCloghrie, M. Rose, S. Waldbusser
- RFC 1443**
Textual Conventions for version 2 of the Simple Network Management Protocol (SNMPv2) J. Case, K. McCloghrie, M. Rose, S. Waldbusser

RFC 1445

Administrative Model for version 2 of the Simple Network Management Protocol (SNMPv2) J. Galvin, K. McCloghrie

RFC 1447

Party MIB for version 2 of the Simple Network Management Protocol (SNMPv2) K. McCloghrie, J. Galvin

RFC 1448

Protocol Operations for version 2 of the Simple Network Management Protocol (SNMPv2) J. Case, K. McCloghrie, M. Rose, S. Waldbusser

RFC 1464

Using the Domain Name System to Store Arbitrary String Attributes R. Rosenbaum

RFC 1469

IP Multicast over Token-Ring Local Area Networks T. Pusateri

RFC 1483

Multiprotocol Encapsulation over ATM Adaptation Layer 5 Juha Heinanen

RFC 1514

Host Resources MIB P. Grillo, S. Waldbusser

RFC 1516

Definitions of Managed Objects for IEEE 802.3 Repeater Devices D. McMaster, K. McCloghrie

RFC 1521

MIME (Multipurpose Internet Mail Extensions) Part One: Mechanisms for Specifying and Describing the Format of Internet Message Bodies N. Borenstein, N. Freed

RFC 1535

A Security Problem and Proposed Correction With Widely Deployed DNS Software E. Gavron

RFC 1536

Common DNS Implementation Errors and Suggested Fixes A. Kumar, J. Postel, C. Neuman, P. Danzig, S. Miller

RFC 1537

Common DNS Data File Configuration Errors P. Beertema

RFC 1540

Internet Official Protocol Standards J. Postel

RFC 1571

Telnet Environment Option Interoperability Issues D. Borman

RFC 1572

Telnet Environment Option S. Alexander

RFC 1573

Evolution of the Interfaces Group of MIB-II K. McCloghrie, F. Kastenholz

RFC 1577

Classical IP and ARP over ATM M. Laubach

RFC 1583

OSPF Version 2 J. Moy

RFC 1591

Domain Name System Structure and Delegation J. Postel

RFC 1592

Simple Network Management Protocol Distributed Protocol Interface Version 2.0 B. Wijnen, G. Carpenter, K. Curran, A. Sehgal, G. Waters

RFC 1594

FYI on Questions and Answers—Answers to Commonly Asked "New Internet User" Questions A. Marine, J. Reynolds, G. Malkin

RFC 1644

T/TCP — TCP Extensions for Transactions Functional Specification R. Braden

- RFC 1646**
TN3270 Extensions for LUsername and Printer Selection C. Graves, T. Butts, M. Angel
- RFC 1647**
TN3270 Enhancements B. Kelly
- RFC 1652**
SMTP Service Extension for 8bit-MIMEtransport J. Klensin, N. Freed, M. Rose, E. Stefferud, D. Crocker
- RFC 1664**
Using the Internet DNS to Distribute RFC1327 Mail Address Mapping Tables C. Allochio, A. Bonito, B. Cole, S. Giordano, R. Hagens
- RFC 1693**
An Extension to TCP: Partial Order Service T. Connolly, P. Amer, P. Conrad
- RFC 1695**
Definitions of Managed Objects for ATM Management Version 8.0 using SMIPv2 M. Ahmed, K. Tesink
- RFC 1701**
Generic Routing Encapsulation (GRE) S. Hanks, T. Li, D. Farinacci, P. Traina
- RFC 1702**
Generic Routing Encapsulation over IPv4 networks S. Hanks, T. Li, D. Farinacci, P. Traina
- RFC 1706**
DNS NSAP Resource Records B. Manning, R. Colella
- RFC 1712**
DNS Encoding of Geographical Location C. Farrell, M. Schulze, S. Pleitner D. Baldoni
- RFC 1713**
Tools for DNS debugging A. Romao
- RFC 1723**
RIP Version 2—Carrying Additional Information G. Malkin
- RFC 1752**
The Recommendation for the IP Next Generation Protocol S. Bradner, A. Mankin
- RFC 1766**
Tags for the Identification of Languages H. Alvestrand
- RFC 1771**
A Border Gateway Protocol 4 (BGP-4) Y. Rekhter, T. Li
- RFC 1794**
DNS Support for Load Balancing T. Brisco
- RFC 1819**
Internet Stream Protocol Version 2 (ST2) Protocol Specification—Version ST2+ L. Delgrossi, L. Berger Eds.
- RFC 1826**
IP Authentication Header R. Atkinson
- RFC 1828**
IP Authentication using Keyed MD5 P. Metzger, W. Simpson
- RFC 1829**
The ESP DES-CBC Transform P. Karn, P. Metzger, W. Simpson
- RFC 1830**
SMTP Service Extensions for Transmission of Large and Binary MIME Messages G. Vaudreuil
- RFC 1831**
RPC: Remote Procedure Call Protocol Specification Version 2 R. Srinivasan
- RFC 1832**
XDR: External Data Representation Standard R. Srinivasan
- RFC 1833**
Binding Protocols for ONC RPC Version 2 R. Srinivasan

RFC 1850

OSPF Version 2 Management Information Base F. Baker, R. Coltun

RFC 1854

SMTP Service Extension for Command Pipelining N. Freed

RFC 1869

SMTP Service Extensions J. Klensin, N. Freed, M. Rose, E. Stefferud, D. Crocker

RFC 1870

SMTP Service Extension for Message Size Declaration J. Klensin, N. Freed, K. Moore

RFC 1876

A Means for Expressing Location Information in the Domain Name System C. Davis, P. Vixie, T. Goodwin, I. Dickinson

RFC 1883

Internet Protocol, Version 6 (IPv6) Specification S. Deering, R. Hinden

RFC 1884

IP Version 6 Addressing Architecture R. Hinden, S. Deering, Eds.

RFC 1886

DNS Extensions to support IP version 6 S. Thomson, C. Huitema

RFC 1888

OSI NSAPs and IPv6 J. Bound, B. Carpenter, D. Harrington, J. Houldsworth, A. Lloyd

RFC 1891

SMTP Service Extension for Delivery Status Notifications K. Moore

RFC 1892

The Multipart/Report Content Type for the Reporting of Mail System Administrative Messages G. Vaudreuil

RFC 1894

An Extensible Message Format for Delivery Status Notifications K. Moore, G. Vaudreuil

RFC 1901

Introduction to Community-based SNMPv2 J. Case, K. McCloghrie, M. Rose, S. Waldbusser

RFC 1902

Structure of Management Information for Version 2 of the Simple Network Management Protocol (SNMPv2) J. Case, K. McCloghrie, M. Rose, S. Waldbusser

RFC 1903

Textual Conventions for Version 2 of the Simple Network Management Protocol (SNMPv2) J. Case, K. McCloghrie, M. Rose, S. Waldbusser

RFC 1904

Conformance Statements for Version 2 of the Simple Network Management Protocol (SNMPv2) J. Case, K. McCloghrie, M. Rose, S. Waldbusser

RFC 1905

Protocol Operations for Version 2 of the Simple Network Management Protocol (SNMPv2) J. Case, K. McCloghrie, M. Rose, S. Waldbusser

RFC 1906

Transport Mappings for Version 2 of the Simple Network Management Protocol (SNMPv2) J. Case, K. McCloghrie, M. Rose, S. Waldbusser

RFC 1907

Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2) J. Case, K. McCloghrie, M. Rose, S. Waldbusser

RFC 1908

Coexistence between Version 1 and Version 2 of the Internet-standard Network Management Framework J. Case, K. McCloghrie, M. Rose, S. Waldbusser

RFC 1912

Common DNS Operational and Configuration Errors D. Barr

RFC 1918

Address Allocation for Private Internets Y. Rekhter, B. Moskowitz, D. Karrenberg, G.J. de Groot, E. Lear

RFC 1928

SOCKS Protocol Version 5 M. Leech, M. Ganis, Y. Lee, R. Kuris, D. Koblas, L. Jones

RFC 1930

Guidelines for creation, selection, and registration of an Autonomous System (AS) J. Hawkinson, T. Bates

RFC 1939

Post Office Protocol-Version 3 J. Myers, M. Rose

RFC 1981

Path MTU Discovery for IP version 6 J. McCann, S. Deering, J. Mogul

RFC 1982

Serial Number Arithmetic R. Elz, R. Bush

RFC 1985

SMTP Service Extension for Remote Message Queue Starting J. De Winter

RFC 1995

Incremental Zone Transfer in DNS M. Ohta

RFC 1996

A Mechanism for Prompt Notification of Zone Changes (DNS NOTIFY) P. Vixie

RFC 2010

Operational Criteria for Root Name Servers B. Manning, P. Vixie

RFC 2011

SNMPv2 Management Information Base for the Internet Protocol using SMIPv2 K. McCloghrie, Ed.

RFC 2012

SNMPv2 Management Information Base for the Transmission Control Protocol using SMIPv2 K. McCloghrie, Ed.

RFC 2013

SNMPv2 Management Information Base for the User Datagram Protocol using SMIPv2 K. McCloghrie, Ed.

RFC 2018

TCP Selective Acknowledgement Options M. Mathis, J. Mahdavi, S. Floyd, A. Romanow

RFC 2026

The Internet Standards Process — Revision 3 S. Bradner

RFC 2030

Simple Network Time Protocol (SNTP) Version 4 for IPv4, IPv6 and OSI D. Mills

RFC 2033

Local Mail Transfer Protocol J. Myers

RFC 2034

SMTP Service Extension for Returning Enhanced Error Codes N. Freed

RFC 2040

The RC5, RC5-CBC, RC-5-CBC-Pad, and RC5-CTS Algorithms R. Baldwin, R. Rivest

RFC 2045

Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies N. Freed, N. Borenstein

RFC 2052

A DNS RR for specifying the location of services (DNS SRV) A. Gulbrandsen, P. Vixie

RFC 2065

Domain Name System Security Extensions D. Eastlake 3rd, C. Kaufman

RFC 2066

TELNET CHARSET Option R. Gellens

RFC 2080

RIPng for IPv6 G. Malkin, R. Minnear

RFC 2096

IP Forwarding Table MIB F. Baker

RFC 2104

HMAC: Keyed-Hashing for Message Authentication H. Krawczyk, M. Bellare, R. Canetti

RFC 2119

Keywords for use in RFCs to Indicate Requirement Levels S. Bradner

RFC 2133

Basic Socket Interface Extensions for IPv6 R. Gilligan, S. Thomson, J. Bound, W. Stevens

RFC 2136

Dynamic Updates in the Domain Name System (DNS UPDATE) P. Vixie, Ed., S. Thomson, Y. Rekhter, J. Bound

RFC 2137

Secure Domain Name System Dynamic Update D. Eastlake 3rd

RFC 2163

Using the Internet DNS to Distribute MIXER Conformant Global Address Mapping (MCGAM) C. Allocchio

RFC 2168

Resolution of Uniform Resource Identifiers using the Domain Name System R. Daniel, M. Mealling

RFC 2178

OSPF Version 2 J. Moy

RFC 2181

Clarifications to the DNS Specification R. Elz, R. Bush

RFC 2205

Resource ReSerVation Protocol (RSVP)—Version 1 Functional Specification R. Braden, Ed., L. Zhang, S. Berson, S. Herzog, S. Jamin

RFC 2210

The Use of RSVP with IETF Integrated Services J. Wroclawski

RFC 2211

Specification of the Controlled-Load Network Element Service J. Wroclawski

RFC 2212

Specification of Guaranteed Quality of Service S. Shenker, C. Partridge, R. Guerin

RFC 2215

General Characterization Parameters for Integrated Service Network Elements S. Shenker, J. Wroclawski

RFC 2217

Telnet Com Port Control Option G. Clarke

RFC 2219

Use of DNS Aliases for Network Services M. Hamilton, R. Wright

RFC 2228

FTP Security Extensions M. Horowitz, S. Lunt

RFC 2230

Key Exchange Delegation Record for the DNS R. Atkinson

RFC 2233

The Interfaces Group MIB using SMIV2 K. McCloghrie, F. Kastenholz

RFC 2240

A Legal Basis for Domain Name Allocation O. Vaughn

RFC 2246

The TLS Protocol Version 1.0 T. Dierks, C. Allen

- RFC 2251**
Lightweight Directory Access Protocol (v3) M. Wahl, T. Howes, S. Kille
- RFC 2253**
Lightweight Directory Access Protocol (v3): UTF-8 String Representation of Distinguished Names M. Wahl, S. Kille, T. Howes
- RFC 2254**
The String Representation of LDAP Search Filters T. Howes
- RFC 2261**
An Architecture for Describing SNMP Management Frameworks D. Harrington, R. Presuhn, B. Wijnen
- RFC 2262**
Message Processing and Dispatching for the Simple Network Management Protocol (SNMP) J. Case, D. Harrington, R. Presuhn, B. Wijnen
- RFC 2271**
An Architecture for Describing SNMP Management Frameworks D. Harrington, R. Presuhn, B. Wijnen
- RFC 2273**
SNMPv3 Applications D. Levi, P. Meyer, B. Stewartz
- RFC 2274**
User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3) U. Blumenthal, B. Wijnen
- RFC 2275**
View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP) B. Wijnen, R. Presuhn, K. McCloghrie
- RFC 2279**
UTF-8, a transformation format of ISO 10646 F. Yergeau
- RFC 2292**
Advanced Sockets API for IPv6 W. Stevens, M. Thomas
- RFC 2308**
Negative Caching of DNS Queries (DNS NCACHE) M. Andrews
- RFC 2317**
Classless IN-ADDR.ARPA delegation H. Eidnes, G. de Groot, P. Vixie
- RFC 2320**
Definitions of Managed Objects for Classical IP and ARP Over ATM Using SMIPv2 (IPOA-MIB) M. Greene, J. Luciani, K. White, T. Kuo
- RFC 2328**
OSPF Version 2 J. Moy
- RFC 2345**
Domain Names and Company Name Retrieval J. Klensin, T. Wolf, G. Oglesby
- RFC 2352**
A Convention for Using Legal Names as Domain Names O. Vaughn
- RFC 2355**
TN3270 Enhancements B. Kelly
- RFC 2358**
Definitions of Managed Objects for the Ethernet-like Interface Types J. Flick, J. Johnson
- RFC 2373**
IP Version 6 Addressing Architecture R. Hinden, S. Deering
- RFC 2374**
An IPv6 Aggregatable Global Unicast Address Format R. Hinden, M. O'Dell, S. Deering
- RFC 2375**
IPv6 Multicast Address Assignments R. Hinden, S. Deering

RFC 2385

Protection of BGP Sessions via the TCP MD5 Signature Option A. Hefferman

RFC 2389

Feature negotiation mechanism for the File Transfer Protocol P. Hethmon, R. Elz

RFC 2401

Security Architecture for Internet Protocol S. Kent, R. Atkinson

RFC 2402

IP Authentication Header S. Kent, R. Atkinson

RFC 2403

The Use of HMAC-MD5-96 within ESP and AH C. Madson, R. Glenn

RFC 2404

The Use of HMAC-SHA-1-96 within ESP and AH C. Madson, R. Glenn

RFC 2405

The ESP DES-CBC Cipher Algorithm With Explicit IV C. Madson, N. Doraswamy

RFC 2406

IP Encapsulating Security Payload (ESP) S. Kent, R. Atkinson

RFC 2407

The Internet IP Security Domain of Interpretation for ISAKMPD Piper

RFC 2408

Internet Security Association and Key Management Protocol (ISAKMP) D. Maughan, M. Schertler, M. Schneider, J. Turner

RFC 2409

The Internet Key Exchange (IKE) D. Harkins, D. Carrel

RFC 2410

The NULL Encryption Algorithm and Its Use With IPsec R. Glenn, S. Kent,

RFC 2428

FTP Extensions for IPv6 and NATs M. Allman, S. Ostermann, C. Metz

RFC 2445

Internet Calendaring and Scheduling Core Object Specification (iCalendar) F. Dawson, D. Stenerson

RFC 2459

Internet X.509 Public Key Infrastructure Certificate and CRL Profile R. Housley, W. Ford, W. Polk, D. Solo

RFC 2460

Internet Protocol, Version 6 (IPv6) Specification S. Deering, R. Hinden

RFC 2461

Neighbor Discovery for IP Version 6 (IPv6) T. Narten, E. Nordmark, W. Simpson

RFC 2462

IPv6 Stateless Address Autoconfiguration S. Thomson, T. Narten

RFC 2463

Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification A. Conta, S. Deering

RFC 2464

Transmission of IPv6 Packets over Ethernet Networks M. Crawford

RFC 2466

Management Information Base for IP Version 6: ICMPv6 Group D. Haskin, S. Onishi

RFC 2476

Message Submission R. Gellens, J. Klensin

RFC 2487

SMTP Service Extension for Secure SMTP over TLS P. Hoffman

RFC 2505

Anti-Spam Recommendations for SMTP MTAs G. Lindberg

- RFC 2523**
Photuris: Extended Schemes and Attributes P. Karn, W. Simpson
- RFC 2535**
Domain Name System Security Extensions D. Eastlake 3rd
- RFC 2538**
Storing Certificates in the Domain Name System (DNS) D. Eastlake 3rd, O. Gudmundsson
- RFC 2539**
Storage of Diffie-Hellman Keys in the Domain Name System (DNS) D. Eastlake 3rd
- RFC 2540**
Detached Domain Name System (DNS) Information D. Eastlake 3rd
- RFC 2554**
SMTP Service Extension for Authentication J. Myers
- RFC 2570**
Introduction to Version 3 of the Internet-standard Network Management Framework J. Case, R. Mundy, D. Partain, B. Stewart
- RFC 2571**
An Architecture for Describing SNMP Management Frameworks B. Wijnen, D. Harrington, R. Presuhn
- RFC 2572**
Message Processing and Dispatching for the Simple Network Management Protocol (SNMP) J. Case, D. Harrington, R. Presuhn, B. Wijnen
- RFC 2573**
SNMP Applications D. Levi, P. Meyer, B. Stewart
- RFC 2574**
User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3) U. Blumenthal, B. Wijnen
- RFC 2575**
View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP) B. Wijnen, R. Presuhn, K. McCloghrie
- RFC 2576**
Co-Existence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework R. Frye, D. Levi, S. Routhier, B. Wijnen
- RFC 2578**
Structure of Management Information Version 2 (SMIv2) K. McCloghrie, D. Perkins, J. Schoenwaelder
- RFC 2579**
Textual Conventions for SMIv2 K. McCloghrie, D. Perkins, J. Schoenwaelder
- RFC 2580**
Conformance Statements for SMIv2 K. McCloghrie, D. Perkins, J. Schoenwaelder
- RFC 2581**
TCP Congestion Control M. Allman, V. Paxson, W. Stevens
- RFC 2583**
Guidelines for Next Hop Client (NHC) Developers R. Carlson, L. Winkler
- RFC 2591**
Definitions of Managed Objects for Scheduling Management Operations D. Levi, J. Schoenwaelder
- RFC 2625**
IP and ARP over Fibre Channel M. Rajagopal, R. Bhagwat, W. Rickard
- RFC 2635**
Don't SPEW A Set of Guidelines for Mass Unsolicited Mailings and Postings (spam)* S. Hambridge, A. Lunde
- RFC 2637**
Point-to-Point Tunneling Protocol K. Hamzeh, G. Pall, W. Verthein, J. Taarud, W. Little, G. Zorn

- RFC 2640**
Internationalization of the File Transfer Protocol B. Curtin
- RFC 2665**
Definitions of Managed Objects for the Ethernet-like Interface Types J. Flick, J. Johnson
- RFC 2671**
Extension Mechanisms for DNS (EDNS0) P. Vixie
- RFC 2672**
Non-Terminal DNS Name Redirection M. Crawford
- RFC 2675**
IPv6 Jumbograms D. Borman, S. Deering, R. Hinden
- RFC 2710**
Multicast Listener Discovery (MLD) for IPv6 S. Deering, W. Fenner, B. Haberman
- RFC 2711**
IPv6 Router Alert Option C. Partridge, A. Jackson
- RFC 2740**
OSPF for IPv6 R. Coltun, D. Ferguson, J. Moy
- RFC 2753**
A Framework for Policy-based Admission Control R. Yavatkar, D. Pendarakis, R. Guerin
- RFC 2782**
A DNS RR for specifying the location of services (DNS SRV) A. Gubrandsen, P. Vixie, L. Esibov
- RFC 2821**
Simple Mail Transfer Protocol J. Klensin, Ed.
- RFC 2822**
Internet Message Format P. Resnick, Ed.
- RFC 2840**
TELNET KERMIT OPTION J. Altman, F. da Cruz
- RFC 2845**
Secret Key Transaction Authentication for DNS (TSIG) P. Vixie, O. Gudmundsson, D. Eastlake 3rd, B. Wellington
- RFC 2851**
Textual Conventions for Internet Network Addresses M. Daniele, B. Haberman, S. Routhier, J. Schoenwaelder
- RFC 2852**
Deliver By SMTP Service Extension D. Newman
- RFC 2874**
DNS Extensions to Support IPv6 Address Aggregation and Renumbering M. Crawford, C. Huitema
- RFC 2915**
The Naming Authority Pointer (NAPTR) DNS Resource Record M. Mealling, R. Daniel
- RFC 2920**
SMTP Service Extension for Command Pipelining N. Freed
- RFC 2930**
Secret Key Establishment for DNS (TKEY RR) D. Eastlake, 3rd
- RFC 2941**
Telnet Authentication Option T. Ts'o, ed., J. Altman
- RFC 2942**
Telnet Authentication: Kerberos Version 5 T. Ts'o
- RFC 2946**
Telnet Data Encryption Option T. Ts'o
- RFC 2952**
Telnet Encryption: DES 64 bit Cipher Feedback T. Ts'o

RFC 2953

Telnet Encryption: DES 64 bit Output Feedback T. Ts'o

RFC 2992

Analysis of an Equal-Cost Multi-Path Algorithm C. Hopps

RFC 3019

IP Version 6 Management Information Base for The Multicast Listener Discovery Protocol B. Haberman, R. Worzella

RFC 3060

Policy Core Information Model—Version 1 Specification B. Moore, E. Ellessen, J. Strassner, A. Westerinen

RFC 3152

Delegation of IP6.ARPA R. Bush

RFC 3164

The BSD Syslog Protocol C. Lonvick

RFC 3207

SMTP Service Extension for Secure SMTP over Transport Layer Security P. Hoffman

RFC 3226

DNSSEC and IPv6 A6 aware server/resolver message size requirements O. Gudmundsson

RFC 3291

Textual Conventions for Internet Network Addresses M. Daniele, B. Haberman, S. Routhier, J. Schoenwaelder

RFC 3363

Representing Internet Protocol version 6 (IPv6) Addresses in the Domain Name System R. Bush, A. Durand, B. Fink, O. Gudmundsson, T. Hain

RFC 3376

Internet Group Management Protocol, Version 3 B. Cain, S. Deering, I. Kouvelas, B. Fenner, A. Thyagarajan

RFC 3390

Increasing TCP's Initial Window M. Allman, S. Floyd, C. Partridge

RFC 3410

Introduction and Applicability Statements for Internet-Standard Management Framework J. Case, R. Mundy, D. Partain, B. Stewart

RFC 3411

An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks D. Harrington, R. Presuhn, B. Wijnen

RFC 3412

Message Processing and Dispatching for the Simple Network Management Protocol (SNMP) J. Case, D. Harrington, R. Presuhn, B. Wijnen

RFC 3413

Simple Network Management Protocol (SNMP) Applications D. Levi, P. Meyer, B. Stewart

RFC 3414

User-based Security Model (USM) for version 3 of the Simple Network Management Protocol (SNMPv3) U. Blumenthal, B. Wijnen

RFC 3415

View-based Access Control Model (VACM) for the Simple Network Management Protocol (SNMP) B. Wijnen, R. Presuhn, K. McCloghrie

RFC 3416

Version 2 of the Protocol Operations for the Simple Network Management Protocol (SNMP) R. Presuhn, J. Case, K. McCloghrie, M. Rose, S. Waldbusser

RFC 3417

Transport Mappings for the Simple Network Management Protocol (SNMP) R. Presuhn, J. Case, K. McCloghrie, M. Rose, S. Waldbusser

RFC 3418

Management Information Base (MIB) for the Simple Network Management Protocol (SNMP) R. Presuhn, J. Case, K. McCloghrie, M. Rose, S. Waldbusser

RFC 3419

Textual Conventions for Transport Addresses M. Daniele, J. Schoenwaelder

RFC 3484

Default Address Selection for Internet Protocol version 6 (IPv6) R. Draves

RFC 3493

Basic Socket Interface Extensions for IPv6 R. Gilligan, S. Thomson, J. Bound, J. McCann, W. Stevens

RFC 3513

Internet Protocol Version 6 (IPv6) Addressing Architecture R. Hinden, S. Deering

RFC 3526

More Modular Exponential (MODP) Diffie-Hellman groups for Internet Key Exchange (IKE) T. Kivinen, M. Kojo

RFC 3542

Advanced Sockets Application Programming Interface (API) for IPv6 W. Richard Stevens, M. Thomas, E. Nordmark, T. Jinmei

RFC 3566

The AES-XCBC-MAC-96 Algorithm and Its Use With IPsec S. Frankel, H. Herbert

RFC 3569

An Overview of Source-Specific Multicast (SSM) S. Bhattacharyya, Ed.

RFC 3584

Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework R. Frye, D. Levi, S. Routhier, B. Wijnen

RFC 3602

The AES-CBC Cipher Algorithm and Its Use with IPsec S. Frankel, R. Glenn, S. Kelly

RFC 3629

UTF-8, a transformation format of ISO 10646 R. Kermode, C. Vicisano

RFC 3658

Delegation Signer (DS) Resource Record (RR) O. Gudmundsson

RFC 3678

Socket Interface Extensions for Multicast Source Filters D. Thaler, B. Fenner, B. Quinn

RFC 3715

IPsec-Network Address Translation (NAT) Compatibility Requirements B. Aboba, W. Dixon

RFC 3810

Multicast Listener Discovery Version 2 (MLDv2) for IPv6 R. Vida, Ed., L. Costa, Ed.

RFC 3826

The Advanced Encryption Standard (AES) Cipher Algorithm in the SNMP User-based Security Model U. Blumenthal, F. Maino, K. McCloghrie.

RFC 3947

Negotiation of NAT-Traversal in the IKE T. Kivinen, B. Swander, A. Huttunen, V. Volpe

RFC 3948

UDP Encapsulation of IPsec ESP Packets A. Huttunen, B. Swander, V. Volpe, L. DiBurro, M. Stenberg

RFC 4001

Textual Conventions for Internet Network Addresses M. Daniele, B. Haberman, S. Routhier, J. Schoenwaelder

RFC 4007

IPv6 Scoped Address Architecture S. Deering, B. Haberman, T. Jinmei, E. Nordmark, B. Zill

- RFC 4022**
Management Information Base for the Transmission Control Protocol (TCP) R. Raghunarayan
- RFC 4106**
The Use of Galois/Counter Mode (GCM) in IPsec Encapsulating Security Payload (ESP) J. Viega, D. McGrew
- RFC 4109**
Algorithms for Internet Key Exchange version 1 (IKEv1) P. Hoffman
- RFC 4113**
Management Information Base for the User Datagram Protocol (UDP) B. Fenner, J. Flick
- RFC 4191**
Default Router Preferences and More-Specific Routes R. Draves, D. Thaler
- RFC 4217**
Securing FTP with TLS P. Ford-Hutchinson
- RFC 4292**
IP Forwarding Table MIB B. Haberman
- RFC 4293**
Management Information Base for the Internet Protocol (IP) S. Routhier
- RFC 4301**
Security Architecture for the Internet Protocol S. Kent, K. Seo
- RFC 4302**
IP Authentication Header S. Kent
- RFC 4303**
IP Encapsulating Security Payload (ESP) S. Kent
- RFC 4304**
Extended Sequence Number (ESN) Addendum to IPsec Domain of Interpretation (DOI) for Internet Security Association and Key Management Protocol (ISAKMP) S. Kent
- RFC 4307**
Cryptographic Algorithms for Use in the Internet Key Exchange Version 2 (IKEv2) J. Schiller
- RFC 4308**
Cryptographic Suites for IPsec P. Hoffman
- RFC 4434**
The AES-XCBC-PRF-128 Algorithm for the Internet Key Exchange Protocol P. Hoffman
- RFC 4443**
Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification A. Conta, S. Deering
- RFC 4552**
Authentication/Confidentiality for OSPFv3 M. Gupta, N. Melam
- RFC 4678**
Server/Application State Protocol v1 A. Bivens
- RFC 4753**
ECP Groups for IKE and IKEv2 D. Fu, J. Solinas
- RFC 4754**
IKE and IKEv2 Authentication Using the Elliptic Curve Digital Signature Algorithm (ECDSA) D. Fu, J. Solinas
- RFC 4809**
Requirements for an IPsec Certificate Management Profile C. Bonatti, Ed., S. Turner, Ed., G. Lebovitz, Ed.
- RFC 4835**
Cryptographic Algorithm Implementation Requirements for Encapsulating Security Payload (ESP) and Authentication Header (AH) V. Manral

RFC 4862

IPv6 Stateless Address Autoconfiguration S. Thomson, T. Narten, T. Jinmei

RFC 4868

Using HMAC-SHA-256, HMAC-SHA-384, and HMAC-SHA-512 with IPsec S. Kelly, S. Frankel

RFC 4869

Suite B Cryptographic Suites for IPsec L. Law, J. Solinas

RFC 4941

Privacy Extensions for Stateless Address Autoconfiguration in IPv6 T. Narten, R. Draves, S. Krishnan

RFC 4945

The Internet IP Security PKI Profile of IKEv1/ISAKMP, IKEv2, and PKIX B. Korver

RFC 5014

IPv6 Socket API for Source Address Selection E. Nordmark, S. Chakrabarti, J. Laganier

RFC 5095

Deprecation of Type 0 Routing Headers in IPv6 J. Abley, P. Savola, G. Neville-Neil

RFC 5175

IPv6 Router Advertisement Flags Option B. Haberman, Ed., R. Hinden

RFC 5282

Using Authenticated Encryption Algorithms with the Encrypted Payload of the Internet Key Exchange version 2 (IKEv2) Protocol D. Black, D. McGrew

RFC 5996

Internet Key Exchange Protocol Version 2 (IKEv2) C. Kaufman, P. Hoffman, Y. Nir, P. Eronen

RFC 7627

Transport Layer Security (TLS) Session Hash and Extended Master Secret Extension K. Bhargavan, A. Delignat-Lavaud, A. Pironti, Inria Paris-Rocquencourt, A. Langley, M. Ray

RFC 8446

The Transport Layer Security (TLS) Protocol Version 1.3 E. Rescorla

Internet drafts

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Appendix B. 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 (GA27-3136-20)
- SNA Technical Overview (GC30-3073-04)

The following RFC also contains SNA architectural specifications:

- RFC 2353 *APPN/HPR in IP Networks APPN Implementers' Workshop Closed Pages Document*

RFCs are available at <http://www.rfc-editor.org/rfc.html>.

Appendix C. Architectural specifications

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RFCs are available at <http://www.rfc-editor.org/rfc.html>.

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Bibliography

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z/OS Communications Server information

z/OS Communications Server product information is grouped by task in the following tables.

Planning

Title	Number	Description
z/OS Communications Server: New Function Summary	GC27-3664	This document is intended to help you plan for new IP or SNA functions, whether you are migrating from a previous version or installing z/OS for the first time. It summarizes what is new in the release and identifies the suggested and required modifications needed to use the enhanced functions.
z/OS Communications Server: IPv6 Network and Appl Design Guide	SC27-3663	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
z/OS Communications Server: IP Configuration Guide	SC27-3650	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 with the z/OS Communications Server: IP Configuration Reference .
z/OS Communications Server: IP Configuration Reference	SC27-3651	This document presents information for people who want to administer and maintain IP. Use this document with the z/OS Communications Server: IP Configuration Guide . The information in this document includes: • TCP/IP configuration data sets • Configuration statements • Translation tables • Protocol number and port assignments

Title	Number	Description
z/OS Communications Server: SNA Network Implementation Guide	SC27-3672	This document presents the major concepts involved in implementing an SNA network. Use this document with the z/OS Communications Server: SNA Resource Definition Reference .
z/OS Communications Server: SNA Resource Definition Reference	SC27-3675	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 with the z/OS Communications Server: SNA Network Implementation Guide .
z/OS Communications Server: SNA Resource Definition Samples	SC27-3676	This document contains sample definitions to help you implement SNA functions in your networks, and includes sample major node definitions.
z/OS Communications Server: IP Network Print Facility	SC27-3658	This document is for systems 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
z/OS Communications Server: IP User's Guide and Commands	SC27-3662	This document describes how to use TCP/IP applications. It contains requests with which a user can log on to a remote host using Telnet, transfer data sets using FTP, send electronic mail, print on remote printers, and authenticate network users.
z/OS Communications Server: IP System Administrator's Commands	SC27-3661	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.
z/OS Communications Server: SNA Operation	SC27-3673	This document serves as a reference for programmers and operators requiring detailed information about specific operator commands.
z/OS Communications Server: Quick Reference	SC27-3665	This document contains essential information about SNA and IP commands.

Customization

Title	Number	Description
z/OS Communications Server: SNA Customization	SC27-3666	This document enables you to customize SNA, and includes the following information: • 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
z/OS Communications Server: IP Sockets Application Programming Interface Guide and Reference	SC27-3660	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.
z/OS Communications Server: IP CICS Sockets Guide	SC27-3649	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.
z/OS Communications Server: IP IMS Sockets Guide	SC27-3653	This document is for programmers who want application programs that use the IMS TCP/IP application development services provided by the TCP/IP Services of IBM.
z/OS Communications Server: IP Programmer's Guide and Reference	SC27-3659	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.
z/OS Communications Server: SNA Programming	SC27-3674	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.
z/OS Communications Server: SNA Programmer's LU 6.2 Guide	SC27-3669	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.)
z/OS Communications Server: SNA Programmer's LU 6.2 Reference	SC27-3670	This document provides reference material for the SNA LU 6.2 programming interface for host application programs.
z/OS Communications Server: CSM Guide	SC27-3647	This document describes how applications use the communications storage manager.

Diagnosis

Title	Number	Description
z/OS Communications Server: IP Diagnosis Guide	GC27-3652	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.

Title	Number	Description
z/OS Communications Server: ACF/TAP Trace Analysis Handbook	GC27-3645	This document explains how to gather the trace data that is collected and stored in the host processor. It also explains how to use the Advanced Communications Function/Trace Analysis Program (ACF/TAP) service aid to produce reports for analyzing the trace data information.
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	GC27-3667 GC27-3668	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.
z/OS Communications Server: SNA Data Areas Volume 1 and z/OS Communications Server: SNA Data Areas Volume 2	GC31-6852 GC31-6853	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
z/OS Communications Server: SNA Messages	SC27-3671	This document describes the ELM, IKT, IST, IUT, IVT, and USS messages. Other information in this document includes: • Command and RU types in SNA messages • Node and ID types in SNA messages • Supplemental message-related information
z/OS Communications Server: IP Messages Volume 1 (EZA)	SC27-3654	This volume contains TCP/IP messages beginning with EZA.
z/OS Communications Server: IP Messages Volume 2 (EZB, EZD)	SC27-3655	This volume contains TCP/IP messages beginning with EZB or EZD.
z/OS Communications Server: IP Messages Volume 3 (EZY)	SC27-3656	This volume contains TCP/IP messages beginning with EZY.
z/OS Communications Server: IP Messages Volume 4 (EZZ, SNM)	SC27-3657	This volume contains TCP/IP messages beginning with EZZ and SNM.
z/OS Communications Server: IP and SNA Codes	SC27-3648	This document describes codes and other information that appear in z/OS Communications Server messages.

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