

z/OS Communications Server



IP User's Guide and Commands

Version 1 Release 6

z/OS Communications Server



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Version 1 Release 6

Note:

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 431.

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This edition applies to Version 1 Release 6 of z/OS (5694-A01) and Version 1 Release 6 of z/OS.e (5655-G52) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this document

This document describes how to use the applications available in z/OS[®] Communications Server to perform the following functions:

- Log on to a remote host
- Transfer data sets
- Send and receive electronic mail
- Print on remote printers
- Display IBM[®] GDDM/MVS graphics on X Window System workstations
- Run a command on another host

The information in this document supports both IPv6 and IPv4. Unless explicitly noted, information describes IPv4 networking protocol. IPv6 support is qualified within the text.

A companion to this document is the *z/OS Communications Server: IP System Administrator's Commands*, which contains specific system administrator commands used to monitor the network, manage resources, and maintain performance of z/OS CS V1R6.

This document supports z/OS.e.

Who should read this document

This document is written for users who want to use the applications that are available in z/OS CS V1R6.

Before using this document, you should be familiar with the IBM Multiple Virtual Storage (MVS[™]) operating system, the IBM Time Sharing Option (TSO), and z/OS UNIX System Services and the z/OS UNIX shell. In addition, z/OS CS V1R6 should already be installed and customized for your network. For information about installing, refer to the *z/OS Program Directory*. For information about customizing, refer to the *z/OS Communications Server: IP Configuration Reference*.

How this document is organized

This book contains the following chapters and appendices:

- Chapter 1, "Getting started," on page 1 contains basic information about TCP/IP and how to get started using it.
- Chapter 2, "Logging on to a host using TELNET," on page 9 describes how to use TELNET.
- Chapter 3, "File Transfer Protocol (FTP)," on page 29 contains basic information about FTP.
- Chapter 4, "Transferring data using the File Transfer Protocol (FTP)," on page 49 describes how to use the FTP command and its subcommands to sequentially access multiple hosts without leaving the FTP environment.
- Chapter 5, "FTP subcommands," on page 127 describes the FTP subcommands.
- Chapter 6, "Sending electronic mail using SMTP commands," on page 289 describes how to use the SMTPNOTE command, provided with z/OS Communications Server, to prepare and send electronic mail.

- Chapter 7, “Sending electronic mail using z/OS UNIX sendmail,” on page 323 describes how to use z/OS UNIX sendmail, provided with z/OS Communications Server, to prepare and send electronic mail using the facilities of the z/OS shell.
- Chapter 8, “Using remote printing,” on page 327 describes the remote printing commands.
- Chapter 9, “Using GDDMXD/MVS with the X Window system,” on page 349 describes GDDMXD/MVS and the GDDMXD CLIST and how to use GDDMXD/MVS user-specified options and keyboard functions.
- Chapter 10, “Executing commands on a remote host,” on page 369 describes how to use the REXEC and RSH clients.
- Chapter 11, “Using the Network Database System,” on page 385 describes the Network Database System (NDB), that is used to access relational database systems in a TCP/IP environment.
- Appendix A, “Specifying data sets and files,” on page 393 describes the file-naming formats for the MVS, AIX®, UNIX®, AS/400®, and VM operating systems.
- Appendix B, “Mapping values for the APL2 character set,” on page 399 lists the GDDMXD/MVS default mapping values for the APL2® character set.
- Appendix C, “TELNET extensions,” on page 405 describes the Telnet 3270 DBCS Transform special operations.
- Appendix D, “ICMP/ICMPv6 types and codes,” on page 413 lists the Internet Control Message Protocol (ICMP) types and codes from *TCP/IP Illustrated, Volume 1 The Protocols*, by W. Richard Stevens.
- Appendix E, “Related protocol specifications (RFCs),” on page 415 lists the related protocol specifications for TCP/IP.
- Appendix F, “Information APARs,” on page 425 lists information APARs for IP and SNA documents.
- Appendix G, “Accessibility,” on page 429 describes accessibility features to help users with physical disabilities.
- “Notices” on page 431 contains notices and trademarks used in this document.
- “Bibliography” on page 441 contains descriptions of the documents in the z/OS Communications Server library.

How to use this document

To use this document, you should be familiar with z/OS TCP/IP Services and the TCP/IP suite of protocols.

Determining if a publication is current

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

- At the end of a publication’s order number there is a dash followed by two digits, often referred to as the dash level. A publication with a higher dash level is more current than one with a lower dash level. For example, in the publication order number GC28-1747-07, the dash level 07 means that the publication is more current than previous levels, such as 05 or 04.

- If a hardcopy publication and a softcopy publication have the same dash level, it is possible that the softcopy publication is more current than the hardcopy publication. Check the dates shown in the Summary of Changes. The softcopy publication might have a more recently dated Summary of Changes than the hardcopy publication.
- To compare softcopy publications, you can check the last two characters of the publication's filename (also called the book name). The higher the number, the more recent the publication. Also, next to the publication titles in the CD-ROM booklet and the readme files, there is an asterisk (*) that indicates whether a publication is new or changed.

How to contact IBM service

For immediate assistance, visit this Web site:

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

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

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

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

If you would like to provide feedback on this publication, see “Communicating Your Comments to IBM” on page 457.

Conventions and terminology used in this document

For definitions of the terms and abbreviations used in this document, you can view the latest IBM terminology at the IBM Terminology Web site.

Clarification of notes

Information traditionally qualified as **Notes** is further qualified as follows:

Note Supplemental detail

Tip Offers shortcuts or alternative ways of performing an action; a hint

Guideline

Customary way to perform a procedure; stronger request than recommendation

Rule Something you must do; limitations on your actions

Restriction

Indicates certain conditions are not supported; limitations on a product or facility

Requirement

Dependencies, prerequisites

Result Indicates the outcome

How to read a syntax diagram

This syntax information applies to all commands and statements included in this document that do not have their own syntax described elsewhere in this document.

The syntax diagram shows you how to specify a command so that the operating system can correctly interpret what you type. Read the syntax diagram from left to right and from top to bottom, following the horizontal line (the main path).

Symbols and punctuation

The following symbols are used in syntax diagrams:

Symbol	Description
▶▶	Marks the beginning of the command syntax.
▶	Indicates that the command syntax is continued.
	Marks the beginning and end of a fragment or part of the command syntax.
◀◀	Marks the end of the command syntax.

You must include all punctuation such as colons, semicolons, commas, quotation marks, and minus signs that are shown in the syntax diagram.

Parameters

The following types of parameters are used in syntax diagrams.

Required

Required parameters are displayed on the main path.

Optional

Optional parameters are displayed below the main path.

Default

Default parameters are displayed above the main path.

Parameters are classified as keywords or variables. For the TSO and MVS console commands, the keywords are not case sensitive. You can code them in uppercase or lowercase. If the keyword appears in the syntax diagram in both uppercase and lowercase, the uppercase portion is the abbreviation for the keyword (for example, OPERand).

For the z/OS UNIX commands, the keywords must be entered in the case indicated in the syntax diagram.

Variables are italicized, appear in lowercase letters, and represent names or values you supply. For example, a data set is a variable.

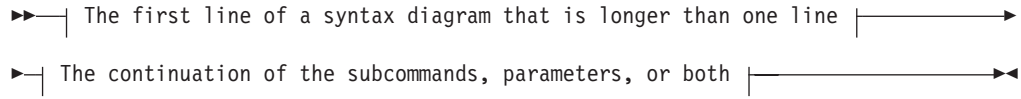
Syntax examples

In the following example, the USER command is a keyword. The required variable parameter is *user_id*, and the optional variable parameter is *password*. Replace the variable parameters with your own values.



Longer than one line

If a diagram is longer than one line, the first line ends with a single arrowhead and the second line begins with a single arrowhead.



Required operands

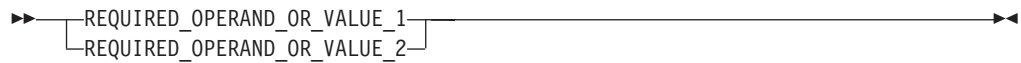
Required operands and values appear on the main path line.



You must code required operands and values.

Choose one required item from a stack

If there is more than one mutually exclusive required operand or value to choose from, they are stacked vertically.



Optional values

Optional operands and values appear below the main path line.



You can choose not to code optional operands and values.

Choose one optional operand from a stack

If there is more than one mutually exclusive optional operand or value to choose from, they are stacked vertically below the main path line.



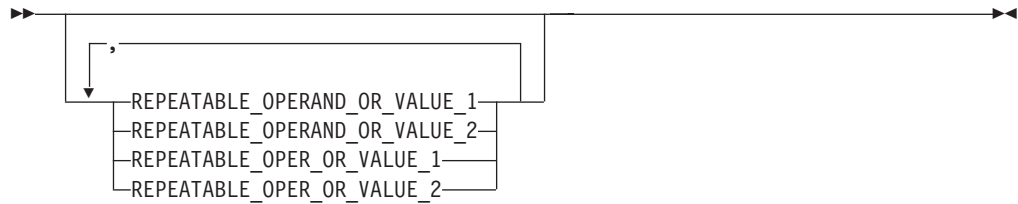
Repeating an operand

An arrow returning to the left above an operand or value on the main path line means that the operand or value can be repeated. The comma means that each operand or value must be separated from the next by a comma. If no comma appears in the returning arrow, the operand or value must be separated from the next by a blank.



Selecting more than one operand

An arrow returning to the left above a group of operands or values means more than one can be selected, or a single one can be repeated.



Nonalphanumeric characters

If a diagram shows a character that is not alphanumeric (such as parentheses, periods, commas, and equal signs), you must code the character as part of the syntax. In this example, you must code OPERAND=(001,0.001).



Blank spaces in syntax diagrams

If a diagram shows a blank space, you must code the blank space as part of the syntax. In this example, you must code OPERAND=(001 FIXED).



Default operands

Default operands and values appear above the main path line. TCP/IP uses the default if you omit the operand entirely.



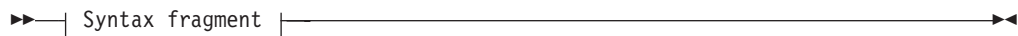
Variables

A word in all lowercase italics is a *variable*. Where you see a variable in the syntax, you must replace it with one of its allowable names or values, as defined in the text.



Syntax fragments

Some diagrams contain syntax fragments, which serve to break up diagrams that are too long, too complex, or too repetitious. Syntax fragment names are in mixed case and are shown in the diagram and in the heading of the fragment. The fragment is placed below the main diagram.



Syntax fragment:

|—1ST_OPERAND,2ND_OPERAND,3RD_OPERAND—|

Prerequisite and related information

z/OS Communications Server function is described in the z/OS Communications Server library. Descriptions of those documents are listed in “z/OS Communications Server information” on page 441, in the back of this document.

Required information

Before using this product, you should be familiar with TCP/IP, VTAM®, MVS, and UNIX System Services.

Related information

This section contains subsections on:

- “Softcopy information”
- “Other documents”
- “Redbooks” on page xx
- “Where to find related information on the Internet” on page xxi
- “Accessing z/OS licensed documents on the Internet” on page xxii
- “Using LookAt to look up message explanations” on page xxii

Softcopy information

Softcopy publications are available in the following collections:

Titles	Order Number	Description
<i>z/OS V1R6 Collection</i>	SK3T-4269	This is the CD collection shipped with the z/OS product. It includes the libraries for z/OS V1R6, in both BookManager and PDF formats.
<i>z/OS Software Products Collection</i>	SK3T-4270	This CD includes, in both BookManager and PDF formats, the libraries of z/OS software products that run on z/OS but are not elements and features, as well as the <i>Getting Started with Parallel Sysplex</i> ® bookshelf.
<i>z/OS V1R6 and Software Products DVD Collection</i>	SK3T-4271	This collection includes the libraries of z/OS (the element and feature libraries) and the libraries for z/OS software products in both BookManager and PDF format. This collection combines SK3T-4269 and SK3T-4270.
<i>z/OS Licensed Product Library</i>	SK3T-4307	This CD includes the licensed documents in both BookManager and PDF format.
<i>System Center Publication IBM S/390® Redbooks™ Collection</i>	SK2T-2177	This collection contains over 300 ITSO redbooks that apply to the S/390 platform and to host networking arranged into subject bookshelves.

Other documents

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

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

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

Title	Number
<i>z/OS Integrated Security Services Firewall Technologies</i>	SC24-5922
<i>S/390: OSA-Express Customer's Guide and Reference</i>	SA22-7403
<i>z/OS JES2 Initialization and Tuning Guide</i>	SA22-7532
<i>z/OS MVS Diagnosis: Procedures</i>	GA22-7587
<i>z/OS MVS Diagnosis: Reference</i>	GA22-7588
<i>z/OS MVS Diagnosis: Tools and Service Aids</i>	GA22-7589
<i>z/OS Integrated Security Services LDAP Client Programming</i>	SC24-5924
<i>z/OS Integrated Security Services LDAP Server Administration and Use</i>	SC24-5923
<i>Understanding LDAP</i>	SG24-4986
<i>z/OS UNIX System Services Programming: Assembler Callable Services Reference</i>	SA22-7803
<i>z/OS UNIX System Services Command Reference</i>	SA22-7802
<i>z/OS UNIX System Services User's Guide</i>	SA22-7801
<i>z/OS UNIX System Services Planning</i>	GA22-7800
<i>z/OS MVS Using the Subsystem Interface</i>	SA22-7642
<i>z/OS C/C++ Run-Time Library Reference</i>	SA22-7821
<i>z/OS Program Directory</i>	GI10-0670
<i>DNS and BIND</i> , Fourth Edition, O'Reilly and Associates, 2001	ISBN 0-596-00158-4
<i>Routing in the Internet</i> , Christian Huitema (Prentice Hall PTR, 1995)	ISBN 0-13-132192-7
<i>sendmail</i> , Bryan Costales and Eric Allman, O'Reilly and Associates, 2002	ISBN 1-56592-839-3
<i>TCP/IP Tutorial and Technical Overview</i>	GG24-3376
<i>TCP/IP Illustrated, Volume I: The Protocols</i> , W. Richard Stevens, Addison-Wesley Publishing, 1994	ISBN 0-201-63346-9
<i>TCP/IP Illustrated, Volume II: The Implementation</i> , Gary R. Wright and W. Richard Stevens, Addison-Wesley Publishing, 1995	ISBN 0-201-63354-X
<i>TCP/IP Illustrated, Volume III</i> , W. Richard Stevens, Addison-Wesley Publishing, 1995	ISBN 0-201-63495-3
<i>z/OS Cryptographic Service System Secure Sockets Layer Programming</i>	SC24-5901
<i>SNA Formats</i>	GA27-3136

Redbooks

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

Title	Number
<i>TCP/IP Tutorial and Technical Overview</i>	GG24-3376
<i>SNA and TCP/IP Integration</i>	SG24-5291
<i>IBM Communications Server for OS/390® V2R10 TCP/IP Implementation Guide: Volume 1: Configuration and Routing</i>	SG24-5227
<i>IBM Communications Server for OS/390 V2R10 TCP/IP Implementation Guide: Volume 2: UNIX Applications</i>	SG24-5228

Title	Number
<i>IBM Communications Server for OS/390 V2R7 TCP/IP Implementation Guide: Volume 3: MVS Applications</i>	SG24-5229
<i>Secureway Communications Server for OS/390 V2R8 TCP/IP: Guide to Enhancements</i>	SG24-5631
<i>TCP/IP in a Sysplex</i>	SG24-5235
<i>Managing OS/390 TCP/IP with SNMP</i>	SG24-5866
<i>Security in OS/390-based TCP/IP Networks</i>	SG24-5383
<i>IP Network Design Guide</i>	SG24-2580
<i>Migrating Subarea Networks to an IP Infrastructure</i>	SG24-5957
<i>IBM Communication Controller Migration Guide</i>	SG24-6298

Where to find related information on the Internet

z/OS

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

z/OS Internet Library

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

IBM Communications Server product

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

IBM Communications Server product support

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

IBM Systems Center publications

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

IBM Systems Center flashes

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

RFCs

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

Internet drafts

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

Information about Web addresses can also be found in information APAR II11334.

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

USENET news groups:

comp.protocols.dns.bind

For BIND mailing lists, see:

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

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

Accessing z/OS licensed documents on the Internet

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

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

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

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

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

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

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

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

Printed licensed documents are not available from IBM.

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

Using LookAt to look up message explanations

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

You can access LookAt from the Internet at:

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

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

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

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

How to send your comments

Your feedback is important in helping to provide the most accurate and high-quality information. If you have any comments about this document or any other z/OS Communications Server documentation:

- Go to the z/OS contact page at:
<http://www.ibm.com/servers/eserver/zseries/zos/webqs.html>
There you will find the feedback page where you can enter and submit your comments.
- Send your comments by e-mail to comsvrcf@us.ibm.com. Be sure to include the name of the document, the part number of the document, the version of z/OS Communications Server, and, if applicable, the specific location of the text you are commenting on (for example, a section number, a page number or a table number).

Summary of changes

Summary of changes for SC31-8780-04 z/OS Version 1 Release 6

This document contains information previously presented in SC31-8780-03, which supports z/OS Version 1 Release 5. The information in this document supports both IPv6 and IPv4. Unless explicitly noted, information describes IPv4 networking protocol. IPv6 support is qualified within the text.

New information:

- Table containing environment variables that are referenced by FTP, see “Environment variables” on page 38.
- Information about using the multibyte support in FTP that is activated by the ENCODING keyword in FTP.DATA, LOC SITE subcommand, or SITE command as an alternative to the traditional DBCS (TYPE B) language support was added to “Support for MBCS languages” on page 80.
- Added a new PROGRESS parameter to the FTP LOC SITE subcommand, see “PROGRESS” on page 192.

Changed information:

- Updated the MBDATA CONN parameter in “LOC SITE subcommand—Specify site information to the local host” on page 181 and “SITE subcommand—Send site-specific information to a host” on page 243.

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

Starting with z/OS V1R4, you may notice changes in the style and structure of some content in this document—for example, headings that use uppercase for the first letter of initial words only, and procedures that have a different look and format. The changes are ongoing improvements to the consistency and retrievability of information in our documents.

Summary of changes for SC31-8780-03 z/OS Version 1 Release 5

This document contains information previously presented in SC31-8780-02, which supports z/OS Version 1 Release 4. The information in this document supports both IPv6 and IPv4. Unless explicitly noted, information describes IPv4 networking protocol. IPv6 support is qualified within the text.

New information:

- “MKdir subcommand—Create a directory on the remote host” on page 213
- “LMkdir subcommand—Create a directory on the local host” on page 201
- “FTP return codes” on page 94
- The following areas contain new information pertaining to IPv6 support:

- “The z/OS UNIX orsh/rsh Command—Execute a Command on the Remote Host” on page 382

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

Starting with z/OS V1R4, you may notice changes in the style and structure of some content in this document—for example, headings that use uppercase for the first letter of initial words only, and procedures that have a different look and format. The changes are ongoing improvements to the consistency and retrievability of information in our documents.

Summary of changes for SC31-8780-02 z/OS Version 1 Release 4

This document contains information previously presented in SC31-8780-01, which supports z/OS Version 1 Release 2. The information in this document supports both IPv6 and IPv4. Unless explicitly noted, information describes IPv4 networking protocol. IPv6 support is qualified within the text.

New information:

- FTP Enhancements include the following:
 - FTP support for substitution characters during EBCDIC/ASCII single-byte translations
 - FTP.DATA data set statements
 - LOCSite command (see page 191)
 - Site command (see page 196)
 - The following areas contain information in support for Codepage GB18030:
 - New section describing using different MBCS translation tables (see page 80)
 - FTP.DATA data set statements
 - LOCSite command (see page 190)
 - Site command (see page 257)
- The following areas contain information for the new IPv6 support:
 - Applications: FTP (see page 29)

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

Changed information:

- FTP Client sessions that use //DD: support (see page 58)

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

Starting with z/OS V1R4, you may notice changes in the style and structure of some content in this document—for example, headings that use uppercase for the first letter of initial words only, and procedures that have a different look and format. The changes are ongoing improvements to the consistency and retrievability of information in our documents.

This document supports z/OS.e.

Chapter 1. Getting started

Transmission Control Protocol/Internet Protocol (TCP/IP) is a set of industry-standard protocols and applications that enable you to share data and computing resources with other computers, both IBM and non-IBM. By using TCP/IP commands at your workstation, you can perform tasks and communicate easily with a variety of other systems and workstations. z/OS Communications Server (z/OS CS) enables the user to interactively run TCP/IP applications (TCP/IP commands) from both the Time Sharing Option (TSO) and the z/OS shell.

The following subjects are covered in this chapter:

- “Understanding TCP/IP”
- “How TCP/IP uses networks” on page 2
- “Understanding what you can do” on page 4
- “What you need to get started” on page 6
- “Testing commands with loopback” on page 7
- “Obtaining command help” on page 7

Understanding TCP/IP

TCP/IP is a set of protocols and applications that enable you to perform certain computer functions in a similar manner independent of the types of computers or networks being used. When you use TCP/IP, you are using a network of computers to communicate with other users, share data with each other, and share the processing resources of the computers connected to the TCP/IP network.

A computer network is a group of computer nodes electronically connected by some communication medium. Each node has the hardware and the programs necessary to communicate with other computer nodes across this communication medium. The node can be a PC, workstation, microcomputer, departmental computer, or large computer system. The size of the computer is not important. The ability to communicate with other nodes is important.

Computer networks enable you to share the data and computing resources of many computers. Applications, such as departmental file servers, rely on networking as a way to share data and programs.

Many forms of communication media are available today. Each is designed to take advantage of the environment in which it operates. Communication media consist of a combination of the physical network used to connect the computer nodes and the language, or protocol, they use to communicate with each other.

Physical network

A physical network consists of electrical wiring and components, such as modems, bridges, controllers, access units, telephone lines, fiber optic cables, and coaxial cables. These are used to connect the computer nodes. The physical network can connect two nodes in a single room or thousands of nodes communicating across large geographic areas. The most common networks in use today are Local Area Networks (LANs) and Wide Area Networks (WANs). LANs cover a limited distance, generally one or two floors or buildings, while WANs, using telecommunication facilities, are used for longer distances.

Protocols

Network protocols are the rules that define how information is delivered between nodes. They describe the sequence and contents of the data exchanged between nodes on the network. Network protocols determine how a computer node functions during communication with another node, how data is encoded to reach its destination safely, and what path it should follow. Protocols coordinate the flow of messages and can specify which node a message is destined for in the network. A variety of protocols are used to take advantage of the characteristics of each of the physical network types. The most common protocols are Ethernet, 802.3, token ring, X.25, and System Network Architecture (SNA).

Network devices

Refer to the *z/OS Communications Server: IP Configuration Reference* for more information about network devices.

Addresses

A network address is a component of the communication network and is associated with both hardware and software. The address is the means by which the sending node selects the receiving node for data transfer. It is also used by the receiving node to recognize what data is destined for it. An address is a unique code assigned to every node on a network. But an address is formed differently for different protocols. The length, position, and method used to specify an address are unique for each protocol. A communication node using one protocol cannot recognize the address of another protocol.

How TCP/IP uses networks

TCP/IP consists of a layered structure of protocols ranging from hardware-dependent programs to high-level applications. Each TCP/IP layer provides services to the layer above it and uses the services of the layer below it. The lowest layer, which is next to the physical layer, is not part of TCP/IP. This layer consists of existing protocols, such as Ethernet and token ring. TCP/IP uses the services of this layer to transport data across dissimilar networks, much like a gateway.

Local and remote nodes

A physical network is used by the hosts that reside on that network. Each host is a node on that network. A node is an addressable location in a communication network that provides host processing services. The intercommunication of these nodes gives rise to the concept of *local* and *remote* nodes. A *local node* pertains to a device, file, or host accessed directly from your system. A *remote node* pertains to a device, file, or host accessed by your system through the network.

Client and server

A server is a computer or a program that contains data or provides services to be used by other computers on the network. Some of the common server types are file, print, and mail servers. They enable your computer to share the data, devices and resources of another computer. There are also servers that provide services to let you execute programs on a computer other than your own. This enables your computer to share the processing power of another computer. Servers are also known as daemons. Generally, a server runs continuously and can handle the requests of multiple clients simultaneously.

A client is a computer or a program that requests services or data from a server. A client could, for example, request that a file located at the server be sent across the network to the client.

TCP/IP addresses

An address enables data to be routed to the chosen destination. Each destination in your network, as well as any other TCP/IP network you have access to, can be uniquely identified by its assigned address (either a 32-bit IPv4 address in *dotted decimal* notation, or a 128-bit IPv6 address in *colon hexadecimal* notation).

- IPv4 TCP/IP address

An IPv4 TCP/IP address is a 32-bit number written in *dotted decimal* notation. This scheme is numeric and consists of four groups separated by a period (.). For example, 9.67.1.100 represents a single host on a single network. 193.5.86.9 represents another host on another network.

- IPv6 TCP/IP address

An IPv6 TCP/IP address is a 128-bit number written in *colon hexadecimal* notation. This scheme is hexadecimal and consists of eight 16-bit pieces of the address. For example, `x::x::x::x::x::x` represents a single host on a single network. Alternate notations described in RFC 2373 are acceptable. For example, `FEDC:BA98:7654:3210:FEDC:BA98:7654:321` or `::1`.

To indicate IPv6 prefixing use a slash followed by the number of prefix bits. For example, use `12AB:0:0:CD30::/60` to indicate the prefix 'X'12AB00000000CD3'.

Most TCP/IP commands require you to include the address of the remote host where the server you wish to access resides. Each link (physical or virtual) on a host has an IP address.

Network names

An alternative to supplying a numeric address is to use the host name, rather than the address, in TCP/IP commands. (Each host may be assigned at least one name.) Your local host can resolve the name you supply in a command into the correct numeric address. The names are translated using either a translation file or an application known as a *name server*. Your ability to use *network names* depends on how your TCP/IP network has been designed and which features have been installed.

Ports and port numbers

The use of *ports* and their identifying numbers are an extension to the addressing scheme. Once the address is used to deliver data to the desired host on the network, the *port number* is used to identify the process for which the data is used. This enables one host to provide more than one service.

How you define the port number depends on your configuration. Some applications make use of standard, or well-known, port numbers. Two applications at the same address cannot use the same port number. If you are configuring your system with multiple instances of TCP/IP on the same system, however, they will have different addresses and therefore the same port number can be used for the same function on each stack.

TCP/IP assumes the well-known port number unless you explicitly specify otherwise when entering a TCP/IP command. A port number is entered as a

decimal number on TCP/IP commands. For those cases when you are requesting the services of a user-developed server, you need to know the port number of that server.

Understanding what you can do

You can perform many functions from either TCP/IP environment: TSO or z/OS UNIX System Services (z/OS UNIX). See “How to read a syntax diagram” on page xvi for additional information about command syntax.

z/OS CS commands provide a set of basic functions that include:

- Logging on to other hosts
- Transferring data sets and files between hosts
- Sending and receiving mail
- Using other hosts
- Printing to or from other hosts

Logging on to other hosts

The Telnet protocol provides a standardized interface that enables terminal devices and terminal-oriented processes on hosts that support TCP/IP to communicate with each other. The TSO TELNET command runs the MVS telnet client that enables you to log on to a remote host from TSO as though you are directly attached to that host. This client supports the Telnet 3270 protocol. The MVS Telnet client does not run in the z/OS UNIX environment.

Connecting to the z/OS UNIX Telnet server from any client results in a session with the z/OS shell as if the user had entered UNIX System Services from TSO in line mode or character mode. Once the z/OS UNIX Telnet session has been established, you can enter any UNIX System Services command that can be issued from within the z/OS shell.

See Chapter 2, “Logging on to a host using TELNET,” on page 9 for more information about TELNET.

Transferring data sets between hosts

When data is created or stored at one host but is processed by another host, some method for transferring the data between hosts is necessary. TCP/IP implements File Transfer Protocol (FTP), a protocol for transferring files between any two hosts. The FTP command invokes the z/OS FTP client. From the FTP client, you can copy data sets and files between your local host and any host that implements an FTP server.

The FTP command provides subcommands that enable you to change the local and remote directories, set the transmission character code, list remote files, delete remote files, and send and receive files between hosts. You can use z/OS FTP client to perform Structured Query Language (SQL) queries and to submit jobs to JES for batch processing, as well as file transfer. FTP includes optional security features such as Kerberos and TLS authentication, and server user ID and password verification.

See Chapter 3, “File Transfer Protocol (FTP),” on page 29, for a complete list of FTP functions.

Sending and receiving mail

The Simple Mail Transfer Protocol (SMTP) is a TCP/IP application that is used to transport electronic mail. Electronic mail enables you to send notes, messages, letters, or correspondence to others on the network. It is similar to sending a letter through the post office. You compose the message just as you would an ordinary letter, address the letter to one or more people and possibly carbon copy others. You enclose copies of the letter in envelopes, address them to the recipients, and give them to the delivery system. You expect the mail to be delivered to the correct address available for pickup when the recipient is ready. And you want any undeliverable mail returned to you. You can even keep a log of the mail you send and receive. The following commands are available to let you send and receive mail:

Command	Description
SMTPNOTE	Composes and sends mail from you to users on local or remote hosts. The TSO SMTPNOTE command helps you address the mail, set up a copy list, and enter the text of the message. The date, time, and your address are included automatically.
z/OS UNIX sendmail	Composes and sends mail from you to users on local or remote hosts. The z/OS UNIX sendmail command helps you address the mail, set up a copy list, and enter the text of the message. The date, time, and your address are included automatically.
RECEIVE	Retrieves data that has been sent to you through the Job Entry Subsystem (JES). You use the RECEIVE command for your TCP/IP mail just as you do for other mail, messages, and data sets that are sent to you.

See Chapter 6, “Sending electronic mail using SMTP commands,” on page 289 for more information about the SMTP mail facility.

See Chapter 7, “Sending electronic mail using z/OS UNIX sendmail,” on page 323 for more information about the z/OS UNIX mail facility.

Remote command execution

Just as there are occasions when you want to transfer data to a host where it can be processed, there are also occasions when you want to process the data where it exists and send the processing results to another host. The data sets or files could be too large to transfer efficiently or all the data might be kept at one host for security reasons. The computing power necessary to perform some tasks could be more than your host is capable of or the only licensed copy of a required program might reside at some other host. TCP/IP provides a command that enables you to use the processing resources of other hosts. The TSO commands REXEC and RSH and the OE shell command orexec run client programs enable you to send any command that is valid in the remote host shell environment and receive the results at the local host. The remote host must be running a rexec server, an rsh server or both. A user ID and password provide security checking at the remote host. The command sent to the remote host must not require user interaction to complete. Refer to the *z/OS Communications Server: IP System Administrator's Commands* for more information about these commands.

Printing to or from other hosts

You can print reports, documents, listings, and so on completely independent of where the job or process that created them was executed by routing the data sets to a remote host for printing. Four TSO commands are provided for remote printing. These TSO commands do not run in the z/OS shell environment and do

not support printing of HFS files.

Command	Description
L PQ	Enables you to query a printer queue on a remote printer. You can query a printer queue for a specific job, a specific user ID, or all the jobs in a remote printer queue.
L PR	Prints a data set on a remote printer. A variety of options enables you to specify how and where the data set is printed.
L PRM	Removes a job from a printer queue.
L PRSET	Specifies remote printer and remote host names when they are not specifically included in the Line Print commands.

What you need to get started

TCP/IP is a part of your z/OS system. To use it you need a TSO user ID and password. If you are already a TSO user, you can begin using TCP/IP.

In order to use z/OS CS for V1R6 applications, you must be authorized to use z/OS UNIX System Services. For information about z/OS UNIX, refer to the *z/OS UNIX System Services User's Guide*.

Ensure that you have the following before proceeding:

User IDs and passwords

You should have a user ID and password for each host you intend to use that requires user authorization and authentication. This includes most hosts you use. Some hosts on a TCP/IP network use a user ID of anonymous and a password of guest to permit all interested parties access to data sets contained at that host, but that is the exception and not the rule.

Host names

TCP/IP commands require that you know the name or IP address of the remote host you want to use.

Authorizations for data and programs

Your ability to access data sets and programs on remote hosts depends on the data security system used by that host. You might require authorization by the Resource Access Control Facility (RACF®) or other security programs before you can gain access to data sets, commands, or other resources on remote hosts.

Electronic mail addresses

To send mail electronically, you need the e-mail address of the users you wish to send mail to and they need to know your electronic mail address to send you mail.

Printer names

You need the printer name and name of the remote host to which it is attached to print using TCP/IP.

Testing commands with loopback

In order to test your local machine, an address is reserved that always refers to your local host rather than any other hosts on a network. For IPv4, this class A network address is 127.0.0.1. For IPv6, the reserved loopback address is ::1. You can also specify loopback as the host name. Not all commands and clients shipped with z/OS CS V1R6 support IPv6 addresses or hostnames that resolve to IPv6 addresses.

You can use the loopback address with any TCP/IP command that accepts IP addresses. When you issue a command with the loopback address, the command is sent out from your local host's client and continues until it reaches the IP layer on your local host. The command is then sent on to your local host's server.

Note: Any command or data that you send using the loopback address never actually goes out on any network.

You can also use a nonloopback local IP address for testing. It can be any local IP address assigned to a device, even though the device may not be active, but cannot be a multicast or broadcast address. The nonloopback address provides a faster response but may not reach the IP layer on your host.

The loopback address is commonly used as the first step in diagnosing network problems. The information you receive indicates the state of your system and checks to ensure that the client and server code for the function you are testing is operating properly. You should see the same response as for a normal, successful command. If the client or server code is not operating properly, the same message that would be returned for an unsuccessful command is returned.

Obtaining command help

Commands typically support HELP or -? options that allow users to obtain online help. Additionally, end user commands supported in the z/OS UNIX System Services shell environment support man pages (manual pages). For example, typing **man ftp** will display the manual pages for the ftp command.

Chapter 2. Logging on to a host using TELNET

The TELNET protocol provides a standardized interface that enables terminal devices and terminal-oriented processes on hosts that support TCP/IP to communicate with each other.

The following subjects are covered in this chapter:

- “Using the TSO TELNET command”
- “Using the TELNET subcommands” on page 13
- “Using the TELNET function keys” on page 23
- “Suppressing carriage return and line feed” on page 23
- “Using TELNET 3270 DBCS transform mode” on page 24

Using the TSO TELNET command

When you use the TSO TELNET command you are running a Telnet client to connect to a remote host running a Telnet server. The data displayed on your terminal is managed by the Telnet client which communicates using TCP/IP with the Telnet server at the remote host. As a result, the operation of your terminal may differ from what you are used to seeing when you are directly logged on to TSO or to another MVS application. For example, the remote host may be running UNIX, VM or any other operating system that provides a telnet server. You need to use the terminal operation procedures of the remote host operating system while you have a TELNET session with that remote host.

TELNET management of your terminal for the remote host can also cause operational differences. For example, the function keys described in “Using the TELNET function keys” on page 23 can result in different actions.

When all of the display data will not fit on your screen, Linemode displays the HOLDING message in the lower right corner of your screen. If this message appears, press the CLEAR key to see the rest of the data.

If your TELNET session ends for any reason, the following message is displayed:
Session ended. <ENTER> to return to TSO.

If you invoke the services of the MVS telnet 3270 server from a telnet client that is not telnet 3270 capable, you will not be able to use applications in full-screen mode. Once in line-mode all nested telnet sessions will continue to be line mode. If you use TELNET in line mode to access an MVS or VM TELNET server, all subsequent nested TELNET requests are automatically connected in line mode as a start-stop TTY terminal, and transparent (full-screen) operations are not possible.

When you return to TSO, a message explaining why the TELNET session ended is displayed. The following is an example of what is displayed when you return to TSO:

```
TELNET terminated -- Foreign host is no longer responding
```

Note: The z/OS TELNET client does not support the Secure Sockets Layer (SSL) protocol.

TELNET command

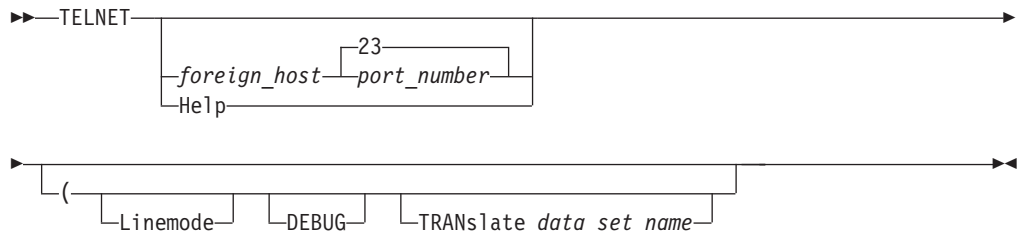
Purpose

The TELNET command enables you to log on to a foreign host that supports TCP/IP.

Notes:

1. For information on how to read syntax diagrams, see “How to read a syntax diagram” on page xvi.
2. The TSO TELNET command uses the Pascal socket API, so VMCF must be started for the command to be successful. If VMCF is not started, an ABEND00D6 can occur.

Format



Parameters

foreign_host

Specifies the name or IP address of the local or remote host. If you do not specify the name or IP address of the host, you are prompted for the *foreign_host*. This must be an IPv4 address or a hostname that resolves to an IPv4 address.

port_number

Specifies the port number to which you want to connect on the host. The default is well-known port 23.

Help

Provides a description of the TELNET command, its subcommands, and how it operates.

Linemode

Uses the line mode and prevents operation in the transparent mode.

In line mode, the foreign host output is displayed on your screen one line at a time, without full-screen capabilities.

Note: You cannot use the TELNET command to log on to an MVS host from an existing MVS line mode TELNET session. In this situation, the error message TELNET requires a 327x-Type terminal is displayed.

In transparent mode, the foreign host full-screen capabilities are functional on your local terminal.

Transparent mode is the default.

DEBUG

Causes TELNET client-trace data, including the data transferred to and

received from the TELNET server, to be written to a data set defined by the DEBUGFIL DD statement in the user TSO LOGON procedure, or as specified by issuing the TSO ALLOC command.

The following is an example of the DEBUGFIL DD statement:

```
//DEBUGFIL DD DSN=USER28.TELNET.TRACE,DISP=OLD
```

The following is an example of the TSO ALLOC command:

```
ALLOC DDNAME(DEBUGFIL) DSNAME(USER28.TELNET.TRACE) OLD
```

TRANslate *data_set_name*

Specifies the name of a nonstandard translation table. If you specify this parameter, TELNET uses the translation table in the *user_id.data_set_name*.TCPXLBIN data set, rather than the standard translation tables *user_id*.TELNET.TCPXLBIN or *hlq*.TELNET.TCPXLBIN.

If *user_id.data_set_name*.TCPXLBIN does not exist, TELNET uses *hlq.data_set_name*.TCPXLBIN.

If *user_id.data_set_name*.TCPXLBIN and *hlq.data_set_name*.TCPXLBIN do not exist, or if they were incorrectly created, TELNET ends with an error message. A nonstandard translation table is used in line mode only.

Examples

- To log on to a host with an IP address of 1.1.2.3, enter:

```
TELNET 1.1.2.3
```

The following is displayed:

```
System:
User:    READY
System:  TELNET 1.1.2.3
MVS TCP/IP TELNET CS V1R2
Connecting to 1.1.2.3, port TELNET (23)
***
Using Transparent Mode...

Notes on using TELNET when in Transparent Mode:
- To enter TELNET Command, Hit PA1
***
```

- If your user ID is RON and the translation table RON.EXAMPLE.TCPXLBIN is required rather than the standard one, you should enter:

```
TELNET 1.1.2.3 (TRANslate EXAMPLE
```

- If the remote host is neither MVS nor VM, and you specify a nonstandard translation table, a linemode connection is automatically used.
- If the remote host is an MVS or VM host and you specify a nonstandard translation table without the linemode parameter, the nonstandard translation table is ignored.
- If the host is an MVS or VM host and both the linemode parameter and a nonstandard translation table are specified, the nonstandard translation table is used.

Usage

- The minimum abbreviation for each parameter is shown in uppercase letters.
- TELNET normally operates in transparent mode. In 3270 transparent mode, all full-screen capabilities of the remote host are functional at your local display station, but the **PA1** key is the only special-function key whose intended

function is passed to the application by Telnet. In line mode, the remote host output is displayed on your screen one line at a time, without full-screen capabilities.

- The TELNET command supports IBM 3270-type display stations. Examples of supported display stations are:
 - IBM 3178 Display Station
 - IBM 3179 Display Station
 - IBM 3180 Display Station
 - IBM 3191 Display Station
 - IBM 3192 Display Station
 - IBM 3193 Display Station
 - IBM 3194 Display Station
 - IBM 3275 Display Station Model 2
 - IBM 3276 Control Unit Display Station Models 2, 3, and 4
 - IBM 3277 Display Station Model 2
 - IBM 3278 Display Station Models 2, 3, 4, and 5
 - IBM 3279 Color Display Station Models 2 and 3

Using the TELNET subcommands

You must be in the TELNET environment to use the TELNET subcommands.

To invoke a TELNET subcommand while you are logged on to the foreign host, press the PA1 key (transparent mode) or the designated PF key (line mode). After you press the PA1 or PF key, you will be prompted to enter a TELNET subcommand. You can enter TELNET subcommands in uppercase or lowercase. Table 1 lists the TELNET subcommands.

Table 1. TELNET subcommands

Subcommand	Description	Page
AO	Stops the display of information	14
AYt	Queries the existence of the connection	15
Brk	Sends a Break or Attn keystroke	16
Help or ?	Displays help information	17
Ip	Interrupts the current process	18
Pa1	Sends a PA1 keystroke in transparent mode	19
Quit	Disconnects from the foreign host	20
Synch	Clears the data path	21

Note: The minimum abbreviation for each subcommand is shown in uppercase letters.

AO—Terminate output display

Purpose

Use the AO (Abort Output) subcommand to stop the display of output.

Format

▶▶—AO—▶▶

Parameters

There are no parameters for this subcommand.

Usage

The AO subcommand is used to clear any output that has already been produced, but has not been displayed on your terminal.

AYT—Query the connection

Purpose

Use the AYT (Are You There) subcommand to query the existence of the connection.

Format

▶—AYt—▶

Parameters

There are no parameters for this subcommand.

Usage

- You can use the AYT subcommand to check for the existence of a TELNET connection. For example, if you feel that a command is taking longer than it should to complete, issue the AYT subcommand to test whether the connection is still active.
- If the connection exists and you are operating in transparent mode, the terminal makes a sound. If you are operating in line mode, you receive a message from the TELNET server.

BRK—Send a Break or Attention keystroke to a host

Purpose

Use the BRK subcommand to send a **Break** or **Attn** (Attention) keystroke to the remote session.

Format

►►—Brk—◄◄

Parameters

There are no parameters for this subcommand.

Usage

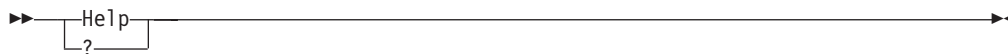
You can use the BRK subcommand to end a command without terminating the TELNET session.

HELP or ?—Display help information

Purpose

Use the **HELP** (or **?**) subcommand to access the help facility.

Format



Parameters

There are no parameters for this subcommand.

Usage

- After your TELNET connection is established, your display station screen is controlled by the foreign host, so the help you see is different for line mode and transparent mode. The help available in transparent mode is abbreviated because TELNET does not have control of the screen.
- When you invoke the HELP or ? subcommand in line mode, TELNET displays the help information one line after another, as in the following example:

Once connected, follow the log in and usage procedures of the remote host.

To invoke one of several TELNET commands, hit a PF key (PF4-12, PF16-24), and then enter any of the following commands:

Help or ? -- Receive (this) assistance

AYT -- Are You There?

AO -- Abort Output

BRK -- Break

IP -- Interrupt Process

SYNCH -- Clear data path, except for TELNET commands

Quit -- Quit the TELNET session

The following PF settings are in force:

- PF1 or 13 -- Retrieve previous input line
- PF2 or 14 -- Scroll halfway up
- PF3 or 15 -- Turn off display of user-line; designed to be used before entering password

For control characters, enter `^c` or `~c` where `c` is:

- "0": 00, "a" - "z" or "A" - "Z": 0x01-0x1A
- "2" - "6": 0x1B-0x1F
- "{": 0x5B, "}": 0x5D, "#": 0x7F

- When you invoke the `HELP` or `?` subcommand in transparent mode, TELNET overwrites one line of the current screen with the help information, as in the following example:

Valid TELNET cmds: A0,AYT,BRK,IP,PA1,QUIT,SYNCH.

IP—Interrupt the process

Purpose

Use the IP subcommand to interrupt the current process running on the remote host.

Format

►►—Ip—◄◄

Parameters

There are no parameters for this subcommand.

Usage

You can use the IP subcommand if you want to stop a process that is in a loop, or when you want to stop a process that you inadvertently started.

PA1—Send the PA1 keystroke to a host

Purpose

Use the PA1 subcommand to send a **PA1** keystroke to the remote session in transparent mode.

Format

►—Pa1—◄

Parameters

There are no parameters for this subcommand.

Usage

- The PA1 subcommand operates only in transparent mode. This subcommand replaces the **PA1** attention key on the remote host.
- When there are nested TELNET sessions, use the **PA1** key to enter a TELNET subcommand in the first open TELNET session. To enter a TELNET subcommand in the second open TELNET session, send a PA1 subcommand from the first session.
- You would normally interrupt a PING command by pressing **PA1**. However, in a transparent mode TELNET session, this key is used to invoke a TELNET subcommand. You would issue a PA1 subcommand to interrupt the PING command instead.

QUIT—End the TELNET session

Purpose

Use the QUIT subcommand to end the TELNET session.

Format

►—Quit—►

Parameters

There are no parameters for this subcommand.

Usage

- You should use the QUIT subcommand carefully because it can create an MVS error condition. If you do not reconnect within a timeout period, your TELNET session is canceled.
- If you are logged on to an application on a remote host, and that application is defined as disconnectable to VTAM and TCP/IP, you can use the QUIT subcommand to disconnect from the remote host without logging off the application.
- When you want to end a logon session with the host, use the logoff procedure of the host.

For more information about defining applications to VTAM and TCP/IP, refer to the *z/OS Communications Server: IP Configuration Reference*.

SYNCH—Clear the data path

Purpose

Use the SYNCH subcommand to clear the data path.

Format

►►—Synch—◄◄

Parameters

There are no parameters for this subcommand.

Usage


The SYNCH subcommand clears the data path to the host, except for any TELNET subcommands in the data path. This subcommand enables you to ensure that commands issued when the TELNET server is inactive are not executed when the TELNET server becomes active.

¢ and `—Send ASCII control characters to a host in line mode

Purpose

Use the ¢ character and the grave accent (`) in line mode to indicate a control character.

Format

►  *control_character* ►

Parameters

control_character

Indicates the ASCII control character that you want to send to the host. The purpose of each control character is specific to the remote host.

Examples

To send **Ctrl - p**, use either: ¢p or `p.

Usage

- If you want to use ¢ or ` without indicating a control character, you must enter these characters twice.
- The ASCII control characters are shown in Table 2.

Table 2. ASCII control characters

Character input	ASCII output
`A – `Z	01 – 1A (Ctrl-a – Ctrl-z)
`{	5B (left square bracket - [)
`}	5D (right square bracket -])
`2 – `6	1B – 1F
`#	7F (DEL)

Using the TELNET function keys

This section describes the functions that are assigned to PF keys when you invoke TELNET in transparent mode and line mode.

Transparent mode function keys

In transparent mode, the only function key available is the **PA1** attention key. It is used to invoke a TELNET subcommand. If there is more than one nested TELNET session, the **PA1** key is used to invoke a TELNET subcommand for the first TELNET session.

See “PA1—Send the PA1 keystroke to a host” on page 19 for information about how to send the PA1 keystroke to the foreign host session.

Line mode function keys

Table 3 describes the function keys that are available in line mode.

Table 3. TELNET function keys in line mode

Function key	Description
PF4 – PF12 , PF16 – PF24	Enables you to invoke a TELNET subcommand. After pressing one of these function keys, enter a subcommand or enter Help to get a list of valid subcommands.
PF1 , PF13	Retrieves the previous input line, except when the line was entered in hidden mode for security reasons.
PF2 , PF14	Scrolls halfway up the screen.
PF3 , PF15	Turns off input line display so data is not echoed to the screen. For example, use either of these keys before entering your password to keep it from being displayed.

Suppressing carriage return and line feed

It is useful if the command environment of the foreign host responds when you enter a single character, without the need for a carriage return and line feed after that character. This function is also useful when your cursor is at the end of the input field, but you want to continue the line without introducing a carriage return.

Figure 1 and Figure 2 on page 24 show the output of a BSD UNIX program called MORE™. This program displays one line or one page at a time. A carriage return character (CR) causes it to display one line, while a blank character causes it to display one page. If you are executing this program from an MVS host, use the grave accent (`) character to suppress the CR that is normally sent when you press Enter.

```
% more hosts.local
NET : 4.0.0.0 : SATNET :
NET : 6.0.0.0 : YPG-NET :
NET : 7.0.0.0 : EDN-TEMP :
NET : 8.0.0.0 : BBNCCNET :
NET : 9.0.0.0 : IBM :
NET : 10.0.0.0 : ARPANET :
NET : 12.0.0.0 : ATT :
NET : 13.0.0.0 : XEROX-NET :
NET : 14.0.0.0 : PDN :
NET : 15.0.0.0 : HP-INTERNET :
NET : 18.0.0.0 : MIT-TEMP :
NET : 21.0.0.0 : DDN-RVN :
NET : 23.0.0.0 : DDN-TC-NET :
NET : 24.0.0.0 : MINET :
NET : 25.0.0.0 : RSRE-EXP :
NET : 26.0.0.0 : MILNET :
NET : 27.0.0.0 : NOSC-LCCN-TEMP :
NET : 28.0.0.0 : WIDEBAND :
NET : 29.0.0.0 : MILX25-TEMP :
NET : 30.0.0.0 : ARPAX25-TEMP :
NET : 31.0.0.0 : UCCLA-NET :
NET : 35.0.0.0 : MERIT :
--More--(0%) [HIT <ENTER> HERE. ONE LINE IS DISPLAYED]
NET : 36.0.0.0 : SU-NET-TEMP :
--More--(0%)
```

Figure 1. Sample output of the MORE program—first screen

```
NET : 39.0.0.0 : SRINET-TEMP :
--More--(0%) [HIT <BLANK>, <ACCENT GRAVE>, <ENTER>]
NET : 39.0.0.0 : SRINET-TEMP :
NET : 41.0.0.0 : BBN-TEST-A :
NET : 42.0.0.0 : CAN-INET :
NET : 44.0.0.0 : AMPRNET :
NET : 46.0.0.0 : BBNET :
NET : 128.1.0.0 : BBN-TEST-B :
NET : 128.2.0.0 : CMU-NET :
NET : 128.3.0.0 : LBL-IP-NET1 :
NET : 128.4.0.0 : DCNET :
NET : 128.5.0.0 : FORDNET :
NET : 128.6.0.0 : RUTGERS :
NET : 128.7.0.0 : KRAUTNET :
NET : 128.8.0.0 : UMDNET :
NET : 128.9.0.0 : ISI-NET :
NET : 128.10.0.0 : PURDUE-CS-EN :
NET : 128.11.0.0 : BBN-CRONUS :
NET : 128.12.0.0 : SU-NET :
NET : 128.13.0.0 : MATNET :
NET : 128.14.0.0 : BBN-SAT-TEST :
NET : 128.15.0.0 : S1NET :
NET : 128.16.0.0 : UCLNET :
NET : 128.17.0.0 : MATNET-ALT :
--More--(1%)
```

Figure 2. Sample output of the MORE program—second screen

Using TELNET 3270 DBCS transform mode

When 3270 DBCS transform mode is configured for the MVS TELNET server, all new line-mode sessions to the server are introduced with a panel where you can select transform mode or line mode.

TELNET 3270 DBCS transform mode is used to provide 3270 DBCS emulation, while the 3270 processing is done only at the host end of the connection. This enables full-screen access from non-3270 terminals.

TELNET 3270 DBCS transform mode supports terminals of the VT100/VT220 family of terminals, including VT100 and VT282.

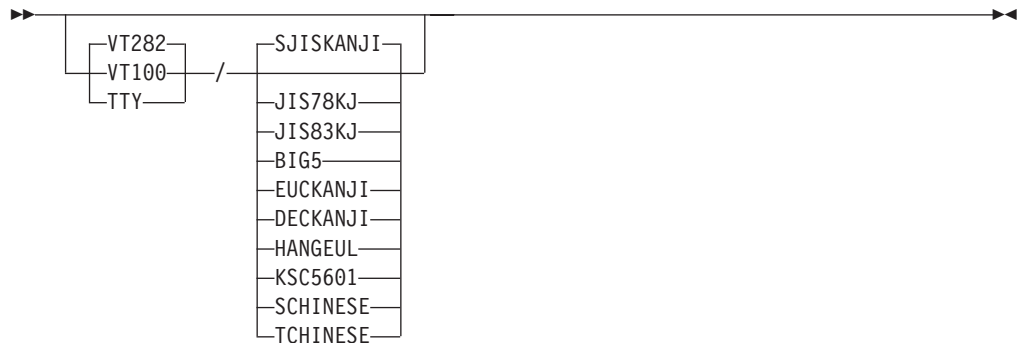
To log on to the server using 3270 DBCS transform mode, specify the LINEMODE option on the TELNET client command line. The following banner is displayed if transform mode is available:

```
IBM TCP/IP TELNET SERVER DBCS SERVICE START AT HH.MM.SS ON MM/DD/YY  
KEY-IN YOUR TERMINAL TYPE & CONVERSION TYPE:
```

Terminal and conversion type

Format

When the DBCS banner appears, enter the required terminal and conversion type.



Parameters

VT100

VT100 terminal type, full-screen mode—no DBCS support

VT282

VT282 terminal type, full-screen mode—with DBCS support

TTY

Line mode—no DBCS support. This option bypasses operation in transform mode.

SJISKANJI

Shift JIS Kanji DBCS conversion

JIS78KJ

JIS Kanji 1978 DBCS conversion

JIS83KJ

JIS Kanji 1983 DBCS conversion

BIG5

Big-5 DBCS conversion

EUCKANJI

Extended UNIX code Kanji DBCS conversion

DECKANJI

DEC Kanji DBCS conversion

HANGEUL

Hangeul DBCS conversion

KSC5601

Korean Standard code KSC-5601 DBCS conversion

SCHINESE

Simplified Chinese DBCS conversion

TCHINESE

Traditional Chinese (5550) DBCS conversion

Usage

- Do not enter any spaces between the terminal type and the slash character (/), or between the slash character (/) and the conversion type. For example, to specify a VT282 terminal with Shift JIS Kanji DBCS conversion, enter the following:
VT282/SJISKANJI
- If the conversion type is not specified, it defaults to the CODEKIND specified in the TNCBCSTM configuration data set. If neither terminal type nor conversion type is specified, the terminal type defaults to VT282 and the conversion type to the CODEKIND specified in the TNDBCSTM configuration data set.
- TELNET 3270 with DBCS transform mode supports a screen size of 24 by 80. Unpredictable results may occur when using a larger screen size.
- The maximum number of concurrent TELNET 3270 DBCS Transform connections is 250.

Context

For more information about using translation tables, refer to the *z/OS Communications Server: IP Configuration Reference*.

For information about character sets, see “Character set cross reference table” on page 405.

For information about the TELNET extensions for terminals other than the 3270 family, see Appendix C, “TELNET extensions,” on page 405.

Chapter 3. File Transfer Protocol (FTP)

The FTP command runs the FTP client program that enables you to transfer data sets and files between your local host and another host running an FTP server. Using the FTP command and its subcommands, you can sequentially access multiple hosts without leaving the FTP client.

This chapter describes:

- “Using FTP”
- “Getting help” on page 38
- “Establishing and exiting a connection” on page 38
- “Obtaining status and system information” on page 40
- “Working with directories on the remote host” on page 41
- “Working with directories on the local host” on page 45
- “Security considerations” on page 46

Using FTP

Before transferring files between your local host and a remote host, or using any other FTP functions, you must enter the FTP environment. Enter the FTP environment by doing one of the following:

- Code PGM=FTP in a batch job and pass parameters using PARM keyword. See “Submitting FTP requests in batch” on page 88 for more information.
- Enter the FTP command from TSO.
- Enter the FTP command from the z/OS UNIX shell.
- Pass the FTP command parameters to the FTP Callable API. Refer to the FTP Callable API chapter in the *z/OS Communications Server: IP Programmer's Reference* for complete details on the FTP Callable API.

Entering the FTP environment

Purpose

Use the FTP command to enter the FTP environment. When using the FTP Callable API, omit the FTP keyword.

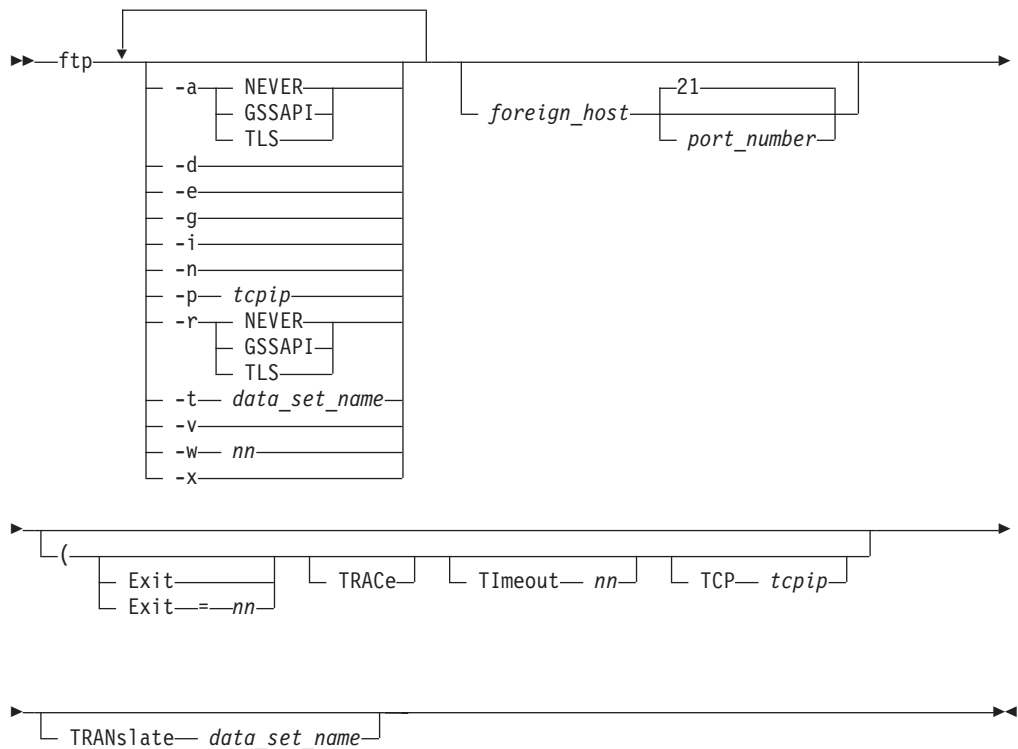
Note: In a z/OS UNIX environment, using the FTP command in the format shown in this example results in an error:

```
ftp 1.1.2.3 (trace
```

Instead, use the standard UNIX flag (for example, -d) or precede the left parenthesis with an escape character, such as the backslash (\):

```
ftp 1.1.2.3 \ (trace
```

Format



Parameters

-a

NEVER

FTP will not attempt authentication upon initial connection.

GSSAPI

FTP will attempt auto-authentication upon initial connection. FTP attempts to authenticate to the FTP server by sending the AUTH command specifying GSSAPI as the authentication type. Once the authentication type is accepted, the authentication protocol will proceed by issuing ADAT commands.

TLS

FTP will attempt auto-authentication upon initial connection. FTP attempts to authenticate to the FTP server by sending the AUTH command specifying TLS as the authentication type.

- d Starts the generation of tracing output. Equivalent to TRACE.
- e Terminates FTP for certain FTP errors with a nonzero MVS return code. Equivalent to EXIT.
- g Turns off metacharacter expansion (globbing). Equivalent to the GLOB subcommand.
- i Turns off interactive prompting for MDELETE, MGET, and MPUT subcommands. Equivalent to the PROMPT subcommand.
- n Inhibits automatic login. If you have defined a NETRC data set, it will not be used to log in to this session.
- p *tcpip*
Indicates the name of the TCP on the local host to which the FTP client should connect. This parameter is ignored if your system is not configured for multiple instances of TCP/IP. This is equivalent to TCP *tcpip*.
- t *data_set_name*
Specifies the name of a nonstandard translation table. Equivalent to TRANSLATE *data_set_name*.
- r The option -r is the same as -a except that the AUTH command must be accepted by the server. If it is not, then the client ends the session.

NEVER

FTP will not attempt authentication upon initial connection. This option overrides a value in the FTP.DATA file that would cause authentication.

GSSAPI

FTP will attempt auto-authentication upon initial connection. FTP attempts to authenticate to the FTP server by sending the AUTH command specifying GSSAPI as the authentication type. Once the authentication type is accepted, the authentication protocol will proceed by issuing ADAT commands. If the authentication type is not accepted the client will terminate the connection.

TLS

FTP will attempt auto-authentication upon initial connection. FTP attempts to authenticate to the FTP server by sending the AUTH command specifying TLS as the authentication type.

- v Enables verbose mode. This parameter gives you extra information (such as message IDs) when running in z/OS UNIX.

Note: When running the FTP client from TSO, use the TSO profile options MSGID and NOMSGID to affix or discard message IDs.

- w *nn*
Specifies the number of seconds to be used for the TIMEOUT parameters. Equivalent to TIMEOUT *nn*.
- x Client attempts to negotiate encryption (data and command protection level of private) immediately after a successful authentication negotiation.

foreign_host

Specifies the name of the host to which you are connecting. Specify the host by its host name or its IP address. The host can be a remote host or your local host.

You are prompted for a host name if you do not specify a *foreign_host* with the FTP command. If you specify *foreign_host* incorrectly, or if the host is not accessible, you enter the FTP environment without connecting to a host. You should then use either the OPEN subcommand to attempt another connection with a host, or the QUIT subcommand (or Ctrl-C, in z/OS UNIX) to exit the FTP environment.

port_number

Specifies the port number of the FTP server on the remote host. The default is well-known port 21. The maximum port number that can be specified is 65534. This parameter should not be used unless you are sure there is a server listening on a port other than the well-known port 21 at the destination.

Exit

Terminates FTP, for certain FTP errors, with a nonzero MVS return code. See “FTP return codes” on page 94 for a description of the return code options available for the client.

Exit=nn

Terminates FTP with a nonzero return code of your choice when an FTP error occurs. Valid values are in the range 0–4095.

TRACe

Starts the generation of tracing output. TRACe is used in debugging.

Timeout nn

Specifies the number of seconds (*nn*) to be used for the following Timeout parameters:

- MyopenTime
- DconnTime
- CconnTime
- InactTime
- DataCtTime

See “Changing local site defaults using FTP.DATA” on page 63 for a description of each of these timers and their default values. FTP.DATA can be used to customize each timer individually.

If you specify a value outside the range 15–86400, the Timeout parameters are not changed.

Note: If the value is not a number, all Timeout values are set to 0.

TCP *tcpip*

Indicates the name of the TCP on the local host to which the FTP client should connect. This parameter is ignored if your system is not configured for multiple instances of TCP/IP.

Note: You must specify this value as a parameter, not as a value in the FTP.DATA data set. You may choose to specify this value with the TCPIPJOBNAME statement in the resolver configuration file.

TRANslate *data_set_name*

Specifies the data set name of a nonstandard translation table. If you specify

this parameter, FTP uses the translation table in the *user_id.data_set_name.TCPXLBIN* data set, rather than the standard translation table provided with TCP/IP (*hlq.STANDARD.TCPXLBIN*). The *hlq.STANDARD.TCPXLBIN* data set is never used if you specify the TRANSLATE parameter.

If *user_id.data_set_name.TCPXLBIN* does not exist, FTP uses *hlq.data_set_name.TCPXLBIN*. If neither data set exists, or if they were incorrectly created, FTP ends with an error message.

Since the TRANSLATE parameter also dictates the search order for DBCS translation tables, you may wish to use a customized DBCS translation table but not require a modified SBCS translation table. If this is the case, copy *hlq.STANDARD.TCPXLBIN* into the nonstandard TCPXLBIN translation table data set to ensure FTP will start.

Notes:

1. Use the CTRLConn and SBDataconn statements in your local FTP.DATA data set to specify different SBCS tables for the control and data connections, or use the LOCSITE SBDataconn subcommand to change the SBCS translation for the data connection. For information on specifying these statements, see “Support for SBCS languages” on page 76.
2. If you require the use of a customized DBCS translation table, but cannot or do not wish to use the TRANSLATE parameter, you can name the data set such that it will be found in the client search order (e.g. *userid.FTP.TCPdbBIN*). Refer to the *z/OS Communications Server: IP Configuration Reference* for information about the DBCS translation table search order. FTP does not terminate because it fails to find a nonstandard DBCS translation table data set.

Usage

- When starting FTP in a TSO environment that includes support for the REXX programming language, you receive the following message:

```
CSV003I Requested module IRXSTK not found
```

This is a normal informational message when starting FTP in a TSO environment.

- If entered from z/OS UNIX, the FTP flags (-a, d, -e, -g, -i, -n, -p, -r, t, -v, -w, and -x) must be entered in lowercase. These options can be entered in lowercase or uppercase from TSO.
- GSSAPI authentication is supported only for IPv4 connections. The client will fail the negotiation when the connection is IPv6.
- NOOPTMSS is no longer supported and is ignored.
- When FTP is started from the FTP Callable API, some of the start parameters are ignored. Refer to the FTP client behavior when started by the FTP Callable API section in the *z/OS Communications Server: IP Programmer's Reference* for more information.

Context

- See “Open subcommand—Connect to the FTP server” on page 220 and “QUIT subcommand—Leave the FTP environment” on page 231 for more information about the OPEN and QUIT subcommands.
- See “FTP return codes” on page 94 for a description of return code handling in the FTP client.

- See “Changing local site defaults using FTP.DATA” on page 63 for information about the FTP.DATA data set.
- Refer to the *z/OS Communications Server: IP Configuration Reference* for information about the TCPIP.DATA data set or loading and customizing DBCS translation tables.

Logging in to FTP

If you correctly specify a foreign host with the FTP command, you are prompted to identify yourself. The following is a sample of the information that is displayed after you successfully invoke the FTP command with *foreign_host* correctly specified.

```
IBM FTP CS V1R5
FTP: using TCPCS
Connecting to: 9.67.113.37 port: 21.
220-FTPD1 IBM FTP CS V1R4 at vic135, 19:11:09 on 2003-01-15.
220 Connection will close if idle for more than 5 minutes.
NAME (9.67.113.37:USER10):
>>> USER USER10
331 Send password please.
PASSWORD:

>>> PASS
230 USER10 is logged on. Working directory is "/tmp".
Command
```

After successfully identifying yourself, you are prompted for a password if the foreign host requires a password. If you enter the password correctly, you are connected to the foreign host.

Notes:

1. You can use the data set NETRC to automatically log in to a remote host. For information about using NETRC, see “NETRC data set” on page 37.
2. If you have enabled UTF-8 encoding of the control connection, the login sequence is different. See “UTF-8 enabled control connection” on page 36 for more information.
3. During the FTP login process, if you receive a series of 230-type replies there may be errors in the user-level configuration files. These replies contain CD and SITE command errors that may appear. These errors describe the failures of CD and SITE commands listed in a user-level configuration file. Contact the system programmer for assistance.

Refer to *z/OS Communications Server: IP and SNA Codes* for additional information about 230-type replies.

4. When the FTP Callable API is invoked by an application program, DD names associated with the application are not available to the spawned FTP client process and the handling of prompts from the client differs. Refer to the FTP client behavior when started by the FTP Callable API section in the *z/OS Communications Server: IP Programmer's Reference* for more information.

For the procedure to enter the FTP environment using the FTP command, see “Establishing and exiting a connection” on page 38 for more information.

Allocating FTP input and output data sets

When you invoke the FTP command from TSO, a check is made to see whether a data set is allocated to INPUT. If a data set is allocated, subcommands are read from that data set rather than from your terminal. Similarly, a check is also made to see whether a data set is allocated to OUTPUT. If so, all FTP prompts and replies are written to that data set rather than to your terminal.

The record length and block size of the output data set can be any size. If the logical record length of the output data set is less than 100 bytes, some messages could be truncated or wrapped around to the next line.

If you create INPUT and OUTPUT data sets, use the following guidelines:

- Specify the INPUT data set:
 - Record format=FB.
 - Logical record length=2080.
The logical record length of the input data set may be any value in the range 80–2080.
 - Block size is a multiple of logical record length.
- Specify the OUTPUT data set:
 - Record format=FB.
 - Logical record length=160.
 - Block size is a multiple of 160.

Restriction: When the FTP Callable API is invoked by an application program, INPUT and OUTPUT DD names are not available to the spawned FTP client process. Refer to the *z/OS Communications Server: IP Programmer's Reference* for a description of the FTP Callable API.

UTF-8 enabled control connection

You can specify EXTENSIONS UTF8 in the client's FTP.DATA data set to enable the FTP client to use and accept UTF-8 encoding of the control connection. Refer to the *z/OS Communications Server: IP Configuration Reference* for information about the EXTENSIONS statement. If you code EXTENSIONS UTF8 in the client's FTP.DATA data set, the login sequence is different. Following is an example of logging in to a UTF-8 enabled FTP server when the client has enabled UTF-8 encoding of the control connection.

```
IBM FTP CS V1R5
FTP: using TCPCS
Connecting to: 9.67.113.37 port: 21.
220-FTPD1 IBM FTP CS V1R4 at vic135, 19:16:11 on 2003-01-15.
220 Connection will close if idle for more than 5 minutes.
>>> FEAT
211- Extensions supported
    UTF8
    LANG en*
211 End
>>> LANG en
200 - Language is en-US (United States English)
NAME (9.67.113.37:USER10):

>>> USER USER10
331 Send password please.
PASSWORD:

>>> PASS
230 USER10 is logged on. Working directory is "/tmp".
Command:
```

The difference is that the client issues the FEAT command during login to negotiate use of UTF-8 on the control connection, as specified in RFC 2640 (see Appendix E, “Related protocol specifications (RFCs),” on page 415). In this example, the FEAT reply indicates the server supports RFC 2640 (UTF8 and LANG keywords), so the client issues LANG to commence UTF-8 encoding of the control connection.

Here is an example of a UTF-8 enabled client logging in to a server which does not support UTF-8 encoding:

```

IBM FTP CS V1R5
FTP: using TCPCS
Connecting to: 9.67.113.37 port: 21.
220-FTPD1 IBM FTP CS V1R4 at vic135, 19:20:43 on 2001-10-15.
220 Connection will close if idle for more than 5 minutes.
>>> FEAT
211- Extensions supported
SIZE
MDTM
REST STREAM
211 End
NAME (9.67.113.37:USER10):

>>> USER USER10
331 Send password please.
PASSWORD:

>>> PASS
230 USER10 is logged on. Working directory is "/tmp".
Command:

```

The client issued the FEAT command during login because EXTENSIONS UTF8 is coded in FTP.DATA. Since the server FEAT reply did not indicate the server supports RFC 2640, no LANG command was issued by the client. The client will not send UTF-8 encoded data to this server.

NETRC data set

The *user_id*.NETRC data set (*/\$HOME/.netrc*, in *z/OS UNIX*) provides you with an alternative to specifying your *user_id* and *password* as FTP parameters when you want to FTP to a remote host. The following example shows you how to specify the *user_id*.NETRC data set:

```

MACHINE mvs1.tcp.raleigh.ibm.com LOGIN user28 PASSWORD user28
MACHINE 9.67.112.25 LOGIN user28
MACHINE FEDC:BA98:7654:3210:FEDC:BA98:7654:3210 LOGIN user28

```

The keywords MACHINE, LOGIN, and PASSWORD do not have to be uppercase. The variables *user_ID* and *password* may be case-sensitive, depending on the remote host. (For example, UNIX or AIX hosts require *user_ID* and *password* to be specified case-sensitive.)

To invoke the *user_id*.NETRC data set and automatically log on to the remote host named MVS1, enter the FTP command as shown in the following example:

```

User: ftp mvs1
System:
        IBM FTP CS V1R5
        FTP: using TCPCS
        Connecting to: 9.67.113.61 port: 21.
        220-FTPD1 IBM FTP CS V1R2 at MVSVIC04, 12:00:51 on 2003-01-12.
        220 Connection will close if idle for more than 5 minutes.
        >>>USER user28
        331 Send password please.
        >>>PASS *****
        230 USER28 is logged on. Working directory is "/u/user28".
        Command:

```

In order to bypass definitions in a *user_id*.NETRC data set for an ftp session, specify the *-n* parameter. For information about using the *user_id*.NETRC data set in a batch file, see “Submitting FTP requests in batch” on page 88.

Environment variables

The following are environment variables that are referenced by FTP:

Table 4. Environment variables accessed by FTP

	Environment Variable	Command-type Application	Description
1	HOME	FTP CLIENT	Initialized by the system at time of login to a value equal to the pathname of the user's home directory.
2	LANG	FTP CLIENT	Determines the locale category for native language, local customs, and coded character set in the absence of the LC_ALL and other LC_* environment variables (including LC_COLLATE, LC_CTYPE, LC_MESSAGES, LC_MONETARY, LC_NUMERIC, AND LC_TIME).
3	NLSPATH	FTP CLIENT	Contains a sequence of templates used by the catopen() function when it attempts to locate message catalogs. Each template consists of an optional prefix, one or more conversion specifications, a file name, and an optional suffix.
4	SHELL	FTP CLIENT	Sets the default shell used by make, vi, and other tools.

Getting help

The FTP Help subcommands are listed in Table 5.

Table 5. FTP subcommands for getting help

Subcommand	Description	Page
?	Provides an introduction to using FTP.	172
HElP	Displays help information for FTP.	172
man	UNIX Shell command provides help information about the z/OS UNIX ftp client.	7

Establishing and exiting a connection

You normally establish a connection to a foreign host when you invoke the FTP command with a *foreign_host* specified. If you are not successful in specifying a foreign host, or if you need to connect to a different foreign host, use the subcommands listed in Table 6.

Table 6. FTP subcommands for establishing and exiting a connection

Subcommand	Description	Page
ACcT	Sends host-dependent account information.	131
CLose	Disconnects from the foreign host.	146
Open	Opens a connection to a foreign host.	220
PAss	Supplies a password to the foreign host.	221
QUIt	Leaves the FTP command environment.	231
User	Identifies you to a foreign host.	285

Example of establishing and exiting a connection

This example shows how a single FTP session can be used to connect to the following multiple foreign hosts:

1. MVS Host: fec9:c2d4::9:67:115:12 port 21
2. VM Host: 192.9.2.4

```
ftp fec9:c2d4::9:67:115:12
IBM FTP CS V1R5
FTP: using TCPCS
Connecting to: fec9:c2d4::9:67:115:12 port: 21.
220-FTPD1 IBM FTP CS V1R4 at MVSVC96, 12:38:19 on 2003-01-27.
220 Connection will close if idle for more than 5 minutes.
NAME (fec9:c2d4::9:67:115:12:USER1):
user2 *****
>>> USER user2
331 Send password please.
>>> PASS
230 USER2 is logged on. Working directory is "/".
Command:
User: close
System:
>>>QUIT
221 Quit command received. Goodbye.

Command:
User: open 192.9.2.4
System:

Connecting to: 192.9.2.4 port: 21.
220-FTPSERVE IBM VM Level 320 at VM.IBM.COM, 14:03:49 EST MONDAY 2003-01-11
220 Connection will close if idle for more than 5 minutes.
NAME (<host>:tsouserid):
User: vmuser
System:
>>USER vmuser
331 Sent password please.
Password:
>>>PASS *****
230 VMUSER logged in; working directory = VMUSER 191

Command:
User: account
System:
Usage: ACCT account-information

Command:
User: acct vmuser
System:
>>>ACCT *****
230 You now have write permission to VMUSER 191

Command:
User: close
System:
>>>QUIT
221 Quit command received. Goodbye.

Command:
```

Initial working directory considerations at the z/OS FTP server

When you first log in to a z/OS FTP server, the initial or default working directory at the server is determined by the following:

- The value specified on the STARTDIRECTORY statement in the FTP.DATA file of the server
- The user ID you used when you connected to the server
- The prefix defined in the profile for the user ID

Note: To use FTP, your user ID must have an OMVS segment defined (or defaulted).

If STARTDIRECTORY HFS is defined at the server, the initial working directory is the home directory for the user ID. An example of an initial working directory for USER1 is the following:

/u/user1

If STARTDIRECTORY MVS is defined at the server and no prefix is defined for the user ID, the initial working directory is the user ID followed by a period. An example of an initial working directory for USER1 is the following:
USER1.

If your TSO user ID is defined through Resource Access Control Facility (RACF) and a PREFIX is defined for the user ID, the PREFIX value is used as the initial working directory.

The PREFIX of a TSO user ID can be set or changed by using the TSO PROFILE command as follows:

1. Log in to TSO on the MVS system of the FTP server.
2. Set your new prefix using the TSO PROFILE command:
TSO PROFILE Prefix(*prefix*)
where *prefix* is any TSO prefix that you choose.

Notes:

- a. You must enter both the opening and closing parentheses.
 - b. At this point, the TSO prefix is defined for your current TSO session but is not known to RACF or the FTP server until you log off and log on.
3. Log off to save the new default working directory name.

The TSO prefix should now be your default working directory whenever you log on to an FTP session on that FTP server. To make sure you set up the default working directory correctly, use the following steps.

1. Establish an FTP session to the FTP server.
2. Issue a PWD command. This should show the TSO prefix as your new default working directory. For information on using the PWD command, see “PWD subcommand—Display the current working directory” on page 230.

Notes:

1. To use the TSO PREFIX as your default working directory, you must have installed RACF Version 1.9 and you must define your TSO user IDs through RACF.
2. When you log in to an FTP server from a z/OS UNIX shell, the default local working directory is the directory from where the ftp client was started.

Obtaining status and system information

To retrieve and display status information about the local host and remote host, use the subcommands listed in Table 7.

Table 7. FTP subcommands for obtaining status and system information

Subcommand	Description	Page
!	Passes a z/OS UNIX System Services command to the local z/OS shell. This command must be issued while using FTP in the z/OS shell.	130
DEBug	Sets general trace options.	149
DUMP	Sets extended trace options.	159
FEATure	Asks server which features or extensions it supports.	164
LOCStat	Displays FTP status information for the local host.	200

Table 7. FTP subcommands for obtaining status and system information (continued)

Subcommand	Description	Page
NOop	Checks whether the foreign host is still responding.	219
STAtus	Displays status information for the foreign host.	271
SYstem	Displays the name of the foreign host's operating system.	276
TSO	Passes a TSO command to the local host TSO environment.	279

Working with directories on the remote host

To obtain directory information on the remote host, use the subcommands listed in Table 8.

Table 8. FTP subcommands for working with directories on the remote host

Subcommand	Description	Page
CD	Changes the working directory.	140
CDUP	Changes to the parent of the current working directory.	143
CWd	Changes the working directory (synonymous with CD).	140
DIr	Lists the directory entries for files on the foreign host.	155
LS	Lists the names of files on the foreign host.	205
MKdir	Creates a directory on the foreign host.	213
PWd	Displays the name of the active working directory on the foreign host.	230
RMDir	Removes a directory on the foreign host.	237

Examples of the CD subcommand

This example shows how to change and choose remote working directories and how the z/OS FTP server enables you to switch between the MVS and Hierarchical File System (HFS) environments. For more information on how to change the directory levels, see the information on the CD, CDUP, and LCD subcommands later in this chapter.

```

User: ftp 9.67.113.24 621
System:
    IBM FTP CS V1R5
    FTP: using TCPCS
    Connecting to 9.67.113.24, port 621
    220-FTPD1 IBM FTP CS V1R2 at MVS164, 20:12:38 on 2003-01-02.
    220 Connection will not timeout.
    USER(identify yourself to the host):
    NAME (<host>:tsouserid):
User: user121
System:
    >>>USER user121
    331 Send password please.
    Password:

    >>>PASS *****
    230 USER121 is logged on. Working directory is "/u/user121".
    Command:
User: cd tcpip
System:
    >>>CWD tcpip
    250 HFS directory /u/user121/tcpip is the current working directory
    Command:
User: cd ..
System:
    >>>CWD ..
    250 HFS directory /u/user121 is the current working directory
    Command:
User: cd 'user121'
System:
    250 "'user121'" is working directory name prefix.
    Command:

```

Examples showing the differences between DIR and LS output for HFS directories

The examples in this section use the following Internet addresses:

MVSXA2: 9.67.113.25

MVSXA3: 9.67.113.24

The current host is MVSXA2 (9.67.113.25). An FTP command is issued from 9.67.113.25 to 9.67.113.24.

```

User: ftp 9.67.113.24
System:
    IBM FTP CS V1R5
    FTP: using TCPCS
    Connecting to 9.67.113.24, port 621
    220-FTPD1 IBM FTP CS V1R2 at MVS164, 20:12:38 on 2003-01-02.
    220 Connection will not timeout.
    NAME (<host>:tsouserid):
User: user121
System:
    >>>USER user121
    331 Send password please.
    Password:

    >>>PASS *****
    230 USER21 is logged on. Working directory is "/u/user121".
    Command:

```



```

User: dir
System:
>>>PORT 9,67,112,25,4,25
200 Port request OK.
>>>LIST
125 List started OK.
total 2736
drwxr-xr-x    2 USER121 SYS1      0 Nov 20 18:15 IBM
-rwxr-xr-t    2 USER121 SYS1 389120 Feb  5 16:03 ftpdka
-rwxr-xr-t    2 USER121 SYS1 962560 Feb  5 16:04 ftpsrvka
-rw-r-----   1 USER121 SYS1  11648 Jan 20 14:30 g.s
drwxr-x---    3 USER121 SYS1      0 Oct 21 17:50 msg
-rw-r-----   1 USER121 SYS1  1458 Jan 10 19:25 s.k
drwxr-x---    2 USER121 SYS1      0 Feb  6 15:59 tcpip
drwxr-x---    2 USER121 SYS1      0 Feb  6 17:29 test
250 List completed successfully.

Command:
User: ls
System:
>>>PORT 9,67,112,25,4,26
200 Port request OK.
>>>NLST
125 List started OK.
IBM
ftpdka
ftpsrvka
g.s
msg
s.k
tcpip
test
250 List completed successfully.
Command:

```

DIR provides detailed information about the data sets under the remote working directory, while LS shows the data set names only.

Examples showing the differences between DIR and LS output with DIRECTORYMode and DATASetmode for MVS

This section gives examples of issuing a DIR and LS command in both DIRECTORYMode and DATASetmode.

```

User: ftp 1.1.2.3
System:
IBM FTP CS V1R5
FTP: using TCPCS
Connecting to 1.1.2.3, port 21
220-FTPD1 IBM FTP CS V1R2 at MVS164, 20:12:38 on 2003-01-02.
220 Connection will close if idle for more than 5 minutes.
NAME (<host>:tsouserid):
User: mvsuser
System:
>>>USER mvsuser
331 Send password please.
Password:
>>>PASS *****
230 MVSUSER is logged on. Working directory is "/u/mvsuser"
Command:

```

```

User: cd 'tcpv3'
System:
    >>>CWD 'tcpv3'
    257 "TCPV3." is working directory name prefix.
    Command:
User: site directorymode
System:
    >>>SITE directorymode
    200 Site command was accepted
    Command:
User: dir
System:
    >>>PORT 1,1,2,2,4,39
    200 Port request OK.
    >>>LIST 125 List started OK.
    Volume Unit
    Referred Ext Used Recfm Lrecl BlkSz Dsorg Dsname
    Pseudo Directory ETC
    Pseudo Directory FTP
    Pseudo Directory HOSTS
    Pseudo Directory NSMAIN
    Pseudo Directory PROFILE
    Pseudo Directory STANDARD
    Pseudo Directory TCPIP
    Pseudo Directory TCPIPL62
    Pseudo Directory TELNET
    250 List completed successfully.

    Command:

```

```

User: site datasetmode
System:
    >>>SITE datasetmode
    200 Site command was accepted

    Command:
User: dir
System:
    >>>PORT 1,1,2,2,4,40
    200 Port request OK.
    >>>LIST
    125 List started OK.
    Volume Unit      Date Ext Used Recfm Lrecl BlkSz Dsorg Dsname
    APCSPL 3380D 07/16/97 1 1 FB 80 8800 PS ETC.RPC
    APCSPL 3380D 08/03/97 1 1 FB 80 3200 PS ETC.SERVICES
    APCSPL 3380D 08/03/97 1 1 FB 80 3120 PS FTP.DATA
    APCSPL 3380D 08/02/97 1 1 F 158 158 PS HOSTS.ADDRINFO
    APCSPL 3380D 08/03/97 1 1 FB 80 3120 PS HOSTS.LOCAL
    APCSPL 3380D 07/30/97 1 1 F 56 56 PS HOSTS.SITEINFO
    APCSPL 3380D 07/15/97 1 1 FB 80 8800 PS NSMAIN.CACHE
    APCSPL 3380D 07/28/97 1 1 FB 80 8800 PS NSMAIN.DATA
    APCSPL 3380D 08/03/97 1 2 FB 80 3200 PS PROFILE.TCPIP
    APCSPL 3380D 07/26/97 1 2 FB 80 3200 PS PROFILE.TCPIP.XA2
    APCSPL 3380D 08/03/97 1 1 VB 5124 6160 PS STANDARD.TCPKJBIN
    APCSPL 3380D 08/03/97 1 15 F 256 256 PS STANDARD.TCPXLBIN
    APCSPL 3380D 08/03/97 1 1 FB 80 3120 PS TCPIP.DATA
    APCSPL 3380D 06/29/97 1 2 FB 80 3200 PS TCPIPL62.CONFIG
    APCSPL 3380D 07/29/97 1 15 F 256 256 PS TELNET.TCPXLBIN
    250 List completed successfully.

    Command:

```

```

User: site directorymode
System:
    >>>SITE directorymode
    200 Site command was accepted

    Command:
User: ls
System:
    >>>PORT 1,1,2,2,4,41
    200 Port request OK.
    >>>NLST
    125 List started OK.
    ETC
    FTP
    HOSTS
    NSMAIN
    PROFILE
    STANDARD
    TCPIP
    TCPIPL62
    TELNET
    250 List completed successfully.

    Command:

```

```

User: site datasetmode
System:
    >>>SITE datasetmode
    200 Site command was accepted

    Command:
User: ls
System:
    >>>PORT 1,1,2,2,4,42
    200 Port request OK.
    >>>NLST
    125 List started OK.
    ETC.RPC
    ETC.SERVICES
    FTP.DATA
    HOSTS.ADDRINFO
    HOSTS.LOCAL
    HOSTS.SITEINFO
    NSMAIN.CACHE
    NSMAIN.DATA
    PROFILE.TCPIP
    PROFILE.TCPIP.XA2
    STANDARD.TCPKJBIN
    STANDARD.TCPXLBIN
    TCPIP.DATA
    TCPIPL62.CONFIG
    TELNET.TCPXLBIN
    250 List completed successfully.

    Command:

```

Working with directories on the local host

To work with directories on the local host, use the subcommands listed in Table 9.

Table 9. FTP subcommands for working with directories on the local host

Subcommand	Description	Page
LCd	Changes the current directory on the local host.	179
LMkdir	Creates a directory on the local host.	201
LPwd	Displays the name of the active working directory on the local host.	204

Your default working directory on the local host is set according to the environment in which the FTP client is invoked: \$HOME in z/OS UNIX, your MVS user ID in TSO.

The following examples show how to choose local working directories.

```
User: ftp 1.1.2.3
System:
        IBM FTP CS V1R5
        FTP: using TCPCS
        Connecting to 1.1.2.3, port 21
        220-FTPD1 IBM FTP CS V1R2 at MVS164, 20:12:38 on 2003-01-02.
        220 Connection will close if idle for more than 5 minutes.
        NAME (<host>:tsouserid):
User: mvsuser
System:
        >>>USER mvsuser
        331 Send password please.
        Password:

        >>>PASS *****
        230 MVSUSER is logged on. Working directory is "/u/mvsuser".

        Command:
```

```
User: lpwd
System:
        Local directory is MVSUSER.

        Command:
User: lcd tcpip
System:
        Local directory name set to MVSUSER.TCPIP.

        Command:
User: lpwd
System:
        Local directory is MVSUSER.TCPIP.

        Command:
User: lcd 'ftp.test'
System:
        Local directory name set to FTP.TEST.

        Command:
User: lpwd
System:
        Local directory is FTP.TEST.

        Command:
User: lcd ..
System:
        Local directory name set to FTP.

        Command:
User: lpwd
System:
        Local directory is FTP.

        Command:
```

Security considerations

The following describes security issues to consider when using FTP.

Using security mechanisms

File data transferred between an FTP client and server can be secured with respect to encryption, authentication, and data integrity.

Authentication established using a security mechanism may also be used to make the authorization decision. The FTP security interaction begins with a client telling the server what security mechanism it wants to use with the AUTH command. The server either accepts this mechanism, rejects this mechanism, or, in the case of a server which does not implement the security extensions, rejects the command completely. The server's reply indicates if the client must respond with additional data for the security mechanism to interpret.

Once a security association is established, authentication (which is part of this association) may be used in addition to the standard user ID/password exchange for authorizing a user to connect to the server. A user ID specified by the USER command is always required to specify the identity to be used on the server.

Transport Layer Security (TLS) is an upwardly-compatible successor to Secure Sockets Layer (SSL). SSL is a protocol that performs secure and encrypted TCP transmission. The FTP client supports either SSL or TLS protected sessions, including client authentication. Note that the negotiation of SSL versus TLS is performed by the sockets-layer TLS code and is transparent to FTP.

Many TLS/SSL applications work by having a client connect to one TCP port for unprotected sessions and a separate TCP port for protected ones. FTP supports this mode for compatibility with the original SSL design. However, FTP also provides a more general solution for FTP security, where the client connects to the FTP server on the regular, non-encrypted port and negotiates authentication and encryption options.

The FTP client assumes that port 990 is a protected port. An AUTH command is not needed and the client completes the exchange of additional data with the server immediately after a successful connection.

There are optional FTP commands and statements for negotiating session security. The following is a list of the configuration parameters that determine whether the client uses a security mechanism to protect the session:

- See "Entering the FTP environment" on page 30 for a description of the start parameters.

Start parameters

```
-a TLS
-a GSSAPI
-r TLS
-r GSSAPI
```

- See "Changing local site defaults using FTP.DATA" on page 63 and the *z/OS Communications Server: IP Configuration Reference* for a description of the FTP.DATA statements.

FTP.DATA statements

```
SECURE_MECHANISM
SECURE_FTP
SECURE_CTRLCONN
SECURE_DATACONN
CIPHERSUITE
KEYRING
TLSTIMEOUT
SECURE_PBSZ
```

Using a SOCKS server

You can configure the FTP client to access FTP servers through a SOCKS server. When entering FTP through a SOCKS server, the FTP client establishes a connection with the SOCKS server and then the SOCKS server establishes a

connection to the FTP server. All data and commands for the FTP session are relayed through the SOCKS server. A SOCKS server can be configured to log all FTP connections and permit or deny access to certain FTP servers. See “Configuring the FTP client for SOCKS server” on page 65 for more information.

Chapter 4. Transferring data using the File Transfer Protocol (FTP)

The FTP command enables you to transfer data sets between your local host and any host that supports TCP/IP and FTP. Using the FTP command and its subcommands, you can sequentially access multiple hosts without leaving the FTP environment.

This chapter describes information about:

- “Preparing the environment”
- “Transferring data” on page 50
- “Changing local site defaults using FTP.DATA” on page 63
- “Sample FTP.DATA data set (FTCDATA)” on page 65
- “Support for SBCS languages” on page 76
- “Support for MBCS languages” on page 80
- “Specifying values for new data sets” on page 81
- “Generation data group support” on page 84
- “Submitting FTP requests in batch” on page 88
- “Using the EXEC interface” on page 91
- “FTP return codes” on page 94
- “Restarting a failed data transfer” on page 101
- “Interfacing with JES” on page 102
- “Performing DB2 SQL queries with FTP” on page 119
- “FTP with traditional DBCS support” on page 77

Preparing the environment

You can use the subcommands listed in Table 10 to prepare the environment before working with data.

Table 10. FTP subcommands for preparing the environment

Subcommand	Description	Page
AScii	Sets the transfer type to ASCII.	134
BINary	Sets the transfer type to IMAGE.	137
BLOCK	Sets the data transfer mode to block mode.	138
COMpress	Sets the data transfer mode to compressed mode.	147
EBCdic	Sets the transfer type to EBCDIC.	161
File	Sets the file structure to file.	165
GLob	Toggles globbing (the expansion of metacharacters in file names) for the MDELETE, MGET, and MPUT subcommands.	168
LOCSite	Specifies information that is used by the local host to provide service specific to that host system.	181
LANGuage	Sets language for server replies.	178
MOde	Specifies the mode or data format of the transfer.	216

Table 10. FTP subcommands for preparing the environment (continued)

Subcommand	Description	Page
PROMpt	Toggles interactive prompting for MDELETE, MGET, and MPUT commands.	223
QUOte	Sends an uninterpreted string of data.	232
RECOrd	Sets the file structure to record.	234
SENDPort	Enables or disables automatic transmission of the FTP server PORT command.	241
SENDSite	Enables or disables automatic transmission of the SITE subcommand.	242
Site	Sends information to the foreign host using site-specific commands.	243
STREam	Sets the data transfer mode to stream mode.	273
STRucture	Sets the file transfer structure.	274
SUnique	Changes the storage methods.	275
TYPe	Specifies the transfer type.	280

Transferring data

You can use the subcommands listed in Table 11 to work with and transfer data.

Table 11. FTP subcommands for transferring data

Subcommand	Description	Page
APpend	Appends a data set on your local host to a file on the foreign host.	132
DELEte	Deletes a single file on the foreign host.	153
DELimit	Displays the delimiter character between the <i>file_name</i> and <i>file_type</i> .	154
Get	Copies a file from the foreign host to your local host.	166
MDelete	Deletes multiple files on the foreign host.	207
MGet	Copies multiple files from the foreign host to your local host.	209
MPut	Copies multiple files on your local host to the foreign host.	217
PUt	Copies a file on your local host to the foreign host.	228
REName	Renames a file on the foreign host.	235
REStart	Restarts a checkpointed data transfer.	236
SRESTART	Restarts a stream mode data transfer.	269

How to transfer data

FTP supports only the data transfer of a data set or file structured as a continuous sequence of data bytes. This ensures that the correct record format is preserved across MVS hosts. Information could be lost or altered during transmission if you use an incorrect transfer.

Table 12 shows how to set the transmission attributes for different host systems. For example, VM or MVS host systems use EBCDIC for internal character representation. A text file of ASCII data type contains displayable characters; a carriage return (X'0D') and line feed (X'0A') are used to delimit a line. A text file of

EBCDIC data type contains displayable characters; the new-line character (X'15') is used to delimit a line. A binary file contains a contiguous stream of bits with no line delimiters.

Table 12. Recommended methods for data transfer

Transfer between host types	Data transfer type	Data transfer mode
EBCDIC and EBCDIC — DBCS text data	IBMKANJI (EBCDIC)	Stream
EBCDIC and EBCDIC — text data	EBCDIC	Stream
EBCDIC and EBCDIC — DBCS binary data	IBMKANJI (EBCDIC)	Block
EBCDIC and EBCDIC — binary data	EBCDIC	Block
EBCDIC and ASCII — DBCS text data	SJISKANJI, EUCKANJI, JIS78KJ, JIS83KJ, HANGEUL, KSC5601, TCHINESE, BIG5, SCHINESE (ASCII)	Stream
ASCII and EBCDIC — MBCS data	ASCII	Stream
ASCII and EBCDIC — text data	ASCII	Stream
ASCII and EBCDIC — DBCS binary data	Image (binary)	Stream
ASCII and EBCDIC — binary data	Image (binary)	Stream
ASCII-to-EBCDIC-to-ASCII — all data	Image (binary)	Stream
Note: The EBCDIC host is used for storage only. Data remains encoded in ASCII; therefore, the data cannot be used on the EBCDIC host.		

For more information about the DBCS data type keywords and examples, see “FTP with traditional DBCS support” on page 77.

For information about setting data transfer type, see “Type subcommand—Set the data transfer type” on page 280. For information about setting data transfer mode, see “Mode subcommand—Set the data transfer mode” on page 216.

Examples of GET and MGET subcommands

GET and MGET enable you to obtain files from a remote host and send them to the local host. In this example, FTP subcommands are issued from MVSXA2 to MVSVIC03. See Table 11 on page 50 for other subcommands useful for working with and transferring data.

The following members exist in the data set USER121.FTP.EXAMPLE on MVSVIC03:

```
FILE1
FILE2
FILE3
FILE4
FILE5
```

The following is displayed when entering the FTP environment:

```
User: ftp 9.67.113.24 621
System:
        IBM FTP CS V1R5
        FTP: using TCPCS
        Connecting to 9.67.113.24, port 621
        220-FTPD1 IBM FTP CS V1R2 at MVS164, 20:12:38 on 2003-01-02.
        220 Connection will not timeout.
        NAME (<host>:tsouserid):
User: user121
System:
        >>>USER user121
        331 Send password please.
        Password:
        >>>PASS *****
        230 USER121 is logged on. Working directory is "/u/user121".
        Command:
```

```
User: get 'user121.ftp.example(file1)' 'user121.ftp.example(file1)'
System:
        'USER121.FTP.EXAMPLE(FILE1)' IS AN non-EXISTENT PARTITIONED DATASET.
        USE LMKDIR TO CREATE IT. LOCAL FILE NOT FOUND
        COMMAND:
User: mkdir 'user121.ftp.example'
System:
        USER121.FTP.EXAMPLE CREATED.
        COMMAND:
User: get 'user121.ftp.example(file1)' 'user121.ftp.example(file1)'
System:
        >>>PORT 9,67,112,25,4,9
        200 Port request OK.
        >>>RETR 'USER121.ftp.example(file1)'
        125 Sending data set USER121.FTP.EXAMPLE(FILE1) FIXrecfm 128
        250 Transfer completed successfully.
        3464 bytes transferred in 0.754 seconds. Transfer rate 4.59 Kbytes/sec.
        Command:
User: get 'user121.ftp.example(file2)' 'user121.ftp.example(file2)'
System:
        >>>PORT 9,67,112,25,4,34
        200 Port request OK.
        >>>RETR 'USER121.ftp.example(file2)'
        125 Sending data set USER121.FTP.EXAMPLE(FILE2) FIXrecfm 128
        250 Transfer completed successfully.
        3464 bytes transferred in 1.483 seconds. Transfer rate 2.34 Kbytes/sec.
        Command:
```

```

User: get 'user121.ftp.example(file2)' 'user121.ftp.example(file2)'
System:
    Data set 'USER121.FTP.EXAMPLE(FILE2)' was not replaced.
    Local file already exists
    To replace it, use command with the (REPLACE option)
    Command:
User: get 'user121.ftp.example(file2)' 'user121.ftp.example(file2)' (replace
System:
    >>>PORT 9,67,112,25,4,35
    200 Port request OK.
    >>>RETR 'user121.ftp.example(file2)'
    125 Sending data set USER121.FTP.EXAMPLE(FILE2)
    250 Transfer completed successfully.
    3464 bytes transferred in 0.767 seconds. Transfer rate 0.50 Kbytes/sec.
    Command:
User: lpwd
System:
    Local directory is USER121
    COMMAND:
User: mget 'user121.ftp.example(file3)' 'user121.ftp.example(file4)'
System:
    >>>PORT 9,67,112,25,4,10
    200 Port request OK.
    >>>NLST 'user121.ftp.example(file3)'
    125 List started OK.
    250 List completed successfully.
    >>>PORT 9,67,112,25,4,11
    200 Port request OK.
    >>>NLST 'user121.ftp.example(file4)'
    125 List started OK.
    250 List completed successfully.
    >>>PORT 9,67,112,25,4,12
    200 Port request OK.
    >>>RETR 'USER121.FTP.EXAMPLE(FILE3)'
    125 Sending data set USER121.FTP.EXAMPLE(FILE3)
    250 Transfer completed successfully.
    3993 bytes transferred in 0.745 seconds. Transfer rate 0.51 Kbytes/sec.
    >>>PORT 9,67,112,25,4,13
    200 Port request OK.
    >>>RETR 'USER121.FTP.EXAMPLE(FILE4)'
    125 Sending data set USER121.FTP.EXAMPLE(FILE4)
    250 Transfer completed successfully.
    7367 bytes transferred in 0.818 seconds. Transfer rate 9.01 Kbytes/sec.
    Command:

```

```

User: lpwd
System:      Local directory is USER121.
             Command:
User: cd 'user121.ftp.example'
System:      >>>CWD 'user121.ftp.example'
             250 "USER121.FTP.EXAMPLE" partitioned data set is working directory.
             Command:
User: pwd
System:      >>>PWD
             257 "USER121.FTP.EXAMPLE" partitioned data set is working directory.
             Command:
User: mget file3 file4
System:      >>>PORT 9,67,112,25,4,20
             200 Port request OK.
             >>>NLST file3
             125 List started OK.
             250 List completed successfully.
             >>>PORT 9,67,112,25,4,21
             200 Port request OK.
             >>>NLST file4
             125 List started OK.
             250 List completed successfully.
             >>>PORT 9,67,112,25,4,22
             200 Port request OK.
             >>>RETR FILE3
             125 Sending data set USER121.FTP.EXAMPLE(FILE3)
             250 Transfer completed successfully.
             3993 bytes transferred in 0.549 seconds. Transfer rate 0.46 Kbytes/sec.
             >>>PORT 9,67,112,25,4,23
             200 Port request OK.
             >>>RETR FILE4
             125 Sending data set USER121.FTP.EXAMPLE(FILE4)
             250 Transfer completed successfully.
             7367 bytes transferred in 0.936 seconds. Transfer rate 0.23 Kbytes/sec.
             Command:
User: quit
System:      >>>QUIT
             221 Quit command received. Goodbye.
             READY

```

```

User: ftp 9.67.113.24 621
System:      IBM FTP CS V1R5   2003  314 01:11 UTC
             Connecting to 9.67.113.24, port 621
             220-FTPDI IBM FTP CS/390 V2R10 AT MVS164, 20:12:38 ON 2003-01-02.
             220 Connection will not timeout.
             NAME (<host>:tsouserid):
User: user121
System:      >>>USER user121
             331 Send password please.
             Password:
             >>>PASS *****
             230 USER121 is logged on. Working directory is "/u/user121".
             Command:

```

```

User: get '/u/user121/ftp.example/file1' 'user121.ftp.example(file1)'
System:
    >>>PORT 9,67,112,25,4,24
    200 Port request OK.
    >>>RETR '/u/user121/ftp.example/file1'
    125 Sending data set /u/user121/ftp.example/file1
    250 Transfer completed successfully.
    3464 bytes transferred in 1.391 seconds. Transfer rate 2.49 Kbytes/sec.
    Command:
User: lcd 'user121.ftp.example'
System: Local directory name set to partitioned data set USER121.FTP.EXAMPLE.
    Command:
User: lpwd
System: Local directory is partitioned data set USER121.FTP.EXAMPLE.
    Command:
User: cd '/u/user121/ftp.example'
System: >>>CWD '/u/user121/ftp.example'
    250 HFS directory /u/user121/ftp.example is the current working
        directory
    Command:
User: pwd
System: >>>PWD
    257 "/u/user121.ftp.example" is the HFS working directory.
    Command:
User: get file1
System: >>>PORT 9,67,112,25,4,26
    200 Port request OK.
    >>>RETR file1
    125 Sending data set /u/user121/ftp.example/file1
    250 Transfer completed successfully.
    3464 bytes transferred in 1.059 seconds. Transfer rate 3.27 kbytes/sec.
    Command:

```

```

User: mget '/u/user121/ftp.example/file4' '/u/user121/ftp.example/file5'
System:
    >>>PORT 9,67,112,25,4,33
    200 Port request OK.
    >>>NLST '/u/user121/ftp.example/file4'
    125 List started OK
    250 List completed successfully.
    >>>PORT 9,67,112,25,4,34
    200 Port request OK.
    >>>NLST '/u/user121/ftp.example/file5'
    125 List started OK
    250 List completed successfully.
    >>>PORT 9,67,112,25,4,35
    200 Port request OK.
    >>>RETR /u/user121/ftp.example/file4
    125 Sending data set /u/user121/ftp.example/file4
    250 Transfer completed successfully.
    7367 bytes transferred in 1.324 seconds. Transfer rate 5.56
        kbytes/sec.
    200 Port request OK.
    >>>RETR /u/user121/ftp.example/file5
    125 Sending data set /u/user121/ftp.example/file5
    250 Transfer completed successfully.
    3464 bytes transferred in 0.951 seconds. Transfer rate 3.64
        kbytes/sec.
    Command:

```

The data set USER121.FTP.EXAMPLE on MVSXA2 now contains the following members:

```

FILE1
FILE2
FILE3
FILE4

```

FILE5

Notes:

1. You do not have a choice of names for the local file as a result of the MGET command.
2. The MGET command is not applicable for generation data groups (GDGs).

Examples of PUT and MPUT subcommands

PUT and MPUT enable you to send files from a local host to a remote host. In this example, FTP subcommands are issued from MVSXA2 to MVSVIC03. The data set USER121.FTP.EXAMPLE on MVSXA2 contains the following members:

```
APPEND01
XA2FILE1
XA2FILE2
XA2FILE3
```

The data set USER121.FTP.EXAMPLE on MVSVIC03 contains the following members:

```
XA3FILE1
XA3FILE2
XA3FILE3
```

The following is displayed when entering the FTP environment:

```
User: ftp 1.1.2.3
System: IBM FTP CS V1R5
        FTP: using TCPCS
        Connecting to 1.1.2.3, port 21
        220-FTPD1 IBM FTP CS V1R2 at MVS164, 20:12:38 on 2003-01-02.
        220 Connection will close if idle for more than 5 minutes.
        NAME (<host>:tsouserid):
User: user121
System: >>>USER user121
        331 Send password please.
        Password:
        >>>PASS *****
        230 user121 is logged on. Working directory is "/u/user121"
        Command:
```

```
User: put 'user121.ftp.example(xa2file1)' 'user121.ftp.example(f1from2)'
System: >>>SITE FIXrecfm 128 Lrecl=128 Recfm=FB BlockSize=6144
        200 Site command was accepted
        >>>PORT 1,1,2,2,4,48
        200 Port request OK.
        >>>STOR 'user121.ftp.example(f1from2)'
        125 Storing data set USER121.FTP.EXAMPLE(F1FROM2)
        250 Transfer completed successfully.
        390 bytes transferred in 1.117 seconds.
        Transfer rate 0.35 Kbytes/sec.
        Command:
User: put 'user121.ftp.example(xa2file1)' 'user121.ftp.example(f1from2)'
System: >>>SITE FIXrecfm 128 Lrecl=128 Recfm=FB BlockSize=6144
        200 Site command was accepted
        >>>PORT 1,1,2,2,4,49
        200 Port request OK.
        >>>STOR 'user121.ftp.example(f1from2)'
        125 Storing data set USER121.FTP.EXAMPLE(F1FROM2)
        250 Transfer completed successfully.
        390 bytes transferred in 0.680 seconds.
        Transfer rate 0.57 Kbytes/sec.
        Command:
```

```

User: sunique
System: Store unique is ON
Command:
User: put 'user121.ftp.example(xa2file1)' 'user121.ftp.example(f1from2)'
System: >>>SITE FIXrecfm 128 Lrecl=128 Recfm=FB BlockSize=6144
200 Site command was accepted
>>>PORT 1,1,2,2,4,50
200 Port request OK.
>>>STOU 'user121.ftp.example(f1from2)'
125 Storing data set USER121.FTP.EXAMPLE(F1FROM21) ( unique name )
250 Transfer completed successfully.
390 bytes transferred in 1.085 seconds.
Transfer rate 0.36 Kbytes/sec.
Command:
User: sunique
System: Store unique is OFF
Command:
User: cd 'user121.ftp.example.'
System: >>>CWD 'user121.ftp.example.'
257 "'USER121.FTP.EXAMPLE.'" is working directory name prefix.
Command:
User: lpwd
System: Local directory is USER121.
Command:
User: lcd 'user121.ftp.example'
System: Local directory name set to PDS USER121.FTP.EXAMPLE.
Command:
User: lpwd
System: Local directory is partitioned data set USER121.FTP.EXAMPLE.
Command:

```

```

User: mput xa2file2 xa2file3
System: >>>SITE FIXrecfm 128 Lrecl=128 Recfm=FB BlockSize=6144
200 Site command was accepted
>>>PORT 1,1,2,2,4,51
200 Port request OK.
>>>STOR XA2FILE2
125 Storing data set USER121.FTP.EXAMPLE.XA2FILE2
250 Transfer completed successfully.
390 bytes transferred in 1.437 seconds.
Transfer rate 0.27 Kbytes/sec.
>>>SITE FIXrecfm 128 Lrecl=128 Recfm=FB BlockSize=6144
200 Site command was accepted
>>>PORT 1,1,2,2,4,52
200 Port request OK.
>>>STOR XA2FILE3
125 Storing data set USER121.FTP.EXAMPLE.XA2FILE3
250 Transfer completed successfully.
390 bytes transferred in 1.091 seconds.
Transfer rate 0.36 Kbytes/sec.
Command:
User: quit
System: >>>QUIT
221 Quit command received. Goodbye.
READY

```

The data set USER121.FTP.EXAMPLE on MVSVIC03 now contains the following members:

```

F1FROM2
F1FROM21
XA3FILE1
XA3FILE2
XA3FILE3

```

MVSVIC03 now also has the following data sets:

```

USER121.FTP.EXAMPLE.XA2FILE2

```

Note: The MPUT command is not applicable for generation data groups (GDGs).

DD name support

This section describes how the FTP client transfers a data set or file allocated in the JCL for a batch job or by an interactive user prior to the transfer. The FTP client refers to the data set with the DD name used on the allocation.

The FTP Callable API does not support DD name transfers. The DD names associated with a batch job that invokes an application program using the FTP Callable API are not available to the spawned FTP client process.

The `//DD:` token prefixed before a 1–8 character local file name on a client file access command indicates that the token which follows is actually a DDNAME, rather than a local file name. This DDNAME must be allocated by the user (for example, in the JCL that started the FTP client). The server file name must be explicitly specified when a DDNAME is being used to access a local file for a put command.

Sometimes the client requires DCB information before it opens a data set. Among the situations where this is true are:

- Reading and writing spanned records (RECFM=VS or VBS)
- Reading and writing records that contain ASA control characters
- Reading and writing variable-length records while preserving the RDW
- Reading and writing fixed-length records while preserving trailing blanks

When a data set is allocated using a DDNAME and the DCB information is needed before open, the FTP client must be able to find the DCB information on the DD statement that was used to allocate the data set.

DCB attributes for a DDNAME allocation are acquired using the attributes or data set name specified in the DD statement DCB parameter. Refer to the *z/OS MVS JCL Reference* for restrictions on using backward references in the DCB parameter.

If the DD refers to a cataloged DASD data set, any DCB attributes not specified are retrieved from the DSCB. DCB attributes on the DD statement override those found in the DSCB, except that LRECL=0 and BLKSIZE=0 do not override a different value in the DSCB.

If the DD refers to a tape data set that is to be opened for input (PUT `//DD:`), then the record format specified on the DD statement is used instead of the READTAPEFormat setting. If no record format (RECFM) is specified on the DD statement, the READTAPEFormat setting (if any) is used.

Once the data set is opened by FTP, its attributes are set using the data returned in the DCB by open.

Following is a sample job that shows usage of the `//DD:` token. In the sample job there are two data sets that use the local file specification with the `//DD:` token. One is a data set that is created as a new GDG data set in STEP01 (see the OUTSET DD statement). Note that STEP02 (the FTP step) uses a backward reference with the DD02 DD statement to locate the data set. Since the referenced

DD statement contains explicit DCB attributes, FTP can access the attributes prior to opening the data set. The second data set is an old data set that existed before the job was executed.

```
//USER33J JOB MSGLEVEL=1,MSGCLASS=H,USER=USER33,PASSWORD=**pw**
//STEP01 EXEC PGM=IEBDG
//SYSPRINT DD SYSOUT=A
1 //OUTSET DD DSN=USER33.MYGDG(+1),DISP=(NEW,CATLG,CATLG),
//          VOLUME=SER=CPDLB1,SPACE=(TRK,(5,5)),UNIT=SYSDA,
//          DCB=(RECFM=FB,LRECL=80,BLKSIZE=800)
//SYSIN DD *
< create statements >
//STEP02 EXEC PGM=FTP,REGION=2048K,PARM='(TCP TCPCS TRACE'
//STEPLIB DD DSN=USER33.LINKLIB,DISP=SHR
//SYSPRINT DD SYSOUT=*
2 //DD01 DD DSN=USER33.TEST.S.A,DISP=OLD
3 //DD02 DD DSN=*.STEP01.OUTSET,DISP=SHR
//OUTPUT DD SYSOUT=*
//INPUT DD *
9.67.113.57 6321
USER33 **pw**
4 put //DD:DD02 data
5 get data //DD:DD01
quit
/*
```

Following are short descriptions of the numbered items in the example.

- 1** DD statement that allocates a new generation of a GDG data set
- 2** DD statement for an existing data set
- 3** Backward reference for the new data set in STEP01
- 4** Put subcommand using the //DD: token for the new data set created in STEP01
- 5** Get subcommand using the //DD: token for the existing data set

The FTP output for the above job is the following. Note that only a select few of the FTP trace statements are shown.

```
EZA1736I FTP (TCP TCPCS
EZA1450I IBM FTP CS V1R5 2003 090 19:22 UTC
EZA1466I FTP: using TCPCS
EZA1456I Connect to ?
EZA1736I 9.67.113.57 6321
EZA1554I Connecting to: 9.67.113.57 port: 6321.
220-FTPDJG1 IBM FTP CS V1R2 at MVS164, 14:58:36 on 2003-01-01.
220 Connection will not timeout.
EZA1459I NAME (9.67.113.57:USER33):
EZA1701I >>> USER USER33
331 Send password please.
EZA1701I >>> PASS
230 USER33 is logged on. Working directory is "/u/user33".
EZA1460I Command:
1 EZA1736I put //DD:DD02 data
2 MF0680 seq_open_file: DDname DD02 has filename USER33.MYGDG.G0087V00
EZA1701I >>> PORT 9,67,113,57,6,158
200 Port request OK.
EZA1701I >>> STOR data
125 Storing data set /u/user33/data
250 Transfer completed successfully.
EZA1617I 820 bytes transferred in 0.020 seconds. Transfer rate 41.00 Kbytes/sec.
EZA1460I Command:
3 EZA1736I get data //DD:DD01
```

```

4 MF0680 seq_open_file: DDname DD01 has filename USER33.TEST.S.A
EZA1701I >>> PORT 9,67,113,57,6,159
200 Port request OK.
EZA1701I >>> RETR data
125 Sending data set /u/user33/data
250 Transfer completed successfully.
EZA1617I 820 bytes transferred in 0.030 seconds. Transfer rate 27.33 Kbytes/sec.
EZA1460I Command:
EZA1736I quit
EZA1701I >>> QUIT
221 Quit command received. Goodbye.

```

- 1** Put subcommand using //DD: token for the local file
- 2** Trace statement showing that the local data set name is the new GDG data set created in STEP01
- 3** Get subcommand using //DD: token for the local file
- 4** Trace statement showing that the local data set name is the existing data set.

Load module transfer (LMTR)

As long as your FTP client and FTP server are both at the IBM Communications Server for OS/390 V2R10 level or higher, you can use FTP to transfer MVS load modules between load libraries on different hosts or the same host. MVS load modules transferred, using IBM Communications Server for OS/390 V2R10 level or higher of support, are executable on the target system. A load module can be specified by its real name or by one of its alias names, and in either case, all aliases are transferred with each load module. Load module transfer is also supported for proxy transfer, in which case all three hosts (client, primary server, and secondary server) must be IBM Communications Server for OS/390 V2R10 or higher.

Load module transfer processing (at z/OS V1R2 Communications Server level or higher) makes use of the IEBCOPY system utility, which must be available on both the origin and destination hosts.

The following FTP file transfer commands will properly transfer MVS load modules:

- get
- mget
- put
- mput

Because of the special requirements of MVS load modules, there are some additional restrictions:

- The current working directory on both the client and the server must be the source or destination load library. A load library is a PDS or PDSE with RECFM=U.
- Only member names can be specified. No fully qualified names can be specified.
- File rename is not supported on load module transfer.
- Load modules can only be transferred between the same types of libraries. For example, PDS to PDSE transfer is not allowed.
- If load modules are being sent to or from the z/OS FTP client, the client must be started from one of the following environments:
 - TSO terminal session

- TSO REXX
- TSO batch
- TSO background
- Unix System services terminal session
- A load module loading from a temporary data set will always be a REPLACE operation, overwriting existing members. LMTR is not performed in STOU mode (the user has toggled SUNIQUE on).
- There is no prompting on mput and mget commands. All files that match the mask provided are transferred.

In most cases where load module processing cannot be performed, including failure to abide by the restrictions given above, FTP completes the file transfer using normal processing. Any load modules transferred with normal processing will not be executable on the target system.

For the examples shown below, the following assumptions are made:

- The contents of load library USER.LINKLIB are:

Name	Prompt	Alias-of	Size	TTR	AC	AM	RM
EZACDOPN			0000D268	00160F	01	31	ANY
EZAFTPLC			000E3758	00001B	01	31	ANY
FTP		EZAFTPLC	000E3758	00001B	01	31	ANY
OPING		EZACDOPN	0000D268	00160F	01	31	ANY

- USER1.TESTLIB is a PDS with RECFM=U.

The following example is a sample session involving a load module transfer with debug/trace on. (For clarity, user input is shown offset to the left and notes are contained within // characters.)

```

220-FTPD1 IBM FTP CS V1R2 at MVS097, 21:16:25 on 2003-01-16.
220 Connection will not timeout.
NAME (9.67.43.61:USER1):
user1
>>> USER user1
331 Send password please.
PASSWORD:

>>> PASS
230 USER1 is logged on. Working directory is "USER1.".
Command:
cd 'user.linklib'
>>> CWD 'user.linklib'
250-The working directory may be a load library
250-The working directory "USER.LINKLIB" is a partitioned data set //1//
Command:
lcd 'user1.testlib'
Local directory might be a load library //2//
Local directory name set to partitioned data set USER1.TESTLIB
Command:
get oping
>>> XLMT PDS 0 oping //2//
250 PDS 53864 - send next command for load module transfer //2//
>>> PORT 9,67,43,65,4,41
200 Port request OK.
>>> RETR oping
125-Transferring load module //2//
125 DCB 32760 32760 //2//

```

```

IEBCOPY  FMID HDZ11D0  SERVICE LEVEL UW90570  DATED 19990520 DFSMS
          1.5.0  MVS SP6.0.8 HBB6608  CPU 9672
USER1    OS390R5  OS390R5  16:20:59 TUE 16 NOV 1999 PARM=''
          STANDARD DD NAMES- SYSIN  SYSPRINT SYSUT1  SYSUT2  SYSUT3
          SYSUT4
          OVERRIDING DD NAMES- SYS00158 SYS00159 SYS00157 SYS00156 SYSUT3
          SYSUT4
          VL GETMAIN REQUESTED 280K TO 1M BYTES.  OBTAINED 1M.

          COPY      OUTDD=SYS00156,INDD=((SYS00157,R))
          ORIGINAL PDS (BEFORE UNLOAD) WAS RECFM=U  BLKSIZE=32760 LRECL=0
          KEYLEN=0 OPTCD=X'20' UCBDTYPE=X'3010200F' INDC=X'00'
          ALLOCATED 2 CONTIGUOUS BUFFERS EACH 111K BYTES.  WORK AREA HAS 757K
          BYTES AVAILABLE.

          COPYING FROM PDSU  INDD=SYS00157 VOL=
          DSN=SYS99320.T162100.RA000.USER1.TEMPXLMT.H01
          TO PDS  OUTDD=SYS00156 VOL=CPDLB1 DSN=USER1.TESTLIB
          CONTROL TABLE IS 20 BYTES LONG.  WORK AREA HAS 757K BYTES AVAILABLE.
          ALLOCATED SECOND BUFFER OF 745K BYTES.  FIRST BUFFER IS NOW 221K
          BYTES.  WORK AREA HAS 11974 BYTES AVAILABLE.
          FOLLOWING MEMBER(S) LOADED FROM INPUT DATA SET REFERENCED BY SYS00157
          EZACDPIN HAS BEEN SUCCESSFULLY LOADED //4//
          OPING HAS BEEN SUCCESSFULLY LOADED //4//
          2 OF 2 MEMBERS LOADED FROM INPUT DATA SET REFERENCED BY SYS00157
          THERE ARE 135 UNUSED TRACKS IN OUTPUT DATA SET REFERENCED BY SYS00156
          THERE ARE 23 UNUSED DIRECTORY BLOCKS IN OUTPUT DIRECTORY
          RELEASED 1016K ADDITIONAL BYTES.
          END OF JOB - 0 WAS HIGHEST SEVERITY CODE
          250 Transfer completed successfully.
          63084 bytes transferred in 0.005 seconds.  Transfer rate 12616.80 Kbytes/sec.
          Command:

```

In this next example, the user attempts to transfer a load module and rename the load module. As this is not supported, load module processing will exit and normal processing will take over. The transferred load module will not be executable on the target system.

```

cd 'user.linklib'
>>> CWD 'user.linklib'
250-The working directory may be a load library
250-The working directory "USER.LINKLIB" is a partitioned data set
Command:
lcd 'user1.testlib'
Local directory might be a load library
Local directory name set to partitioned data set USER1.TESTLIB
Command:
get oping ping
Load module transfer does not support load module rename //5//
>>> PORT 9,67,43,66,4,41
200 Port request OK.
>>> RETR oping
125 Sending data set USER.LINKLIB(OPING)
250 Transfer completed successfully.
61984 bytes transferred in 0.190 seconds.  Transfer rate 326.23 Kbytes/sec.
Command:

```

Notes:

1. When a cd or lcd subcommand is performed, the user will be notified if the new current directory is eligible for load module transfer processing. If this message or reply is not seen when changing to a directory, load module transfer will not be attempted.

2. There are additional flows between the client and server for load module transfer.
3. The IEBCOPY system utility is invoked by FTP as part of load module transfer processing. Note that this output is only seen when running with debug or trace on. Otherwise the IEBCOPY output is placed in the syslog.
4. The actual load module and all its aliases will be transferred, even though (in this case only) the alias was specified by the user.
5. When load module transfer processing cannot be performed, the user is warned and the transfer might be completed using normal processing. The data set 'USER.TESTLIB(PING)' will *not* be executable on the client system.

Changing local site defaults using FTP.DATA

The default values for the local site parameters are hardcoded in the FTP client module. You can change these default values by creating an FTP.DATA configuration data set.

Note: Unless otherwise indicated, FTP.DATA data set refers to both the /etc/ftp.data HFS file and the MVS data set FTP.DATA.

The FTP.DATA configuration data set is optional. As shown in Table 13, the FTP client uses one of the following search orders to obtain the local site parameter values:

Table 13. FTP client search orders

TSO shell	z/OS UNIX shell
1. SYSFTPD DD statement	1. \$HOME/ftp.data
2. tso_prefix.FTP.DATA	2. userid.FTP.DATA
3. userid.FTP.DATA	3. /etc/ftp.data
4. /etc/ftp.data	4. SYS1.TCPPARMS(FTPDATA) data set
5. SYS1.TCPPARMS(FTPDATA) data set	5. tcpip_hlq.FTP.DATA file
6. tcpip_hlq.FTP.DATA file	

Refer to the *z/OS Communications Server: IP Programmer's Reference* for a description of the FTP.DATA search order used when FTP is started from the FTP Callable API.

The *z/OS Communications Server: IP Configuration Reference* describes the statements you can code in the FTP.DATA data set. It is not necessary to include all statements in the FTP.DATA data set, only those statements whose default values are to be changed. The hard-coded default is used for any statement not included in the FTP.DATA data set.

You can find a sample FTP.DATA file in SEZAINST (FTPCDATA).

You can change several of the FTP local site parameters during the FTP session by using the LOCSITE subcommand. See "LOCSite subcommand—Specify site information to the local host" on page 181 for more information about using the LOCSITE subcommand to change the local site parameters.

Setting user-level options using FTPS.RC

The default values for the site parameters are coded in the server FTP.DATA. As a client user, you can change the site parameters by creating an FTPS.RC configuration data set. This file can have CD and SITE subcommands.

The FTPS.RC configuration data set is optional. The FTP server uses the following search order to find the data set:

1. tso_prefix.FTPS.RC
2. userid.FTPS.RC
3. \$HOME/ftps.rc

The following are the syntax rules for the FTPS.RC file:

- Only SITE and CWD commands are allowed for this file. (CD will be also accepted and will be treated as CWD.)
- Each command must be contained in one line.
- SITE command can have multiple parameters.
- Comments are allowed, but the entire line will be commented out. In other words, comments cannot exist on the same line as the actual command line.
- Comments must begin with a semicolon.
- Comments can be entered between two or more command lines.

Note: Test your configuration file to ensure it is processed correctly by naming the file (following the preceding naming convention) and putting the file into the correct directory. A 230-type reply of Processing FTPS.RC configuration file.. will be displayed during your login process. The 230-type replies indicate any errors encountered or if the file was successfully opened and processed. Contact system programmer if you cannot fix any errors reported or if the file cannot be opened or created. Refer to *z/OS Communications Server: IP and SNA Codes* for additional information about 230-type replies.

The following are examples of an FTPS.RC file with no errors and with errors.

- No errors (correctly coded).

```
; This is a sample configuration file for FTPS.RC
; You may enter comments by starting a line with semicolon (;). The
; entire line will be ignored.
; The server FTP.DATA file must have the statement DEBUGONSITE TRUE
; for the SITE DEBUG= subcommand to be accepted by the server.
SITE debug=all
; You may also insert comments between command lines.
; You may code either 'CD' or 'CWD'.
CWD /user2
CD tmp
```
- Errors within the file.

```
; This is a sample configuration file for FTPS.RC
; You may enter comments by starting a line with semicolon (;). The
; entire line will be ignored.
; The line below has an error: errormount is an unrecognized parameter.
SITE errormount
; PUT subcommand is not accepted in this file.
PUT 'user2.tmp.banner' 'user3.tmp.banner'
```

Configuring the FTP client for SOCKS server

The FTP client uses a SOCKS configuration data set or file to determine whether to access a given FTP server directly or through a SOCKS server. The name of the data set or file is specified by coding the SOCKSCONFIGFILE statement in the client FTP.DATA.

The FTP client references the SOCKSCONFIGFILE only when the FTP server is known to it by an IPv4 IP address or by a DNS name that resolves to an IPv4 IP address. The FTP client always connects directly to FTP servers known to it by IPv6 addresses or DNS names that resolve to IPv6 addresses.

Refer to the *z/OS Communications Server: IP Configuration Reference* for details regarding the contents of the SOCKS configuration file.

Sample FTP.DATA data set (FTCDATA)

The following is a sample of the contents of the FTP.DATA data set in the FTCDATA member of the *hlq*.SEZAINST data set.

```

;*****
;
; Name of File:          SEZAINST(FTCDATA)
;
; Descriptive Name:      FTP.DATA  (for FTP Client)
;
; SMP/E Distribution Name: EZAFTPAC
;
; Copyright:    Licensed Materials - Property of IBM
;
;               "Restricted Materials of IBM"
;
;               5694-A01
;
;               (C) Copyright IBM Corp. 1977, 2003
;
;               US Government Users Restricted Rights -
;               Use, duplication or disclosure restricted by
;               GSA ADP Schedule Contract with IBM Corp.
;
; Status:          CSV1R5
;
;
; This FTP.DATA file is used to specify default file and disk
; parameters used by the FTP client.
;
; Note: For an example of an FTP.DATA file for the FTP server,
; see the FTPSDATA example.
;
; Syntax Rules for the FTP.DATA Configuration File:
;
; (a) All characters to the right of and including a ; will be
;     treated as a comment.
;
; (b) Blanks and <end-of-line> are used to delimit tokens.
;
; (c) The format for each statement is:
;
;     parameter value
;
;
; The FTP.DATA options are grouped into the following groups in
; this sample FTP client FTP.DATA configuration data set:
;
; 1. Basic configuration options
; 2. HFS file options
; 3. Default attributes for MVS data set creation
; 4. MVS data set transfer options
; 5. Code page conversion options
; 6. DB2 (SQL) interface options
; 7. Security options
; 8. Timers
; 9. Return codes

```

Figure 3. FTP.DATA for FTP client (Part 1 of 11)


```

; 10. Checkpoint / Restart options *
; 11. Socks server access *
; 12. Debug (trace) options *
; 13. Additional advanced options *
; *
; For options that have a pre-selected set of values, a (D) indicates *
; the default value for the option. *
; *
; Options that can be changed via LOCSITE subcommands are identified *
; with an (S). *
; *
; *****
; -----
;
; 1. Basic FTP client configuration options
;
; -----
| SUPPRESSIGNOREWARNINGS FALSE ; Suppress message EZYFT47I
|                               ; while processing remaining
|                               ; statements in this FTP.DATA
|                               ; TRUE - Yes
|                               ; FALSE (D) - No. EZYFT47I is
|                               ; issued to warn of ignored
|                               ; statements
| FILETYPE SEQ ; (S) Client mode of operation
|                               ; SEQ = transfer data sets or
|                               ; files (D)
|                               ; SQL = submit queries to DB2
; -----
;
; 2. HFS file options
;
; -----
UMASK 027 ; (S) Octal UMASK to restrict setting
; of permission bits when creating
; new HFS files
; Default value is 027.
LISTSUBDIR TRUE ; Should wildcard searches span
; subdirectories?
; TRUE (D) - Yes
; FALSE - No
; -----
;
; 3. Default MVS data set creation attributes
;
; -----
BLKSIZE 6233 ; (S) New data set allocation block size
; Default is 6233
; Valid range is 0 to 32760
; DATACLASS SMSDATA ; (S) SMS data class name
; There is no default
; MGMTCLASS SMSMGNT ; (S) SMS mgmtclass name
; There is no default

```

Figure 3. FTP.DATA for FTP client (Part 2 of 11)

;STORCLASS	SMSSTOR	; (S) SMS storclass name ; There is no default
;DCBDSN	MODEL.DCB	; (S) New data set allocation ; model DCB name - must be a ; fully qualified data set name ; There is no default
DIRECTORY	27	; (S) Number of directory blocks in ; new PDS/PDSE data sets. ; Default value is 27. ; Range is from 1 to 16777215.
LRECL	256	; (S) New data set allocation LRECL. ; Default value is 256. ; Valid range 0 through 32760.
PDSTYPE		; (S) no value - allocate MVS ; directories according to the ; system default (PDS or PDSE) ; PDS - allocate MVS ; directories as a PDS ; PDSE - allocate MVS directories ; as a PDSE
PRIMARY	1	; (S) New data set allocation ; primary space units according ; to the value of SPACETYPE. ; Default value is 1. ; Valid range 1 through 16777215.
RECFM	VB	; (S) New data set allocation ; record format. ; Default value is VB. ; Value may be specified as certain ; combinations of: ; A - ASA print control ; B - Blocked ; F - Fixed length records ; M - Machine print control ; S - Spanned (V) or Standard (F) ; U - Undefined record length ; V - Variable length records
RETPD		; (S) New data set retention ; period in days. ; Blank = no retention period (D) ; 0 = expire today ; Valid range 0 through 9999. ; NB: Note the difference between ; a blank value and a value ; of zero.
SECONDARY	1	; (S) New data set allocation ; secondary space units according ; to the value of SPACETYPE. ; Default value is 1. ; Valid range 1 through 16777215.
SPACETYPE	TRACK	; (S) New data set allocation ; space type. ; TRACK (D) ; BLOCK ; CYLINDER

Figure 3. FTP.DATA for FTP client (Part 3 of 11)

```

UCOUNT                ; (S) Sets the unit count for an
                        ; allocation.
                        ; If this option is not specified
                        ; or is specified with a value of
                        ; blank, the unit count attribute
                        ; is not used on an allocation (D)
                        ; Valid range is 1 through 59 or
                        ; the character P for parallel
                        ; mount requests
;UNITNAME              SYSDA    ; (S) New data set allocation unit
                        ; name.
                        ; There is no default.
VCOUNT              59        ; (S) Volume count for an
                        ; allocation.
                        ; Valid range is 1 through 255.
                        ; Default value is 59.
;VOLUME               WRKLB1,WRKLB2 ; (S) Volume serial number(s) to
                        ; use for allocating a data set.
                        ; Specify either a single VOLSER
                        ; or a list of VOLSERs
                        ; separated with commas
; -----
;
;
; 4. MVS data set transfer options
;
; -----
ASATRANS              FALSE     ; (S) Conversion of ASA print
                        ; control characters
                        ; TRUE  = Use C conversion
                        ; FALSE = Do not convert (D)
AUTOMOUNT             TRUE      ; (S) Automatic mount of unmounted
                        ; DASD volumes
                        ; TRUE  = Mount volumes (D)
                        ; FALSE = Do not mount volumes
AUTORECALL            TRUE      ; (S) Automatic recall of
                        ; migrated data sets
                        ; TRUE  = Recall them (D)
                        ; FALSE = Do not recall them
AUTOTAPEMOUNT         FALSE     ; Automatic mount of unmounted
                        ; tape volumes
                        ; TRUE  = Mount volumes
                        ; FALSE = Do not mount volumes (D)
BUFNO                 5         ; (S) Specify number of access
                        ; method buffers
                        ; Valid range is from 1 through
                        ; 35 - default value is 5
CONDDISP              CATLG     ; (S) Disposition of a new data set
                        ; when transfer ends prematurely
                        ; CATLG  = Keep and catalog (D)
                        ; DELETE = Delete data set
                        ; Note this option applies to HFS
                        ; files also
DIRECTORYMODE         FALSE     ; (S) Specifies how to view the MVS
                        ; data set structure:
                        ; FALSE = (D) All qualifiers below

```

Figure 3. FTP.DATA for FTP client (Part 4 of 11)

		;	LCWD are treated as
		;	entries in the directory
		;	TRUE = Qualifiers immediately
		;	below the LCWD are
		;	treated as entries in the
		;	directory
ISPFSTATS	FALSE	;	(S) TRUE = create/update PDS
		;	statistics
		;	FALSE = (D) does not create /
		;	update PDS statistics
MIGRATEVOL	MIGRAT	;	(S) Migration volume VOLSER to
		;	identify migrated data sets
		;	under control of non-HSM
		;	storage management products.
		;	Default value is MIGRAT.
QUOTESOVERRIDE	TRUE	;	(S) How to treat quotes at the
		;	beginning or surrounding file
		;	names.
		;	TRUE = Override current working
		;	directory (D)
		;	FALSE = Treat quotes as part of
		;	file name
RDW	FALSE	;	(S) Specify whether Record
		;	Descriptor Words (RDWs) are
		;	discarded or retained.
		;	TRUE = Retain RDWs and transfer
		;	as part of data
		;	FALSE = Discard RDWs when
		;	transferring data (D)
TRAILINGBLANKS	FALSE	;	(S) How to handle trailing blanks
		;	in fixed format data sets during
		;	text transfers.
		;	TRUE = Retain trailing blanks
		;	(include in transfer)
		;	FALSE = Strip off trailing
		;	blanks (D)
TRUNCATE	FALSE	;	(S) Used in conjunction with
		;	WRAPRECORD to specify what to do
		;	if no new-line is encountered
		;	before reaching the MVS data set
		;	record length limit as defined
		;	by LRECL when transferring data
		;	to MVS. This parameter only has
		;	meaning if WRAPRECORD is false.
		;	TRUE (D) = allow truncation and
		;	continue with the file transfer
		;	FALSE = fail the file
		;	transfer instead of truncating
WRAPRECORD	FALSE	;	(S) Specify what to do if no new-line
		;	is encountered before reaching
		;	the MVS data set record length
		;	limit as defined by LRECL when
		;	transferring data to MVS.
		;	TRUE = Wrap data to new record
		;	FALSE = Truncate data (D)

Figure 3. FTP.DATA for FTP client (Part 5 of 11)

```

WRTAPEFASTIO      FALSE      ; (S) How should the server write
                               ; ASCII stream mode to tapes?
                               ; TRUE = Use BSAM I/O routines
                               ; FALSE (D) = Use LE Run Time
                               ; library fwrite
; -----
;
; 5. Text code page conversion options
;
; -----
;CCTrans          dsn_qual      ; Control connection translate
                               ; table data set qualifier.
                               ; Used to search for
                               ;   a) userid.dsn_qual.TCPXLBIN
                               ;   b) hlq.dsn_qual.TCPXLBIN
                               ; If CTRLCONN is specified, that
                               ; value overrides CCTrans.
;CTRLCONN          7BIT         ; (S) ASCII code page for
                               ; control connection.
                               ; 7BIT is the default if CTRLCONN
                               ; is not specified AND no TCPXLBIN
                               ; translation table data set found.
                               ; Can be specified as any iconv
                               ; supported ASCII code page, such
                               ; as IBM-850
;ENCODING          SBCS         ; (S) Specifies whether multi-byte or
                               ; single-byte data conversion is
                               ; to be performed on ASCII data
                               ; transfers.
                               ; MBCS = Use multi-byte
                               ; SBCS = Use single-byte (D)
;EXTENSIONS        UTF8         ; Enable RFC 2640 support.
                               ; Default is disabled.
                               ; Control connection starts as
                               ; 7bit ASCII and switches to UTF-8
                               ; encoding when LANG command
                               ; processed successfully. CCTrans
                               ; and CTRLCONN are ignored.
;MBDATACONN        (IBM-1388,IBM-5488) ; (S) Specifies the conversion table
                               ; names for the data connection
                               ; when ENCODING has a value of
                               ; MBCS. The names are the file
                               ; system code page name and the
                               ; network transfer code page name.
;SBDATACONN        (IBM-1047,IBM-850) ; (S) file system/network transfer
                               ; code pages for data connection.
                               ; Either a fully-qualified MVS
                               ; data set name or HFS file name
                               ; built with the CONVXLAT utility -
                               ;   HLQ.MY.TRANS.DATASET
                               ;   /u/user1/my.trans.file
                               ; Or a file system code page name
                               ; followed by a network transfer
                               ; code page name according to

```

Figure 3. FTP.DATA for FTP client (Part 6 of 11)

```

; iconv supported code pages -
; for example
;   (IBM-1047,IBM-850)
; If SBADATACONN is not present,
; std. search order for a default
; translation table data set will
; be used.
;SBSUB      FALSE      ; (S) Specifies whether untranslatable
;                   ; data bytes should be replaced
;                   ; with SBSUBCHAR when detected
;                   ; during SBCS data transfer.
;                   ; TRUE = Replace each
;                   ; untranslatable byte with
;                   ; SBSUBCHAR.
;                   ; FALSE = Terminate transfer (D)
;                   ; when untranslatable bytes are
;                   ; detected
;SBSUBCHAR   SPACE      ; (S) Specifies the substitution char
;                   ; for SBCS data transfer when
;                   ; SBSUB is TRUE.
;                   ; nn = hexadecimal value from
;                   ; 0x'00' to 0x'FF'.
;                   ; SPACE = x'40' when target code
;                   ; set is EBCDIC, and
;                   ; x'20' when target code
;                   ; set is ASCII. (D)
;SBTRANS     dsn_qual    ; Data connection translate
;                   ; table data set qualifier.
;                   ; Used to search for
;                   ; a) userid.dsn_qual.TCPXLBIN
;                   ; b) hlq.dsn_qual.TCPXLBIN
;                   ; If SBADATACONN is specified, that
;                   ; value overrides SBTRANS
;UCSHOSTCS   code_set    ; (S) Specify the EBCDIC code set
;                   ; to be used for data conversion
;                   ; to or from Unicode.
;                   ; If UCSHOSTCS is not specified,
;                   ; the current EBCDIC code page
;                   ; for the data connection is used.
;UCSSUB      FALSE      ; (S) Specify whether Unicode-to-EBCDIC
;                   ; conversion should use the EBCDIC
;                   ; substitution character or
;                   ; cause the data transfer to be
;                   ; terminated if a Unicode
;                   ; character cannot be converted to
;                   ; a character in the target
;                   ; EBCDIC code set
;                   ; TRUE = Use substitution char
;                   ; FALSE = Terminate transfer (D)
;UCSTRUNC    FALSE      ; (S) Specify whether the transfer
;                   ; of Unicode data should be
;                   ; aborted if truncation
;                   ; occurs at the MVS host
;                   ; TRUE = Truncation allowed
;                   ; FALSE = Terminate transfer (D)

```

Figure 3. FTP.DATA for FTP client (Part 7 of 11)

```

; -----
;
; 6. DB2 (SQL) interface options
;
; -----
DB2          DB2          ; (S) DB2 subsystem name
; The default name is DB2
DB2PLAN      EZAFTPMQ     ; DB2 plan name for FTP client
; The default name is EZAFTPMQ
SPREAD       FALSE       ; (S) SQL spreadsheet output format
; TRUE  = Spreadsheet format
; FALSE = Not spreadsheet
;                format (D)
SQLCOL       NAMES       ; (S) SQL output headings
; NAMES  = Use column names (D)
; LABELS = Use column labels
; ANY    = Use label if defined,
;                else use name
; -----
;
; 7. Security options
;
; -----
;SECURE_MECHANISM GSSAPI    ; Name of the security mechanism
; that the client uses when it
; sends an AUTH command to the
; server.
; GSSAPI = Kerberos support
; TLS    = TLS
;SECURE_FTP      ALLOWED    ; Authentication indicator
; ALLOWED (D)
; REQUIRED
;SECURE_CTRLCONN CLEAR     ; Minimum level of security for
; the control connection
; CLEAR   (D)
; SAFE
; PRIVATE
;SECURE_DATACONN CLEAR     ; Minimum level of security for
; the data connection
; NEVER
; CLEAR   (D)
; SAFE
; PRIVATE
;SECURE_PBSZ     16384     ; Kerberos maximum size of the
; encoded data blocks
; Default value is 16384
; Valid range is 512 through 32768
; Name of a ciphersuite that can be passed to the partner during
; the TLS handshake. None, some, or all of the following may be
; specified. The number to the far right is the cipherspec id
; that corresponds to the ciphersuite's name.
;CIPHERSUITE    SSL_NULL_MD5 ; 01
;CIPHERSUITE    SSL_NULL_SHA  ; 02
;CIPHERSUITE    SSL_RC4_MD5_EX ; 03
;CIPHERSUITE    SSL_RC4_MD5   ; 04

```

Figure 3. FTP.DATA for FTP client (Part 8 of 11)

```

;CIPHERSUITE      SSL_RC4_SHA      ; 05
;CIPHERSUITE      SSL_RC2_MD5_EX   ; 06
;CIPHERSUITE      SSL_DES_SHA      ; 09
;CIPHERSUITE      SSL_3DES_SHA     ; 0A
;KEYRING          name             ; Name of the keyring for TLS
                                   ; It can be the name of an HFS
                                   ; file (name starts with /) or
                                   ; a resource name in the security
                                   ; product (e.g., RACF)
;TLSTIMEOUT        100             ; Maximum time limit between full
                                   ; TLS handshakes to protect data
                                   ; connections
                                   ; Default value is 100 seconds.
                                   ; Valid range is 0 through 86400
; -----
;
; 8. Timers
; -----
CCONNTIME          30              ; Timeout value for successful
                                   ; close of control connection.
                                   ; Default value is 30 seconds.
                                   ; Valid range is 15 through 86400.
                                   ; 0 = do not timeout
DATACTIME          120            ; Timeout for send/receive data
                                   ; operations.
                                   ; Default value is 120 seconds.
                                   ; Valid range is 15 through 86400.
                                   ; 0 = do not timeout
DCONNTIME          120            ; Timeout value for successful
                                   ; close of data connection.
                                   ; Default value is 120 seconds.
                                   ; Valid range is 15 through 86400.
                                   ; 0 = do not timeout
FTPKEEPALIVE       0              ; Keepalive packets are sent after
                                   ; the connection is idle for the
                                   ; specified number of seconds
                                   ; Default is 0 seconds
                                   ; 0 = do not send keepalive packets
                                   ; Valid range is 60 - 86400
INACTTIME          120            ; The time in seconds to wait for
                                   ; an expected response from the
                                   ; server.
                                   ; Default value is 120 seconds.
                                   ; Valid range is 15 through 86400.
                                   ; 0 = do not timeout
MYOPENTIME         60             ; Connection timeout value in
                                   ; seconds.
                                   ; Default value is 60 seconds.
                                   ; Valid range is 15 through 86400.
                                   ; 0 = do not timeout
| PROGRESS          10            ; Time interval in seconds between
|                               ; progress updates for file
|                               ; transfers. Default is 10 seconds

```

Figure 3. FTP.DATA for FTP client (Part 9 of 11)


```

|                                     ; Valid range is 10 through 86400,
|                                     ; or 0 to request no updates.
; -----
;
; 9. Return codes
;
; -----
; CLIENTERRCODES      FALSE          ; Return code format
;                                     ; TRUE - 2 digit error return code
;                                     ; FALSE (D) - 5 digit XYYYY format
;                                     ;   XX - FTP subcommand
;                                     ;   YYY - server reply code
;                                     ; EXTENDED - 4 digit XXY format
;                                     ;   XX - 2 digit error return code
;                                     ;   YY - FTP subcommand
; LOGCLIENTERR        FALSE          ; Report errors with EZZ9830I msg?
;                                     ; TRUE      - Yes
;                                     ; FALSE (D) - No
; -----
;
; 10. Checkpoint / Restart options
;
; -----
; CHKPTINT            0              ; (S) Specify the checkpoint interval
;                                     ; in number of records.
;                                     ; NB: checkpointing only works
;                                     ; with datatype EBCDIC and block
;                                     ; or compressed transfer mode.
;                                     ; 0 = no checkpoints (D)
; RESTGET             TRUE           ; (S) Should checkpointing occur during
;                                     ; a GET operation?
;                                     ; TRUE (D) - Yes
;                                     ; FALSE  - No
; CHKPTPREFIX         HOME           ; (S) Low level qualifier of checkpoint
;                                     ; data set: FTP.CHECKPOINT
;                                     ; HOME (D) - either TSO prefix or
;                                     ;         UNIX local directory path
;                                     ; USERID - login user ID
;                                     ; LOCAL  - current local directory
; -----
;
; 11. SOCKS server options
;
; -----
; SOCKSCONFIGFILE     /etc/socks.conf ; file path for SOCKS configuration
;                                     ; file. The SOCKS configuration
;                                     ; file specifies which FTP servers
;                                     ; should be accessed via SOCKS.
; -----
;
; 12. Debug (trace) options
;
; -----
; DEBUG              TIME            ; time stamp client trace entries

```

Figure 3. FTP.DATA for FTP client (Part 10 of 11)

```

;DEBUG          ALL          ; activate all traces
;DEBUG          BAS          ; active basic traces
;              ; (marked with an *)
;DEBUG          FLO          ; function flow
;DEBUG          CMD          ; * command trace
;DEBUG          PAR          ; parser details
;DEBUG          INT          ; * program initialization and
;              ; termination
;DEBUG          ACC          ; access control (logging in)
;DEBUG          SEC          ; security processing
;DEBUG          UTL          ; utility functions
;DEBUG          FSC(1)       ; * file services
;DEBUG          SOC(1)       ; * socket services
;DEBUG          SQL          ; special SQL processing
; -----
;
; 13. Additional advanced options
;
; -----
;FWFRIENDLY     FALSE       ; (S) Use firewall friendly protocol
;              ; for starting data connections?
;              ; TRUE - Yes
;              ; FALSE (D) - NO
;EPSV4          FALSE       ; (S) Use NAT firewall friendly protoco
;              ; for starting data connections?
;              ; TRUE - Yes
;              ; FALSE (D) - NO
;NETRCLEVEL     1           ; When logging in, should the FTP
;              ; server's IP addr be converted to
;              ; a host name to use NETRC login
;              ; file?
;              ; 1 (D) - IP addr is not converted
;              ; 2 - IP addr is converted
;              ; 2 - IP addr is converted

```

Figure 3. FTP.DATA for FTP client (Part 11 of 11)

FTP data conversion

By default, the z/OS FTP client transmits all data on the control connection and on the data connection as single byte ASCII, the same ASCII code page being used to encode both connections. z/OS FTP provides the ability to specify different code pages for the control and data connections. The code page you specify can be single byte (SBCS), double byte (DBCS), or multibyte (MBCS).

Support for SBCS languages

SBCS (single byte character set) encoding is the default encoding for both control and data connections, and is the encoding specified in FTP RFCs such as RFC 959. You can specify SBCS encoding on either the control or data connection.

Some methods of specifying alternate translation tables for the FTP client apply to both the control and data connection. If the translation table you need for data transfer does not support the standard encodings for the portable character set, you should establish different translation tables for the control and data connections to ensure that FTP commands and replies are translated correctly.

Specify SBCS encoding for the data connection with one of the following methods:

- Code statements in FTP.DATA: SBDATACONN and SBTRANS.
- Use LOCSITE SBDataconn or LOCSITE XLATE subcommands to set the code page.

- Place an MVS data set containing a binary translate table in the FTP client's search order for TCPXLBIN data sets. Use the CONVXLAT utility to generate an MVS data set containing the binary translation table you require. Refer to SBCS translation table hierarchy in the *z/OS Communications Server: IP Configuration Reference* for the search order used by the FTP client.

- Specify the TRANSLATE parameter as an FTP client start option. The translate parameter applies to both the control and data connections.

If you need to establish different translate tables for the control and data connection, use one of the other methods to establish the translate table, or else change either translate table after starting the client.

If the table you specified with the TRANSLATE parameter does not support the POSIX portable character set, start the client without specifying a host name so the client does not attempt to send commands on the control connection before the correct translation table is established. Then change the client's translation table after starting FTP.

You can specify different conversions for the control connection by using any of the following methods:

- Code CTRLConn statements in FTP.DATA
- Place an MVS data set containing a binary translate table in the FTP client's search order for TCPXLBIN data sets. Use the CONVXLAT utility to generate an MVS data set containing the binary translation table you require. Refer to SBCS translation table hierarchy in the *z/OS Communications Server: IP Configuration Reference* for the search order used by the FTP client.
- Use the LOCSITE CTRLCONN subcommand.
- Specify the TRANSLATE parameter as an FTP client start option. If you use this method, the table will apply to both control and data connections.

If you code EXTENSIONS UTF8 in the client FTP.DATA, the control connection uses 7-bit ASCII for commands and, when negotiated with the server, UTF-8 encoding of pathnames. The client can override the EXTENSIONS UTF8 statement by using the FTP TRANSLATE start parameter or by issuing SITE and LOCSITE subcommands. However, the client cannot resume UTF-8 encoding on the control connection until you restart the client.

Extended trace point ID 81 is available for tracing the translate tables. When set to ON, 256 bytes of each translate table can be traced as follows:

- When the FTP STAT command is sent to the server, the translate tables being used by the server for the control and data connection are traced. When the FTP LOCSTAT subcommand is entered, the translate tables being used by the client are traced.
- When the LOCSITE subcommand is entered to change the client translate table, the client traces the new table. When the server receives a SITE command to change the translate table, the server traces the new table.

See the "SITE subcommand - DUMP parameter" on page 254 for instructions for activating extended trace point 81 for the server. See the "DUMP subcommand—Set extended trace options" on page 159 for instructions for activating extended trace point 81 for the client.

FTP with traditional DBCS support

This section describes how to use FTP to exchange DBCS data sets between hosts supporting DBCS file transfer.

The z/OS FTP server and client programs access data sets containing data that is usually in EBCDIC format. To transfer these data sets to or from an ASCII-based host requires translation tables. The transfer of DBCS data uses two tables—one for DBCS characters and one for SBCS characters.

Selecting a DBCS translation table

The LOADDBCSTABLES statement in TCPIP.DATA is used by both the FTP server and client to determine which DBCS translation table data sets can be loaded. Refer to Using translation tables in the *z/OS Communications Server: IP Configuration Reference* for more information about the loading and customizing of DBCS translation tables for FTP.

The FTP server and client can be configured to load a number of DBCS translation tables. These are used during data set transfers to convert MVS host DBCS characters and non-MVS DBCS characters. The FTP commandTYPE B nor corresponding client subcommand is used to enter DBCS transfer mode and select a DBCS table.

Selecting an SBCS translation table

The SBCS table used to transfer DBCS data is the SBCS table that is established for the data connection.

SBCS tables are used by the control connection to transfer commands; they are also used by the data connection. Often the same SBCS table is used, but you might want to select a different table to be used for data transfers. How you specify the SBCS table for the data connection depends on whether the translation is to be done by the FTP server or the FTP client.

When the EBCDIC-to-ASCII translation is done by the FTP server, you can issue a SITE SBDataconn command to select the SBCS table to be used by the server for data transfers.

When the EBCDIC-to-ASCII translation is done by the FTP client, you can use the following parameters in your local FTP.DATA file to establish the SBCS tables:

CTRLConn Establishes the SBCS tables the client uses for control connections.

SBDataconn Establishes the SBCS tables the client uses for data connections.

Alternatively, you can use the TRANSLATE option of the FTP command to change the SBCS and DBCS translation table hierarchy for both the control and data connection. The TRANSLATE option results in the same SBCS table for both the control and the data connection.

Note: The TRANSLATE option can be used as long as the table maintains the integrity of the portable character set.

Another alternative when the FTP client is to perform the translation is to use the LOC SITE SBDataconn subcommand to change the SBCS table used by the client for the data connection.

DBCS subcommands

DBCS data sets are transferred using the standard FTP subcommands PUT and GET. However, before the transfer commences, the current transfer type for the session must be set to the required DBCS type. To set the transfer type to DBCS for an FTP session, you must issue the appropriate FTP subcommand to the client or the server, depending on where the DBCS conversion is to be done. The FTP

subcommands for DBCS support are listed in Table 14.

Table 14. FTP subcommands for DBCS support

Subcommand	Description	Page
BIG5	Sets the transfer type to BIG-5	135
EUckanji	Sets the transfer type to EUCKANJI	162
HAngeul	Sets the transfer type to HANGEUL	170
lBmkanji	Sets the transfer type to IBMKANJI	173
JIS78kj	Sets the transfer type to JIS78KJ	174
JIS83kj	Sets the transfer type to JIS83KJ	175
Ksc5601	Sets the transfer type to KSC5601	176
QUOte	Sends an uninterpreted string of data	232
SChinese	Sets the transfer type to SCHINESE	239
SJiskanji	Sets the transfer type to SJISKANJI	267
TChinese	Sets the transfer type to TCHINESE	277
TYPe	Specifies the transfer type	280

Server commands and client subcommands

Table 15 shows examples of the server command that would be generated for each client subcommand:

Table 15. FTP TYPE subcommand aliases

Client subcommand	Server command	Description
BIG5	TYPE B 8	Big-5 transfer type
EUCKANJI	TYPE B 2	Extended UNIX Code kanji transfer type
HANGEUL	TYPE B 5	Hangeul transfer type
IBMKANJI	TYPE F 1	IBM (EBCDIC) kanji transfer type
JIS78KJ	TYPE B 4 A	JIS 1978 kanji using ASCII shift-in transfer type
JIS78KJ (ASCII	TYPE B 4 A	ASCII shift-in escape sequence
JIS78KJ (JISROMAN	TYPE B 4 R	JISROMAN shift-in escape sequence
JIS78KJ (JISROMAN NOSO	TYPE B 4 R N	Pure DBCS data transfer
JIS83KJ	TYPE B 3 A	JIS 1983 kanji using ASCII shift-in transfer type
JIS83KJ (ASCII	TYPE B 3 A	ASCII shift-in escape sequence
JIS83KJ (JISROMAN	TYPE B 3 R	JISROMAN shift-in escape sequence
JIS83KJ (JISROMAN NOSO	TYPE B 3 R N	Pure DBCS data transfer
KSC5601	TYPE B 6	Korean Standard Code KSC-5601 transfer type
SCHINESE	TYPE B 9	Simplified Chinese transfer type
SJISKANJI	TYPE B 1	Shift JIS kanji transfer type
SJISKANJI (Sosi	TYPE B 1 S A	Shift-out/shift-in characters X'1E'/X'1F'

Table 15. FTP TYPE subcommand aliases (continued)

Client subcommand	Server command	Description
SJISKANJI (Sosi ASCII	TYPE B 1 S A	Shift-out/shift-in characters X'1E' /X'1F'
SJISKANJI (Sosi EBCDIC	TYPE B 1 S E	Shift-out/shift-in characters X'0E' /X'0F'
SJISKANJI (Sosi SPACE	TYPE B 1 S S	Shift-out/shift-in characters X'20' /X'20'
SJISKANJI (NOSO	TYPE B 1 N	Pure DBCS data transfer
TCHINESE	TYPE B 7	Traditional Chinese (5550) transfer type

Mapping DBCS aliases to CCSIDs

The code sets supported by the DBCS for FTP options conform to standard coded character set identifiers (CCSIDs). Table 16 shows how CCSIDs map to DBCS keywords.

For more information about CCSIDs, refer to *Character Data Representation Architecture Reference and Registry*, GC09-2207.

Table 16. Mapping of DBCS keywords to CCSIDs

DBCS keyword	CCSID	Description
BIG5	00947	IBM Big-5 DBCS
EUCKANJI	00954	Japanese EUC (G0, G1 and G2 only)
HANGEUL	00926	Korean DBCS-PC
JIS78KJ	00955	JIS X0208–1978
JIS83KJ	05048	JIS X0208–1990
KSC5601	00951	IBM Korean Standard code
SCHINESE	01380	Simplified Chinese DBCS-PC
SJISKANJI	00301	Japanese DBCS-PC
TCHINESE	00927	Traditional Chinese DBCS-PC

Support for MBCS languages

MBCS translation can be performed on the data connection.

The FTP client and server provide double-byte language support using a set of subcommands at the client and corresponding TYPE B commands at the server. This support is described in “FTP with traditional DBCS support” on page 77. An alternative to using the subcommands and TYPE B commands is to use the multibyte support in FTP that is activated by the ENCODING keyword in FTP.DATA, LOCSITE subcommand, or SITE command. Use the ENCODING and MBDATACONN keywords to enable translation using system supplied codepages. This method supports most of the double-byte languages currently handled by the traditional DBCS (TYPE B) support.

For example, you can specify that you want to use the Chinese standard GB18030 provided by the codepage IBM-5488 for data conversion on your data connections. To use the codepage IBM-5488, you must specify that multibyte encoding is to be used. You can do this in one of the following ways:

- Code the following statement in the FTP.DATA file:

```
ENCODING MBCS
```

- Issue a subcommand:

```
LOCSITE ENCODING=MBCS
```

You can then specify which codepage the IBM-5488 encoded data is to be converted to or from in the file system by doing one of the following:

- Code one of the following statements in the FTP.DATA file:

```
MBDATACONN (IBM-1388,IBM-5488)
```

or

```
MBDATACONN (UTF-8,IBM-5488)
```

- Issue one of the following subcommands:

```
LOCSITE MBDATACONN=(IBM-1388,IBM-5488)
```

or

```
LOCSITE MBDATACONN=(UTF-8,IBM-5488)
```

Guideline: These steps control the client end of the data connection. To request the same conversions at the server end of the data connection, the same statements must be added to the server FTP.DATA file or use the SITE subcommand.

Specifying values for new data sets

When allocating new data sets, there are several methods you can use to specify the data set attributes. You can individually use the storage attribute parameters with the SITE and LOCSITE commands or the *hlq*.FTP.DATA data set. Or, if your system administrator has used the Storage Management Subsystem to group together default attributes into named classes, you can specify those class names on the DATAclass, STORclass, and MGmtclass parameters.

Dynamic allocation

FTP enables you to dynamically allocate a new physical-sequential data set, partitioned data set (PDS), or partitioned data set extended (PDSE) for the purpose of transferring data to be written to that data set. The following optional allocation variables can be used by the client to override and turn off the hard-coded defaults that affect the allocation of the data set.

Variable	FTP.DATA parameter
allocation units	SPACETYPE
blocksize	BLKSIZE
data class	DATACLASS
directory blocks	DIRECTORY
logical record length	LRECL
management class	MGMTCLASS
model DCB values	DCBDSN
PDS type	PDSTYPE
primary space	PRIMARY
record format	RECFM
retention period	RETPD

Variable	FTP.DATA parameter
secondary space	SECONDARY
storage class	STORCLASS
unit	UNITNAME
volume count	VCOUNT
unit count	UCOUNT
volume serial number	VOLUME

Some of these allocation variables might provide duplicate information. For example, the model DCB might have a record format (RECFM) that differs from the record format specified by a data class and from the one explicitly specified by the client. FTP passes all variables that are specified to dynamic allocation and lets it determine which of the specifications takes precedence. The following list describes the exceptions to that policy:

- If neither the primary nor secondary space quantity is specified, the allocation units value is not sent.
- If the data set organization is physical-sequential, directory blocks specification is not sent.
- Otherwise, all variables are sent to dynamic allocation where the order of precedence is:
 1. Any FTP.DATA, SITE, or LOCSITE parameters explicitly specified or defaulted
 2. Any attributes picked up from the model DCB and not otherwise explicitly specified
 3. Any attributes picked up from the data class and not previously derived from 1 or 2
 4. Any allocation defaults

Automatically generated SITE subcommand

The FTP client automatically generates a SITE subcommand when sending an MVS data set with the PUt or MPut subcommand. The SITE subcommand includes information on the record format, logical record length, and block size of the data set. An example of a generated SITE command is:

```
SITE FIXrecfm 80 LRECL=80 RECFM=FB BLKSIZE=320
```

Where: FIXrecfm 80 is intended for use by VM servers and LRECL=80 RECFM=FB BLKSIZE=320 is intended for use by MVS servers. ASCII servers ignore this SITE information. The SENDSite command can be used to toggle the automatic sending of the SITE subcommand. See “SEnDSite subcommand—Toggle the sending of site information” on page 242 for more information.

Storage Management Subsystem (SMS)

An FTP client can specify one or more of the following Storage Management Subsystem (SMS) classes to manage characteristics that are associated with or assigned to data sets.

- Data class is an SMS construct that determines data set allocation attributes used by SMS for creation of data sets. The fields listed are available attributes that serve as a template for allocation. Each is *optional* and is overridden by any explicit specification of FTP allocation variables or by a model DCB (DCBDSN).

Variable	FTP.DATA parameter
directory blocks	DIRECTORY
logical record length	LRECL
primary space	PRIMARY
record format	RECFM
retention period	RETPD
secondary space	SEConary

Note: If either primary or secondary space is explicitly specified, the primary and secondary values from data class are not used.

- Management class is an SMS construct that determines Data Facility Hierarchical Storage Manager (DFHSM) action for data set retention, migration, backup, and release of allocated but unused space. Management class replaces and expands attributes that otherwise would be specified. That is, management class might override any other specification of retention period.
- Storage class is a list of storage performance and availability services requests for an SMS-managed data set that SMS attempts to honor when selecting a volume or volumes for the data set. It might conflict with an explicit specification of volume and unit. If storage class is used, volume and unit parameters should be unspecified.

Steps for using a DCBDSN model to create a new data set

Perform the following steps to use a DCBDSN model to create a data set.

1. Issue the following command:

```
SITE DCBDSN=data_set_name
```

where *data_set_name* is the name of the data set to be used as a model to set the values of the logical record length (LREcl), the block size (BLKsize), the retention period (RETPd), and the record format (RECfm) of a new data set.

2. Issue the following command to enable the LREcl, BLKSize, and RECfm of the model to be used:

```
SITE LRECL BLKSIZE RETPD RECFM
```

3. Issue the following command to create the new data set with the values specified by the DCBDSN model:

```
PUT data_set_name
```

where *data_set_name* is the name of the new data set.

Note: If you are using a non-MVS client that does not support the SITE command, you might be able to send the SITE command to the MVS server by using the QUOTE command. For example:

```
QUOTE SITE DCBDSN=data_set_name
```

Statistics for PDS members

ISPFStats can be set to either TRUE or FALSE in a client FTP.DATA or can be set using the LOCSITE subcommand. If ISPFStats is set to TRUE, FTP creates and maintains statistics for partitioned data set members. The following explains the effect ISPFStats has on PDS member statistics when you are issuing GET and MGET subcommands.

Note: ISPFStats is ignored for sequential data sets. Also, the record format must be either variable or fixed, and the record length must be less than 256.

Transferring PDS member to PDS member in block mode or in compress mode differs in behavior from transferring in stream mode. If the user wants to preserve the statistics of the PDS member that already has the statistics and have the same statistics copied over to targeted PDS member, transferring in block mode or in compress mode is required.

- **Effect of ISPFStats setting when issuing GET or MGET when the file does not already exist**

Whenever a PDS member is being transferred, FTP checks the setting of ISPFStats. If the member does not already exist, FTP follows what the ISPFStats is set to. For example:

- If ISPFStats is TRUE, FTP creates statistics for PDS members.
- If ISPFStats is FALSE, FTP does not create statistics.

- **Effect of ISPFStats setting when issuing GET or MGET when the target PDS member already exists**

Whenever a member is being transferred, FTP checks the setting of ISPFStats. If the targeted PDS member already exists, FTP considers whether the target member has statistics and the setting of ISPFStats. For example:

- If ISPFStats is TRUE and the existing member has statistics, FTP updates the statistics.
- If ISPFStats is TRUE and the existing member does not have statistics, FTP creates the statistics.
- If ISPFStats is FALSE and the existing member has statistics, FTP updates the statistics and sends a message indicating the behavior.
- If ISPFStats is FALSE and the existing member does not have statistics, FTP does not create statistics.

Generation data group support

Generation data groups (GDGs) enable you to store multiple data sets, called generation data sets (GDSs), as versions of the GDG. You cannot use FTP to create a new GDG, but you can use it to create a new version (that is, a new GDS) or to transfer an existing version of an existing GDG.

The relationship between DCBDSN and GDGs is governed by MVS allocation rules rather than FTP usage rules. Therefore, when creating a new GDG [put 'sys1.proclib(jes2)' user77.mygdg(+1)], at least one of the following must be true:

- A valid MODEL or PATTERN DSCB (for FTP, DCBDSN) specification must be coded in the FTP.DATA file when the z/OS FTP server is started.
- A valid SITE DCbdsn=*dataset_name* must be issued before a PUT command is issued.
- A data set having the same name as the GDG base must reside on the volume as the user catalog that contains the GDG definition. In this case, neither a SITE DCbdsn nor a DCBDSN argument in the FTP.DATA data file is required.

Allocation detects that a GDG is being created and looks in the VTOC of the volume containing the USERCATALOG for a data set (uncataloged) that has the same name as the GDG BASE (see the sample GDG JCL on page 85).

Notes:

1. A model or pattern DSCB that is the same name as the GDG BASE cannot exist on an SMS managed volume. This is an SMS restriction and is documented in the DFP manuals pertaining to using data sets (generation data sets or generation data groups).
2. Allocation does not generally have any requirements about the characteristics of a MODEL DSCB (cannot be VSAM, must be on DASD). Most facilities create one model DSCB for the entire system and everyone uses that model. The system-wide model usually has no logical record length (LREcl), block size (BLKsize), record format (RECFm), data set organization (DSORG) or retention period (RETpd) associated with it.
3. The z/OS FTP server requires the MODEL DSCB to have a valid DSOrg of physical sequential organization (PS). Otherwise the SITE command for the DCBDSN is ignored, and a message is issued indicating the DCBDSN was ignored.
4. GDGs are MVS specific structures. Other operating systems might not support this structure. Using FTP to send GDG members to other operating systems is not guaranteed to yield the same results as an MVS-to-MVS transfer.

The following restrictions apply:

- DCBDSN=USER.MYGDG(0)/ USER.MYGDG(-n), not supported
- DCBDSN=SYS1.PROCLIB(JES2), specifying a member of a PDS is not valid
- DCBDSN=SYS1.PROCLIB, valid
- The data set referenced on the DCBDSN, a DSOrg of PS needed (FTP requirement)

Note: If there are explicit values associated with LREcl, BLKsize, RECFm, or the SMS management equivalent parameters, these explicit parameters override the values associated with the model DSCB specified on the DCBDSN.

The following is a sample Job Control Language (JCL) to create a model and the GDG BASE:

```

USER77.MYGDG          -MODEL/PATTERN
VOL=SER=CPDLB1        -Volume having USERCATALOG, where USER77 is defined
(NAME(USER77.MYGDG)   -GDG BASE definition

//USER77X JOB MSGLEVEL=(1,1),MSGCLASS=D,NOTIFY=USER77
//GDGA EXEC PGM=IDCAMS
//*
//GDGMOD DD DSN=USER77.MYGDG,
//        VOL=SER=CPDLB1,
//        UNIT=SYSALLDA,
//        SPACE=(TRK,(0)),
//        DCB=(LRECL=80,RECFM=FB,BLKSIZE=6800,DSORG=PS),
//        DISP=(,KEEP)
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
DEFINE GENERATIONDATAGROUP -
(NAME(USER77.MYGDG) -
EMPTY -
NOSCRATCH -
LIMIT(255) )

```

GDG examples

Before you specify a (+*nnn*) value to create a new GDS, issue the following command:

```
SITE DCBDSN=model
```

This subcommand specifies an MVS data set to be used as a model. The model must have a DSORG of PS. The other DCB characteristics of the data set are not checked.

Notes:

1. Failure to have a valid DCBDSN before trying to create a new GDS might cause FTP or ALLOCATION to fail or to return unpredictable results.
2. If you issue a SITE DCbdsn LRecl BLKsize command before the creation of a new data set, the LRecl and BLKsize parameters on the SITE command override the LRecl and BLKsize parameters on the DCbdsn command.

For more information about GDGs, refer to *MVS/DFP Version 3 Release 3: Using Data Sets*.

The following are sample FTP commands that access a GDG called JIMKEO.GDG.

Notes:

1. In the following examples, gdg (0), gdg (-1), and gdg (+1) specify which copy of the GDG you are using. 0 indicates the latest version, -1 indicates the previous version, and +1 indicates that a new version is created.
2. GDGALL is not supported by the z/OS FTP server. GDGALL processing occurs when the base name for the GDG is specified without a relative index value.
3. The MPUT and MGET commands are not applicable for GDGs.

The following example illustrates a PUT to the latest existing GDS. The working directory at the server is JIMKEO:

```
Command:
put my.gdg gdg(0)
>>>SITE FIXrecfm 150
200-Blocksize must be a multiple of lrecl for FB data sets. Blocksize set to
6150.
200 Site command was accepted
>>>PORT 129,34,128,245,126,229
200 Port request OK.
>>>STOR gdg(0)
125 Storing data set JIMKEO.GDG.G0055V00
250 Transfer completed successfully.
612 bytes transferred. Transfer rate 3.24 Kbytes/sec.
```

The following example illustrates a GET of the latest GDG:

```
Command:
get gdg(0) my.gdg2
>>>PORT 129,34,128,245,126,233
200 Port request OK.
>>>RETR gdg(0)
125 Sending data set JIMKEO.GDG.G0055V00 FIXrecfm 150
250 Transfer completed successfully.
612 bytes transferred. Transfer rate 3.04 Kbytes/sec.
```

The following example illustrates a PUT to a new GDS [After the STOR is complete, this new version is referenced by (0)].

```
Command:
put my.gdg gdg(+1)
>>>SITE FIXrecfm 150
200 Site command was accepted
>>>PORT 129,34,128,245,126,234
200 Port request OK.
>>>STOR gdg(+1)
125 Storing data set JIMKEO.GDG.G0056V00
250 Transfer completed successfully.
612 bytes transferred. Transfer rate 1.16 Kbytes/sec.
```

The following example illustrates a GET of the previous GDS into the local file called my.gdg3:

```
Command:
get gdg(-1) my.gdg3
>>>PORT 129,34,128,245,126,239
200 Port request OK.
>>>RETR gdg(-1)
125 Sending data set JIMKEO.GDG.G0055V00 FIXrecfm 150
250 Transfer completed successfully.
612 bytes transferred. Transfer rate 2.77 Kbytes/sec.
```

The following example illustrates a GET that replaces the contents of my.gdg3 with the most recent GDS:

```
Command:
get gdg(0) my.gdg3 (replace)
>>>PORT 129,34,128,245,126,243
200 Port request OK.
>>>RETR gdg(0)
125 Sending data set JIMKEO.GDG.G0056V00 FIXrecfm 150
250 Transfer completed successfully.
612 bytes transferred. Transfer rate 3.36 Kbytes/sec.
```

The following example illustrates changing the working directory:

```
Command:
cd gdg
>>>CWD gdg
257 "'JIMKEO.GDG.'" is working directory name prefix.
```

The following example shows the files created:

```

Command:
dir
>>>MODE s
200 Data transfer mode is Stream.
>>>PORT 129,34,128,245,127,12
200 Port request OK.
>>>LIST
125 List started OK.
Volume Unit    Referred Ext Used Recfm Lrecl BlkSz Dsorg Dsname
STRG73 3380K   04/30/92  1  5 FB    150 32700 PS   G0003V00
STRG65 3380K   04/30/92  1  5 FB    150 32700 PS   G0006V00
STRG61 3380K   04/30/92  1  5 FB    150 32700 PS   G0010V00
STRG47 3380K   04/30/92  1  5 FB    150 32700 PS   G0015V00
STRG47 3380K   04/30/92  1  5 FB    150 32700 PS   G0021V00
STRG66 3380K   04/30/92  1  5 FB    150 32700 PS   G0028V00
STRG47 3380K   04/30/92  1  5 FB    150 32700 PS   G0036V00
STRG01 3380K   04/30/92  1  5 FB    150 32700 PS   G0045V00
STRG53 3380K   04/30/92  1  5 FB    150 32700 PS   G0055V00
STRG59 3380K   04/30/92  1  5 FB    150 32700 PS   G0056V00
250 List completed successfully.
>>>MODE b
200 Data transfer mode is Block.
Command:

```

Submitting FTP requests in batch

FTP is usually run interactively by starting and entering commands from your terminal. You can also run FTP as a batch job, but you must supply the JCL file. You can use batch when you know what functions you want to perform, when you want a hardcopy of the results, or when you want to perform an FTP function many times.

Notes:

1. FTP can be run in batch either by specifying data sets for input and output as in Figure 4 on page 89, or without referring to data sets for input and output as in Figure 6 on page 90.
2. The file containing the FTP commands cannot have sequenced line numbers in it. If each line does not end in a semicolon, the FTP command file must be saved *unnumbered*.
3. Comments can be added to the command input file through the REXX program that stacks the commands. The support includes stand-alone comment records and comments appended to the end-of-line.

The syntax for adding stand-alone comments is to use a semicolon (;) as the first nonspace character on a line. For example,

```
; This is a stand-alone comment record
```

You can add a command line comment by appending the end of the command line with a space-semicolon followed by the comment. For example,

```
USER userx ; This is an appended comment
```

When a user ID or password is expected (including passwords required for read or write access to files or disks), the entire line has to be blank. This example shows a blank password between userid and a comment line.

```
USER userx
```

```
; The line above is a blank password
```

This example shows a blank user ID between a comment line and password.

; This below is a blank userid

mypasswd

4. A blank followed by a plus sign (+) at the end of an FTP subcommand line is used as a continuation indicator for all FTP subcommands except the QUOTE subcommand. When the continuation indicator is encountered at the end of an FTP subcommand line, the next line is appended to the subcommand. For example,

```
PUT SOURCE.DS.NAME +  
DEST.DS.NAME
```

is interpreted as:

```
PUT SOURCE.DS.NAME DEST.DS.NAME
```

5. To have the FTP client perform DB/2 queries in a batch job, the DSNLOAD library must be in the link list or appear on a STEPLIB DD statement for the job.
6. When connecting to a server such as a UNIX server where user IDs, passwords, directory names, and file names are case-sensitive, the data in the FTP batch job must be in the correct case.
7. Use the (EXIT parameter if you want FTP to display an error return code and then exit when certain errors are detected. See “FTP return codes” on page 94 for more information.
8. See “Allocating FTP input and output data sets” on page 35 for the attributes allowed on the INPUT and OUTPUT DD statements.
9. When the FTP Callable API is utilized by an application program invoked from a batch job, the DD names in the batch job are not available to the spawned FTP client process.

Figure 4 shows an example of the JCL required to submit a batch job by referring to data sets for input and output.

```
//USER28F JOB ,CARTER,MSGLEVEL=(1,1)  
//FTPSTP1 EXEC PGM=FTP,REGION=2048K,  
//          PARM='9.67.112.25 (EXIT TIMEOUT 20'  
//NETRC    DD DSN=ANYHLQ.NETRC,DISP=SHR  
//OUTPUT   DD SYSOUT=H  
//INPUT    DD *  
type e  
mode b  
put idss.parts  
/*
```

Figure 4. JCL to run FTP in batch using data sets

Notes:

1. REGION=2048K is a minimum requirement. The requirement could increase depending on the block size of the data set being transmitted.
2. The first JCL statement is a standard job statement. The next JCL statement is an EXEC statement. It has PGM=FTP (a region parameter) because FTP might use more storage than your default region size, and a PARM field.
3. For PARM=, you can specify any parameter that is valid when invoking FTP from your terminal. See “Using FTP” on page 29 for more information. These parameters are only supported on the PARM= field of the EXEC card.

As shown in Figure 4 on page 89, to run FTP in batch, you must have the following three DD statements:

SYSPRINT DD

Alternative name for the OUTPUT DD statement.

OUTPUT DD Specifies the data set where FTP is to place the client messages and server replies generated during the FTP session.

INPUT DD Specifies the data set where the FTP subcommands to be performed are located.

You can use the *user_id*.NETRC data set, as defined by the NETRC DD statement in Figure 4 on page 89, to identify the user ID and password for a batch-processed remote login. You can also specify the user ID and password in the INPUT DD data set.

Figure 5 shows the records in an INPUT DD data set that contains the FTP commands to be executed.

```
HOSTNAME
USERID PASSWD
DIR
PUT MYFILE.LISTING
QUIT
```

Figure 5. Contents of an INPUT DD data set

The first line of Figure 5 contains the name of the host that you want FTP to use. The second line contains the user ID followed by its password. The next three lines contain the FTP commands that you want FTP to perform. In this example, FTP is doing a directory listing of the server to which you are connecting. The example then instructs FTP to send a file to the server. The last line ends the connection.

Any client messages and server replies to the commands you execute appear in the OUTPUT DD data set. The SYSPRINT can contain some additional messages that relate to the execution of your FTP session.

Note: If you do not want your password to be copied to the output file, specify your user ID and password on separate input lines. See Figure 6 for an example.

Submitting requests without input and output data sets

Figure 6 shows an easier way to submit a batch job, because you can avoid referring to data sets for input and output.

```
//USERIDX JOB USERID,MSGLEVEL=(1,1),NOTIFY=USERID,MSGCLASS=H,TIME=9
//FTP EXEC PGM=FTP,REGION=4096K
//INPUT DD *
nodeid
userid
password
CD
DIR
GET hostfile.name locfile.name
QUIT
```

Figure 6. JCL to run FTP in batch without using data sets

Figure 7 shows step 1 creating a new GDS in batch and FTP getting the data set.

```
//USERIDX JOB USERID,MSGLEVEL=(1,1),NOTIFY=USERID,MSGCLASS=H,TIME=9
//STEP1 EXEC PGM=IEBGENER
//SYSPRINT DD SYSOUT=*
//SYSIN DD DUMMY
//SYSUT1 DD DSN=USER31.SOURCE.DATA,DISP=SHR (MYGDG.G0008V00)
//SYSUT2 DD DSN=MYGDG(+1),DISP=(,CATLG),
          UNIT=SYSDA, SPACE=(TRK,(1,1)),DCB=(MODEL)
//FTP EXEC PGM=FTP,REGION=4096K
//INPUT DD *
nodeid
userid
password
CD /u/joe
DIR
GET MYGDG(0) A.DATA.SET
QUIT
//SYSPRINT DD SYSOUT=*
```

Figure 7. Job to create a new GDS in batch

Note: All the GDG allocation in batch must be complete before the start of FTP.

FTP and data set cataloging

When FTP creates a new data set, it issues a dynamic allocation request to allocate space for the data set and catalogs the data set.

If the data transfer fails when CONDDISP=DELETE, the data set is deleted and uncataloged.

If you are running a job scheduling program that detects files as they are catalogued and then schedules a subsequent job for processing, the job scheduler must take into account that setting CONDDISP=DELETE causes FTP to delete and uncatalog the data set when the file transfer fails. For generation data groups, the following might occur:

- FTP intends to create a new GDG(+1) and generates GDG.G00023V00.
- FTP of this data set fails and the GDG.G00023V00 data set is deleted and uncataloged.
- A follow-on reference for the current GDG, for example, GDG(0), would cause the data set GDG.G00022V00 to be accessed and old data to be processed.

Using the EXEC interface

The FTP EXEC interface enables you to execute FTP commands from an EXEC rather than interactively from a terminal. The FTP subcommands to be performed can be in a file (MVS data set or HFS file), or you can code them directly in the EXEC.

By default, the FTP session dialog is printed on the terminal. If you want the dialog sent to a data set rather than the terminal do one of the following:

- | | |
|----------------------------------|---|
| TSO | Specify an OUTPUT data set as part of the ALLOC statement. |
| z/OS UNIX System Services | Redirect the output to an HFS file when invoking the FTP command. |

The following examples are written in REXX. Refer to the *z/OS TSO/E REXX Reference* and *z/OS Using REXX and z/OS UNIX System Services* for more information about the REXX language.

Issuing FTP subcommands from a file

Figure 8 is an example of an EXEC that issues FTP subcommands from a data set. In this example, the FTPIN1 data set is used for the FTP subcommands, and FTPOUT1 is used to store the FTP session dialog. This example must be invoked from TSO.

```
/*REXX*/
"ALLOC DA(FTPIN1) DD(INPUT) SHR REU" /* Input will be from FTPIN1 */
if rc ~= 0 then do
    say 'Error in ALLOC INPUT, rc = ' rc
    exit
end
"ALLOC DA(FTPOUT1) DD(OUTPUT) SHR REU" /* Output goes to FTPOUT1 */
if rc ~= 0 then do
    say 'Error in ALLOC OUTPUT, rc = ' rc
    exit
end
"FTP YKTVSH" /* FTP to the YKTVSH host */
"FREE DD(INPUT)"
"FREE DD(OUTPUT)"
EXIT
```

Figure 8. How to issue the FTP subcommands from a data set

Figure 9 on page 93 is an example of an EXEC that issues FTP subcommands from an HFS file. In this example, the name of the input file and output file are passed as arguments on the EXEC. For example,

```
EXAMPLE1 /u/user117/ftpin1 /u/user117/ftpout1
```

where EXAMPLE1 is the name of the EXEC. This example must be invoked from the z/OS UNIX shell.

```

/* rexx                                                    */
/*                                                    */
/* Input: infile - HFS file containing FTP commands        */
/*          outfile - HFS file to contain FTP output. If not specified */
/*                  output goes to terminal.                */
/*                                                    */

parse arg infile outfile .                               /* get command line input */

if infile = '' then                                     /* input file not specified */
do
    say 'Input file name is required.'
    exit 12                                             /* return to UNIX System Services */
end
else
    input_file = '<' infile                             /* redirect input from file */

if outfile <> '' then
    output_file = '>' outfile                             /* redirect output to file */
else
    output_file = ''

address syscall "stat (infile) fstat." /* test if input file exist */
if fstat.0 = 0 then                      /* input file not found */
do
    say 'Input file:' infile 'not found.'
    exit 28                             /* return to UNIX System Services */
end

"ftp -v -p TCP/IP" input_file output_file /* invoke FTP client with
                                         input and output redirection */

say "FTP client return code is:" rc /* print client return code */

exit 0                                     /* return to UNIX System Services */

```

Figure 9. How to issue the FTP subcommands from an HFS file system

The following is an example of the input file (either the input data set FTPIN1 or the HFS file /u/user117/ftpin1).

```

krasik mvsftp
cd examples
put t.info t1.info
get t1.info t2.info (r
quit

```

Where:

krasik Is the user ID

mvsftp Is the password

t.info Is the file to be transferred

Issuing FTP subcommands directly from the EXEC interface

Figure 10 on page 94 is an example of how to issue FTP subcommands directly from a REXX EXEC. The REXX stack is used to hold the FTP subcommands. This example runs in both the TSO and z/OS UNIX environments.

Note: To use FTP in a z/OS UNIX environment, TSO users must be authorized users or have a default z/OS UNIX user ID.

```

/* rexx */

/* push commands on stack */
QUEUE "YKTVSH" /* server address */
QUEUE "krasik mvsftp" /* userid/password */
QUEUE "cd /tmp/examples/"
QUEUE "put t.info t1.info"
QUEUE "cd .."
QUEUE "cd dummy"
QUEUE "quit"

cmdargs = "-v -p TCP/IP" /* set ftp client arguments */

parse source . . . . . env . /* check if running under */
/* UNIX System Services */
/* env='OpenMVS' if invoked from */
/* UNIX System Services, */
/* otherwise env=' ' */

if env = "OpenMVS" then do; /* running under */
/* UNIX System Services */
ADDRESS SYSCALL /* establish SYSCALL environment */
CALL SYSCALLS 'SIGOFF' /* turn signal handling off */
ADDRESS LINKMVS "FTP cmdargs" /* invoke ftp client */
CALL SYSCALLS 'SIGON' /* turn signal handling on */
/* NOTE: ADDRESS LINKMVS is */
/* required since commands are */
/* on the rexx stack. */
end /* running under Unix System Services */
else /* running under TSO */
"FTP" cmdargs /* invoke ftp client */

say "FTP client return code is:" rc /* print client return code */

exit 0

```

Figure 10. How FTP subcommands can be issued from an EXEC

Notes:

1. If data set DUMMY does not exist, FTP exits with a return code.
2. When using the REXX stack, ADDRESS LINKMVS must be used to invoke the FTP command in the z/OS UNIX environment.

FTP return codes

By default, the FTP client ignores any errors that occur during a session and exits with a return code of zero. You can direct FTP to exit on error with a nonzero return code by specifying the EXIT or EXIT=*nn* parameter on the FTP command. There are several methods you can use to direct the FTP client to compute return codes.

When FTP is started from the FTP Callable Application Programming Interface, all elements that compose the values described below are returned to the application. These include the client error code, the server reply code, and the FTP subcommand code. The CLIENTERRCODES setting in FTP.DATA has no effect on the FTP Callable API. Refer to the *z/OS Communications Server: IP Programmer's Reference* for detailed information about using the FTP Callable API.

The FTP client issues message EZA1735I to display the standard return code and the client error code when the (EXIT parameter is specified on the FTP command and an error occurs. The standard return code is described in “FTP standard return codes” on page 96; the client error code is described in “FTP client error codes” on page 99. All possible computed return codes (excluding EXIT=*nn*) can be derived from the information found in the message. EZA1735I is issued regardless of the type of return code or whether client error logging is in use. See “FTP client error logging” on page 100 for more information about logging client errors.

When a critical error occurs before the client can establish its environment, FTP client initialization can exit with a return code set to client error code regardless of the type of return code requested or the EXIT=*nn* value.

Each subcommand has an EXIT_IF_ERROR flag that determines whether the FTP client exits when an error occurs if you specify EXIT or EXIT=*nn* on the FTP command. See “FTP subcommand codes” on page 96 for a list of the FTP subcommand codes and their EXIT_IF_ERROR settings.

The following are the methods for computing the return code:

EXIT=*nn*

This method instructs the client to exit with a specified fixed return code for any eligible error. The EXIT parameter is specified with an equal sign (=) followed by a number in the range of 0–4095.

EXIT with CLIENTERRCODES FALSE (or unspecified) in FTP.DATA

This is the standard return code processing for FTP with EXIT specified. This type of return code is described in “FTP standard return codes” on page 96. Some limitations of this method are:

- The size of the return code might exceed the capacity (65536) of the SMF record type 30 subtype 4.
- The return code issued as a batch job step completion code generally does not match the original return code.
- The batch job step completion codes are difficult to interpret.

Because of these limitations, using one of the other return code options that are available is recommended.

This method can be used in conjunction with client error logging even if no EXIT parameter is in use. See “FTP client error logging” on page 100 for more information about logging client errors.

EXIT with CLIENTERRCODES TRUE in FTP.DATA

This method uses a list of error codes, defined in “FTP client error codes” on page 99, to describe different types of errors that occur within the FTP client. For example, errors returned by the server are reported in the client as FTP_SERVER_ERROR. The client error codes are the same in all environments and are easier to interpret than standard return codes, but client error codes contain less information about the cause of the error.

This method can be used in conjunction with client error logging even if no EXIT parameter is in use. See “FTP client error logging” on page 100 for more information about logging client errors.

EXIT with CLIENTERRCODES EXTENDED in FTP.DATA

The EXTENDED client error code is composed of an FTP client error code and an FTP subcommand code, as described in “FTP client error codes extended” on page 100

on page 100. These return codes match in all environments, are easily interpreted, and provide more information regarding the cause of the error than the client error codes alone.

This method can be used in conjunction with client error logging even if no EXIT parameter is in use. See “FTP client error logging” on page 100 for more information about logging client errors.

FTP standard return codes

Standard FTP return codes are computed when EXIT is specified with no parameter and CLIENTERRCODES FALSE is specified or defaulted to in FTP.DATA. They might also be displayed in the text of message EZZ9830I if LOGCLIENTERR TRUE and CLIENTERRCODES FALSE are specified in FTP.DATA, whether or not EXIT was specified on the FTP command. A standard FTP return code appears in the following format:

yyxxx

Where:

yy Is the subcommand code, a number in the range 1-99 representing the subcommand that the FTP client was executing when it detected the error. Each subcommand has an EXIT_IF_ERROR flag that determines whether FTP is exited when an error occurs if you specified EXIT on the FTP command. Table 17 on page 97 describes the possible FTP subcommand codes.

xxx

Is the reply code from the most recent reply sent by the FTP server. All FTP server replies begin with a 3-digit number. All reply codes used by the z/OS FTP server are listed the *z/OS Communications Server: IP and SNA Codes*. See RFC 959 and RFC 1123 for a generic description of FTP reply codes. Information about accessing RFCs can be found in Appendix E, “Related protocol specifications (RFCs),” on page 415.

For example, the FTP standard return code 16550 indicates the following:

16 The GET command failed.

550 The reply code from the FTP server. The latest reply from the server began with the number 550.

The FTP standard return code 04532 indicates the following:

04 The APPEND command failed.

532 The reply code from the FTP server.

00 and 000 are valid values for *yy* and *xxx*. This means that the error occurred at a time when no FTP subcommand was being processed (*yy*=00) or at a time when no reply had been received from the server for the current process. Message EZA1735I (issued when EXIT was specified at client start) contains the standard return code and the client error code.

FTP subcommand codes

Table 17 on page 97 lists the valid FTP subcommand codes. The EXIT_IF_ERROR column specifies whether an error causes FTP to end if you specified the EXIT parameter on the FTP command.

Note: LOC SITE will EXIT_IF_ERROR only when there are no parameters on the command.

Table 17. FTP subcommand codes

Code number	Subcommand	EXIT_IF_ERROR
00	No subcommand selected	Determined by internal FTP CLIENT ERROR CODE
1	AMBIGUOUS	false
2	?	false
3	ACCT	true
4	APPEND	true
5	ASCII	true
6	BINARY	true
7	CD	true
8	CLOSE	true
9	TSO	false
10	OPEN	true
11	DEBUG	false
12	DELIMIT	false
13	DELETE	true
14	DIR	true
15	EBCDIC	true
16	GET	true
17	HELP	false
18	LOCSTAT	true
19	USER	true
20	LS	true
21	MDELETE	true
22	MGET	true
23	MODE	true
24	MPUT	true
25	NOOP	true
26	PASS	true
27	PUT	true
28	PWD	true
29	QUIT	true
30	QUOTE	true
31	RENAME	true
32	SENDPORT	true
33	SENDSITE	false
34	SITE	false
35	STATUS	true
36	STRUCTURE	true

Table 17. FTP subcommand codes (continued)

Code number	Subcommand	EXIT_IF_ERROR
37	SUNIQUE	true
38	SYSTEM	true
40	TYPE	true
41	LCD	true
42	LOCSITE	true (see Note on page 97)
43	LPWD	false
44	MKDIR	true
45	LMKDIR	true
46	EUCKANJI	true
47	IBMKANJI	true
48	JIS78KJ	true
49	JIS83KJ	true
50	SJISKANJI	true
51	CDUP	true
52	RMDIR	true
53	HANGEUL	true
54	KSC5601	true
55	TCHINESE	true
56	RESTART	false
57	BIG5	true
58	BLOCK	true
59	COMPRESS	true
60	FILE	true
61	PROXY	true
62	RECORD	true
63	SCHINESE	true
64	STREAM	true
65	GLOB	false
66	PROMPT	false
67	UCS2	true
68	!	true
70	DUMP	false
71	VERBOSE	false
72	CLEAR	true
73	CPROTECT	true
74	PRIVATE	true
75	PROTECT	true
76	SAFE	false
77	CCC	true
78	LANGUAGE	true

Table 17. FTP subcommand codes (continued)

Code number	Subcommand	EXIT_IF_ERROR
79	FEATURE	true
80	SRESTART	true
99	UNKNOWN	true

FTP reply codes

The z/OS FTP client displays each command it sends to the FTP server, and the FTP server reply to that command. As mandated in RFC 959, an FTP server must reply to every command an FTP client sends to it. The replies are architected to begin with a three digit reply code, followed by human readable text. The reply code indicates the status of the command; the text provides additional information. FTP clients generally interpret only the reply code and ignore the text. The reply code indicates to the client whether the server is still processing the command, or whether the server finished processing the command successfully, or whether the server stopped processing the command because of errors. For a generic description of FTP server reply codes, see RFC 959 and RFC 1123. Information about accessing RFCs can be found in Appendix E, “Related protocol specifications (RFCs),” on page 415. For a complete list of the replies used by the z/OS FTP server, refer to *z/OS Communications Server: IP and SNA Codes*.

FTP client error codes

Table 18 lists error codes used as condition codes for batch jobs if **(EXIT** is specified, or as return codes from REXX execs, whenever the FTP client detects one of the described errors and the FTPDATA statement CLIENTERRCODES is TRUE. These codes are also used to build the return code when CLIENTERRCODES is EXTENDED. Message EZA1735I (issued when EXIT was specified at client start) contains the standard return code and the client error code.

Table 18. Client error codes

Code	Error	Examples of cause
01	FTP_INTERNAL_ERROR	Failure to acquire storage, unexpected error in REXX stack.
02	FTP_SERVER_ERROR	Error reply returned by the server.
03	unused	N/A
04	FTP_INVALID_PARAM	Parameter specified on FTP command is not valid.
05	FTP_OPEN_IOSTREAM_FAILED	Failed to open the INPUT stream.
06	FTP_ALREADY_CONNECTED	Attempt to OPEN when already connected.
07	FTP_USAGE	Syntax error in a subcommand, combination of settings is not valid.
08	FTP_CONNECT_FAILED	Attempt to reach unknown host, lost connection, data connect failed.
09	FTP_TIMEOUT	Timeout waiting for response on the control or data connection.
10	FTP_SESSION_ERROR	Socket error, other send/receive errors.
11	FTP_LOGIN_FAILED	User ID, password, or account info is not valid.

Table 18. Client error codes (continued)

Code	Error	Examples of cause
12	FTP_INPUT_ERR	Error reading INPUT or STDIN.
13	FTP_INPUT_EOF	Internal use only.
14	FTP_NOTFOUND	TCP/IP stack not found, resolver not found, translation table not found or could not be loaded.
15	FTP_INVALID_ENVIRONMENT	Missing INPUT DD.
16	FTP_NOT_ENABLED	Improper installation of TCP/IP.
17	FTP_AUTHENTICATION	Security authentication or negotiation failure, incorrect specification of security keywords.
18	FTP_FILE_ACCESS	Data set allocation failure, recall failure, open failure.
19	FTP_FILE_READ	File corrupted.
20	FTP_FILE_WRITE	Out of space condition, close failure.
21	FTP_CONVERSION	Error during data translation or setup not otherwise specified.
22	FTP_PROXY_ERR	Error during proxy processing not otherwise specified.
23	FTP_SQL_ERR	Error returned by the SQL process, including connect failure.
24	FTP_CLIENT_ERR	Other errors in the client, some unrecoverable interface errors.

FTP client error codes extended

The EXTENDED client error codes feature is enabled by specifying CLIENTERRCODES EXTENDED in the FTP.DATA data set used by the client. EXTENDED implies TRUE, meaning that client error codes are be used for return code generation, and it supplements the information returned. The following is the format of the return code:

ecyy

Where:

- ec** The client error code set by the FTP client. See “FTP client error codes” on page 99 for more information.
- yy** The subcommand code, which is a number in the range of 0–99. See “FTP subcommand codes” on page 96 for a list of the subcommand codes.

The return code stored in the SMF record and returned to the user or batch job is the 4-digit *ecyy* value. This value can also be derived from the contents of message EZA1735I, which displays the standard return code and client error code.

FTP client error logging

If you activate FTP client error logging, message EZZ9830I provides the subcommand code, last reply code, and computed return code of any error that causes FTP to exit. If you have not specified the EXIT or EXIT=*nn* parameter on

the FTP command, client error logging will drive message EZZ9830I on the first error that would have caused FTP to exit if EXIT or EXIT=*nn* had been specified.

The client error logging feature is enabled by specifying LOGCLIENTERR TRUE in the FTP.DATA data set used by the client.

Each subcommand has an EXIT_IF_ERROR flag that determines whether the FTP client exits when an error occurs if you specified EXIT or EXIT=*nn* on the FTP command. See “FTP subcommand codes” on page 96 for a list of FTP subcommand codes and their EXIT_IF_ERROR settings.

If the client session is interactive, the message is displayed on the user terminal. If the client session is not running in an interactive environment, the message appears in the system log and in the batch job log. The information contained in EZZ9830I includes:

- The address space name.
- The FTP subcommand code.
- The last reply code from the server (or 000 if none).
- Whether EXIT was specified at client start.
- The type of computed return code.
- The computed return code value based on the start parameters and configuration settings. It might not match the actual return code observed from the client.

Because EZZ9830I is written to the system log when the FTP client is running as a batch job, the message can be used to drive automation. The computed return code displayed in the message might be the EXIT=*nn* value, a standard return code, a client error code, or a client error code extended.

The standard return code can be derived from the FTP subcommand code and last reply from the server displayed in the message text. See *z/OS Communications Server: IP Messages Volume 4 (EZZ-SNM)* for the complete message format of EZZ9830I and an explanation of the computed return code value and the other fields in the message.

Restarting a failed data transfer

FTP supports two subcommands for restarting data transfers that fail. Select the appropriate subcommand based on the data transfer mode at the time the data transfer failed.

- If stream mode data transfer was used, use the `srestart` subcommand to restart the data transfer. See “SRESTART subcommand—Restart a stream data transfer” on page 269 for a description of stream mode restart.
- If block or compressed mode was used, use the `restart` subcommand to restart the data transfer. See “REStart subcommand—Restart a checkpointed data transfer” on page 236 for a description of block or compressed mode restart.

To restart a block or compressed mode data transfer, checkpointing must have been initiated prior to the start of the transfer. You can use either the `LOCSITE` or `SITE` subcommands to initiate checkpointing.

- The `LOCSITE` subcommand parameter `CHKPTINT` controls the checkpoint interval at the client, and the parameters `CHKPTPREFIX` and `RESTGET` control the naming of the client checkpoint data set.

- The SITE subcommand parameter CHKPTINT controls the checkpoint interval at the server.

Each of the LOCSITE/SITE parameters is also supported in the FTP.DATA file.

Interfacing with JES

The MVS Job Entry System (JES) enables you to perform the following functions:

- Submit jobs (consisting of JCL and data) to the job scheduler for execution
- Spool JCL messages and SYSOUT during execution
- Print the output
- View the output
- Delete job output

FTP server provides the following functions in its JES interface:

- Submitting a job
- Displaying the status of all the user's jobs
- Receiving the spool output of the job (JCL messages and SYSOUT)
- Deleting a job
- Submitting a job and automatically receiving output
- Terminating access to JES

Steps for submitting a job

A job consists of job control language (JCL) and data.

Perform the following steps to submit a job using FTP.

1. Create the JCL and data that you want to submit, using the editor on your client.
 - If the FTP server is set up for JESINTERFACELEVEL 1, to be able to display the status, receive spool output for, and delete a job, the job name in the JCL must be the USERIDx, where x is a 1-character letter or number and USERID must be the user ID you use to log into the FTP server to submit the job. Otherwise if the job name in the JCL is not USERIDx, the job can be submitted but the DIR subcommand will not display the job, and the GET and DELETE subcommands will not be supported for the job.
 - If the FTP server is set up for JESINTERFACELEVEL 2, the job name can be any name you are authorized to view using the Security Authorization Facility (SAF), such as RACF. See "JESINTERFACELEVEL differences" on page 109 for more information on security and JESINTERFACELEVEL 2.

You can determine how the FTP server is set up and whether you have authority to view jobs by entering the STAT client command and the SITE command. For JESINTERFACLEVEL 2, the STAT command returns:

```
211-JESINTERFACELEVEL is 2
211-JESOWNER is USER1
211-JESJOBNAME is USER1*
```

If the SITE JESOWNER= completes successfully, then the user has SAF authority to other users' jobs. If the SITE JESJOBNAME= completes successfully, then the user has SAF authority to other jobs.

Note: The maximum LRecl for the submitted job is 254 characters. JES scans only the first 72 characters of JCL.

-
2. Start a session with the FTP server on the MVS system to which you want to submit the job.
-
3. After you have entered your user ID and password, specify that you want to interface to JES with a site parameter by entering the following:
SITE FILEtype=JES
-
4. To submit the JCL file you have created, enter the following:
PUT filename.filetype
-

When you are done, the JCL is then submitted to the JES internal reader and waits for an initiator to start the job. The job is submitted under the user ID that you used when you logged on to the system unless a different user ID is specified on the JOB card.

The default for *filetype* is SEQ, and when you want to go back to normal FTP file transfer mode, enter the following:

SITE FILEtype=SEQ

Refer to the *z/OS MVS JCL Reference* for more information about using JCL.

Displaying the status of a job

This section describes client operation when the MVS server has been placed in FILEtype=JES mode with the SITE command. After you have submitted your job, you can determine whether it is waiting for execution, running, or finished. The status of all the jobs that are on the JES spool for your user ID can be displayed. The format of the display depends on the value of JESINTERFACELEVEL.

DIR output with JESINTERFACELEVEL=1

The following is a sample of the DIR output with JESINTERFACELEVEL=1:

```

MYUSRIDA JOB05444 OUTPUT 3 spool Files
MYUSRIDB JOB05766 OUTPUT 6 spool Files
MYUSRIDC JOB05832 OUTPUT 6 spool Files
MYUSRIDD JOB05946 ACTIVE
MYUSRIDE JOB06021 INPUT

  1      2      3      4

```

1. The first column displays the job name.
2. The second column displays the job ID, assigned by JES. This 8-character job ID, consisting of the word JOB followed by a 5-digit number or the letter J followed by a 7-digit number, is assigned by JES to identify your job.
3. The third column displays the status of the job.
The status is one of the following:

INPUT

The job was received, but not run yet. If the JCL specified that the job be put on hold, it appears with this status.

ACTIVE

The job is running.

OUTPUT

The job has finished and has output to be printed or retrieved. For each OUTPUT job, there are spool files that consist of JCL messages, JES messages, initiator and terminator messages, and SYSOUT. For jobs with a status of OUTPUT, the number of spool files for each job is specified in the DIR display output.

4. The fourth part of the display lists the number of retrievable spool files for the job.

Note: The LS subcommand lists the job ID without the job status or number of spool files. Providing this spool information consumes a lot of computer resources. Use the LS subcommand rather than the DIR subcommand when the job status and number of spool files are not required.

DIR command with JESINTERFACELEVEL=2

The following is a sample of the DIR command with JESINTERFACELEVEL=2:

```
dir
EZA1701I >>> PORT 127,0,0,1,4,5
200 Port request OK.
EZA1701I >>> LIST
125 List started OK for JESJOBNAME=USER1*, JESSTATUS=ALL and JESOWNER=USER
EZA2284I JOBNAME JOBID OWNER STATUS CLASS
EZA2284I USER1A JOB00083 USER1 OUTPUT A ABEND=806 3 spool files
EZA2284I USER1 JOB00070 USER1 OUTPUT A RC=000 5 spool files
EZA2284I USER1J JOB00082 USER1 OUTPUT A (JCL error) 3 spool files
EZA2284I USER1 JOB00054 USER1 OUTPUT A RC=0000 5 spool files
EZA2284I USER1D JOB00029 USER1 OUTPUT A RC=0000 5 spool files
EZA2284I USER1C JOB00028 USER1 OUTPUT A RC=0000 5 spool files
EZA2284I USER1B JOB00027 USER1 OUTPUT A RC=0000 5 spool files
EZA2284I USER1 TSU00024 USER1 ACTIVE TSU
EZA2284I USER1W JOB00081 USER1 INPUT A -DUP-
EZA2284I USER1p JOB00093 USER1 INPUT A -HELD-
250-JESENTRYLIMIT of 10 reached. Additional entries not displayed
250 List completed successfully.
EZA1460I Command:
  dir tsu00024
EZA1701I >>> PORT 127,0,0,1,4,6
200 Port request OK.
EZA1701I >>> LIST tsu00024
125 List started OK for JESJOBNAME=USER1*, JESSTATUS=ALL and JESOWNER=USER
EZA2284I JOBNAME JOBID OWNER STATUS CLASS
EZA2284I USER1 TSU00024 USER1 ACTIVE TSU
-----
EZA2284I STEPNAME ++++++ PROCNAME OS390R5
EZA2284I CPUTIME 0.503 ELAPSED TIME 3853.718
250 List completed successfully.
EZA1460I Command:
  dir job54
EZA1701I >>> PORT 127,0,0,1,4,7
200 Port request OK.
EZA1701I >>> LIST job54
125 List started OK for JESJOBNAME=USER1*, JESSTATUS=ALL and JESOWNER=USER
EZA2284I JOBNAME JOBID OWNER STATUS CLASS
EZA2284I USER1 JOB00054 USER1 OUTPUT A RC=000
EZA2284I -----
EZA2284I ID STEPNAME PROCSTEP C DDNAME BYTE-COUNT
EZA2284I 001 JESE H JESMSG LG 1200
EZA2284I 002 JESE H JESJCL 526
EZA2284I 003 JESE H JESYSMSG 1255
EZA2284I 004 STEP57 H SYSUT2 741
EZA2284I 005 STEP57 A SYSPRINT 209
EZA2284I 5 spool files
250 List completed successfully.
EZA1460I Command:
```

- For a list of jobs these fields are displayed:

JOBNAME

The job name.

JOBID

The job ID, assigned by JES. This 8-character job ID, consisting of the word JOB followed by a 5-digit number or the letter J followed by a 7-digit number, is assigned by JES to identify your job.

OWNER

The user ID that owns the job.

STATUS

The current job status. The status is one of the following:

INPUT

The job was received, but not run yet.

HELD The JCL specified that the job is to be put on hold.

ACTIVE

The job is running.

OUTPUT

The job has finished and has output to be printed or retrieved. For each OUTPUT job, there are spool files that consist of JCL messages, JES messages, initiator and terminator messages, and SYSOUT. For jobs with a status of OUTPUT, the number of spool files for each job is specified in the DIR display output.

CLASS

The job class.

These fields are followed by information about the job termination (if it has been reached) or clarification of the status field. This information might include an ABEND code, an indication of a JCL error, an indication that the job is held as a DUP, or the maximum return code for the job in a 4-digit decimal field.

- For a TSO user the following additional fields are displayed:

STEPNAME

The procstepname for the logon procedure.

PROCNAME

The logon procedure.

CPUTIME

The total CPU seconds used.

ELAPSED TIME

The total elapsed time in seconds.

- For an individual job, these additional fields are displayed for each spool file:

ID The ID for the spool file being listed.

STEPNAME

The job step that generated the spool file.

PROCSTEP

The procedure stepname (if any) that generated the spool file.

C The SYSOUT class of the spool file.

DDNAME

The DDNAME associated with this spool file.

BYTE-COUNT

The total number of bytes in the spool file.

Receiving spool output

You can retrieve JCL messages, JES messages, initiator and terminator messages, and SYSOUT data sets either individually or as a group.

Receiving individual spool files

Retrieving the spool files one at a time enables you to see whether a job ran correctly before you retrieve the rest of the output, giving you greater control over retrieving job information. If your FTP server is configured with JESINTERFACELEVEL=2, then a DIR command displays the output job completion code and the number and size of the job files. If JESINTERFACELEVEL=1, a DIR command displays the number of the output job files.

To retrieve the spool output, use the FTP GET subcommand while in the FILEtype=JES mode, specifying the job ID and the number of the spool file you want.

You can specify a short form of the job ID by entering the letter J followed by a 4-digit or 5-digit job number. For example:

```
GET JOB05444.1 JOB05444.FILE1 (REPLACE
GET JOB05766.6 ASSEMBLY.FILE6
GET JOB06235.2 (REPLACE
GET JOB00275.4
GET J7438.3
```

In these examples, *foreign_file* is specified first, followed by *local_file* (on your client machine) with the appropriate options, such as REPLACE. The first example requests that the first spool file for JOB05444 be transmitted and replace the file on your client named JOB05444.FILE1. The second command requests that the sixth spool file for JOB05766 be transmitted to your client with the name ASSEMBLY.FILE6.

If you have specified FILEtype=JES, you can use the MGET subcommand to receive output from multiple jobs without specifying them one at a time. For example, you can enter:

```
MGET parameter
```

The FTP client requires an MGET subcommand parameter. The parameter is passed to the FTP server but is not used. The server returns all of the SYSOUT files for all the jobs in the HELD queue for your user ID for FTP servers configured for JESINTERFACELEVEL=1. For JESINTERFACELEVEL=2, all jobs that match the filters JESJOBNAME, JESOWNER and JESSTATUS are retrieved whether they are in the HELD queue or not. Note that the JESJOBNAME and JESOWNER SITE parameters allow wildcards (*,?). When using the MGET command the JESOWNER value should be OUTPUT.

Notes:

1. On an MVS FTP server, *local_file* must be specified.
2. Truncation can cause a loss of data.
3. A GET command performed on an empty data set erases the contents of the existing local data set.
4. Receiving the output of a job does not remove the job output from the queue. To remove the job output from the queue, you must issue a DELETE command.

Receiving a group of spool files

To retrieve all the spool files associated with the same job simultaneously into the same destination file, specify:

```
GET jobid.x
```

where *x* can be uppercase or lowercase. All the spool files are transferred together and put into file *jobid.x*. The following line appears between each retrieved JES spool file:

```
!! END OF JES SPOOL FILE !!
```

This enables you to easily find the end of each spool file.

You can also specify a data set name to send the files to, such as:

```
GET jobid.x data_set_name
```

All the spool files are put into the file named `file.name`. This eliminates the need to retrieve each spool file separately. For example, `GET J3456.X` retrieves all the spool files for `JOB03456` and puts them in a file named `J3456.X`.

The command `MGET` with any parameter produces the same results as issuing `GET jobid.x` commands for each job that is associated with your user ID.

Notes:

1. In JES2 (if `JESINTERFACELEVEL=1`), the spool files retrieved by `GET` and tallied by `DIR` must be in a hold queue (commonly `class=H`).
2. In JES3 (if `JESINTERFACELEVEL=1`), the spool files must be in a hold queue reserved for external writers. Ask your system programmer for the class that says (`HOLD=EXTWTR`) in the JES3 installation stream.
3. The maximum record length that can be received at the server is 254 characters before the record is truncated.
4. Receiving the output of a job does not remove the job output from the queue. To remove the job output from the queue, you must issue a `DELETE` command.

Deleting a job

You can delete a job before or during execution, or you can delete the output of a job before you have retrieved it. You do this by using the `DELETE` subcommand while in the `FILEtype=JES` mode and the job ID. You can specify either the 8-character job ID or a short form of the job ID by entering the letter `J` followed by a 1- to 7-digit job number. For example,

```
DELETE JOB05444
DELETE J3672
```

When you issue the `DELETE` command, all spool output related to a job is deleted.

The host returns the message `CANCEL SUCCESSFUL` after it deletes the job.

Steps for submitting a job and automatically receiving output

You can submit a job using FTP and automatically receive your output. Rather than using the JCL you built on the FTP client, this function uses the JCL you have built on the FTP server. Automatic retrieval of jobs works only if the file contains one job. It does not work for files with more than one job (multiple `JOB` cards) in it.

Perform the following steps to submit a job using FTP.

1. Create the JCL and data that you want to submit and save it on the MVS host where the FTP server resides.

The JCL can reside in a sequential data set, or partitioned data set, or hfs file. If `JESINTERFACELEVEL=1`, then the job name in the JCL must be `USERIDx`, where `x` is a 1-character letter or number. Additionally, the output class for any data sets you wish to retrieve (`MSGCLASS` or `SYSOUT` files) contained in your JCL must specify a `JES HOLD` output class. If `JESINTERFACELEVEL=2`, then the `JESJOBNAME` and `JESJOBOWNER` must match the jobname and jobowner. Additionally, `JESSTATUS` must be set to `ALL` or `OUTPUT` and the logged in FTP user ID must have access to `nodeid.userid.jobname.jobid`.

2. Start a session with the FTP server on the MVS system to which you want to submit the job.

3. After you have entered your user ID and password, specify that you want to interface to JES with a site parameter by entering the following:

```
SITE FILEtype=JES
```

-
4. Submit the JCL file you have created by entering the following command:

```
GET jclfilename.jclfiletype outputfilename.outputfiletype
```

The *outputfilename.outputfiletype* defines the data set at the FTP client site that is to contain the HELD job output when the job completes.

The MVS FTP server reads the data set *jclfilename.jclfiletype* and submits it to the JES internal reader.

You know you are done when you see the following replies. The next two replies indicate that the job has been submitted and the MVS FTP server is waiting for it to complete. The third reply indicates that the job has finished and the files have been copied to your output data set:

```
125 Submitting job outputfilename.outputfiletype FIXrecfm 80
125 When JOB05125 is done, will retrieve its output250 Transfer completed successfully.
```

Note: When submitting a job and automatically receiving the output, remember that your session is suspended. You should use care, based on the anticipated run time of your job, when using this function. If your session times out, you must restart FTP and manually retrieve your output. Session timeouts are caused by the following:

- The FTP Server does not wait long enough for the job that is executing to end. Increase the JESPUTGETTO interval in the FTP.DATA data statement on the server. This defaults to 10 minutes and defines the amount of time FTP waits for the submitted job to complete before timing out.
- The FTP client does not wait long enough for the job to complete and the server to retrieve the output. Increase the DATACTIME timer value in the client. This defaults to two minutes and defines the amount of time the client waits for a response from the server.
- FTP client and FTP Server receive resets. This is usually caused by a firewall that timed out the session because of a lack of activity. Add an FTPKEEPALIVE statement or decrease the time interval on the current FTPKEEPALIVE statement in the FTP.DATA data file. The keepalive value on FTPKEEPALIVE must be less than the expected value of the server.

Terminating access to JES

The FTP default for FILEtype is SEQ. When you want to end access to JES and return to FTP in its normal file transfer mode, specify the following:

```
SITE FILEtype=SEQ
```

JESINTERFACELEVEL differences

The FTP JESINTERFACELevel 2 allows increased functionality for users over that available with JESINTERFACELevel 1. Jobs allowable by the system (JESSPOOL RACF class) whether they are in held or nonheld output class can be viewed. Information about jobs such as held/dup for jobs on the internal reader, CPU time of running jobs, and number of sysout data sets for completed jobs can be displayed.

If the user does a DIR subcommand without any operands, the display shows matches of the search criteria — one line per task. If the user does a DIR subcommand for a specific JOBID, the status of the job is listed and, if the status is OUTPUT, it lists information about all the sysout data sets created by this job (and available in the JES spool data set at the time of access). If a JOBID is supplied and the job is active, it lists information about the job step name, cpu busy, and elapsed time.

Whenever a DIR subcommand is executed (with or without arguments), the JESJOBNAME, JESENTRYLIMIT, JESOWNER and JESSTATUS filter keywords can be used to limit the number of entries that are returned to the user. A DIR subcommand with all JES keywords set to their default and JESOWNER set to USER1 returns information about all batch jobs that have USER1 registered as OWNER. If the value of JESOWNER is set to empty (space), it defaults to the logged-in user ID.

- To list jobs for all users, a value of JESOWNER=* must be specified. If the value of JESJOBNAME is set to empty (space), it defaults to the logged-in user ID suffixed with an asterisk (if user is USER1, then JESJOBNAME defaults to USER1*).
- To list all job names, a value of JESJOBNAME=* must be specified. If the value of JESSTATUS is set to empty, it defaults to all types of output.
- To list only the completed jobs, a value of JESSTATUS=OUTPUT must be specified.

The subcommands DIR, LS, MDELETE, and MGET allow for wildcard (*) filtering on a specific jobid only if JESINTERFACELevel 2 is active. A DIR subcommand results in the use of the LIST FTP command. An LS, MDELETE, or MGET subcommand results in the use of the NLST FTP command.

The following table summarizes the behavior of the different levels of JESINTERFACELevel. The term *matching filters* means all jobs that match parameters of JESJOBNAME, JESOWNER, JESSTATUS, and up to the JESENTRYLIMIT entries.

Subcommand	JESINTERFACELevel 1	JESINTERFACELevel 2
DIR [*]	All jobs	All Jobs matching filters
DIR Jxx	All jobs (Jxx ignored)	Details for Jxx (*)
LS	All jobids	All jobids matching filters
LS Jxx with wildcards	All jobids	All Jobs matching filters (*)
LS Jxx no wildcards	All jobids (Jxx ignored)	All Jxx.nnn sysout ds names matching filters (*)
GET Jxx.1 [local-file]	Return single sysout file	Return single sysout file
GET Jxx.x [local-file]	All Jxx sysout files in one file with separators	All Jxx sysout files in one file with separators
MGET *	One file per job - each file with separators - local file names default to jobids	One file per job matching filters - each file with separators - local file names default to jobids
MGET jxx	As MGET * (Jxx ignored)	One file per job matching filters - each file with separators - local file names default to Jxx.nnn (*)

Subcommand	JESINTERFACELevel 1	JESINTERFACELevel 2
DELETE Jxx	Jxx deleted	Jxx Deleted
DELETE Jxx.1	Not supported	Not supported
MDELETE *	All jobs deleted	All jobs matching filters deleted
GET jclds outfile	Server jclds submitted, all output returned in outfile with separators	Server jclds submitted, all output returned in outfile with separators

JESINTERFACELevel 2 returns different entries from JESINTERFACELevel 1 with wildcard (*) filtering, assuming the default values are used for the JESOWNER, JESJOBNAME, and JESENTRYLimit plus JESSTATUS=OUTPUT. The format of the returned data might also be different.

FILETYPE=JES parameters on DIR, LS and MGET subcommands allow an asterisk (*) for all job IDs, or a specific job ID. If a job ID is specified, but no such job ID exists, an error reply is returned to the client.

The NLST command is used under the covers for MGET and MDELETE to obtain lists of the resource names to issue individual GET or DELETE subcommands against. For job IDs, the list is simply a list of JES job IDs. For sysout data set IDs, the list is a list of JES job IDs suffixed with sysout data set numbers — in the same syntax that is supported by the GET and DELETE subcommands.

LIST, NLST, MDELETE, and MGET all show different behaviors for JESINTERFACELevel 2 over JESINTERFACELevel 1. This is because LIST and NLST use the filters for JESINTERFACELevel 2, and the commands DIR, LS, MDELETE, and MGET use LIST and NLST.

- For job IDs, an NLST command returns:
JOB00013
JOB00034
STC00067
- For sysout data set IDs, an NLST command returns:
JOB00013.1
JOB00013.2
JOB00013.3
JOB00013.4

JES security

If FTP.DATA does not change the JESINTERFACELevel to 2, the FTP server behaves as in previous releases. FTP clients are allowed to submit jobs to JES, retrieve held output that matches their logged in user ID plus one character, and delete held jobs that match their logged in user ID plus one character.

If JESINTERFACELevel is set to 2, then FTP clients have the ability to retrieve and delete any job in the system permitted by the Security Access Facility (SAF) resource class JESSPOOL. For that reason, JESINTERFACELevel=2 should only be specified if the proper JES and SDSF security measures are in place to protect access to JES output. The SAF controls used for JESINTERFACELevel=2 are essentially a subset of those used by SDSF. Therefore, if an installation has customized SAF facilities for SDSF, then they are configured for FTP JES level 2.

Before customizing the FTP-to-JES interface, you must complete JES customization. For example, JESJOBS is an SAF class that controls which users can submit jobs to JES. JESSPOOL is the SAF that controls which users can access output jobs. Customize these SAF classes before beginning customization of the FTP-to-JES interface.

JESSPOOL defines resource names as <nodeid>, <userid>, <jobname>, <Dsid>, <dsname>. An FTP client can delete an output job if it has ALTER access to the resource that matches its nodeid, userid, and job name. If the FTP client has UPDATE access to the resource, it can list, retrieve, or GET the job output. (JESINTERFACELevel 2 uses the SAPI interface to JES, so UPDATE authority is required to list job status or retrieve job output.) Refer to the *z/OS JES2 Initialization and Tuning Guide* for more information on JES security. Refer to *z/OS MVS Using the Subsystem Interface* for more information on the SAPI interface.

Changing JESSTATUS, JESOWNER, and JESJOBNAME

There are three filters used by the FTP server to control the display of jobs:

- JESSTATUS
- JESOWNER
- JESJOBNAME

JESSTATUS can be changed by an FTP client using the SITE command to filter jobs in INPUT, ACTIVE, or OUTPUT state. The SDSF resources checked for these states are *ISFCMD.DSP.INPUT.jesx*, *ISFCMD.DSP.ACTIVE.jesx*, and *ISFCMD.DSP.OUTPUT.jesx*, respectively. At login time (USER command), the default value is set to ALL if READ access is allowed to all three classes. Otherwise it attempts to set it to OUTPUT, ACTIVE, and then INPUT if the appropriate READ access is allowed. If no READ access is allowed to any of the classes, JESSTATUS is set to OUTPUT but JESOWNER and JESJOBNAME cannot be changed from the default. In this way, SAF controls can be put in place to limit FTP clients to whatever status of jobs an installation requires.

At login time, JESOWNER has the value of the logged in user ID. Authority to change JESOWNER is obtained by READ access to RACF profiles *ISFCMD.FILTER.OWNER*. An FTP client with READ access to *ISFCMD.FILTER.OWNER* is allowed to change the JESOWNER parameter using the SITE command.

At login time, JESJOBNAME has the value of the logged in user ID plus an asterisk (*). Authority to change JESJOBNAME is obtained by READ access to RACF profile *ISFCMD.FILTER.PREFIX*. An FTP client with READ access to *ISFCMD.FILTER.PREFIX* is allowed to change the JESJOBNAME parameter using the SITE command.

If a user is not authorized to the appropriate *ISFCMD.DSP.<status>.jesx*, any SITE JESSTATUS command is rejected with a reply:

```
200 User xxxxxxx is not authorized to filter on JESSTATUS, JESSTATUS remains
xxxxxxx
```

If a user is not authorized to filter on JESOWNER, any SITE JESOWNER command is rejected with a reply:

```
200 User xxxxxxx is not authorized to filter on JESOWNER, JESOWNER remains
xxxxxxx
```


If a user is not authorized to filter on JESJOBNAME, any SITE JESJOBNAME command is rejected with a reply:

```
200 User xxxxxxx is not authorized to filter on JESJOBNAME, JESJOBNAME remains
xxxxxxx*
```

Displaying the status of jobs (LIST and NLST)

No security checks are made when returning information to the user on an NLST or LIST (DIR, MGET, or MDELETE) command that has a wild card character of * or ? for a jobid. The filter variables were reset when the user connection was made. Any attempts to change them caused the appropriate security check to be made.

When a user issues a DIR command for a specific jobid a check for READ access to JESSPOOL resource nodeid.userid.jobname.jobid is made. This check is performed to prevent a different user (one who happens to know a jobid of another user's job) from obtaining status information, even though the user was not allowed to filter on OWNER. If a user is not allowed READ access, the following reply is sent:

```
550 RETR fails: nodeid.ownerid.jobname.jobid. User not authorized.
```

Browsing of SYSOUT data sets

When a SYSOUT data set is requested for transfer to the FTP client, the server checks JESSPOOL resource nodeid.userid.jobname.jobid.Dsid.dsname for READ access. If a user is not allowed READ access to the resource, the following reply is sent:

```
550 RETR fails: nodeid.ownerid.jobname.jobid. User not authorized.
```

Deleting/purging of SYSOUT data sets

When an FTP client requests to delete a SYSOUT data set, the server checks JESSPOOL resource nodeid.userid.jobname.jobid.Dsid.dsname for ALTER access. If a user is not allowed ALTER access to the resource, the following reply is sent:

```
550 DELE fails: nodeid.ownerid.jobname.jobid. User not authorized.
```

JES examples

The following example shows the JCL file USER121.JCL.CNTL(SMFALL) being submitted to the JES. Before FTP commands are issued, only the data set USER121.FTP.EXAMPLE exists on MVSXA2.

```
User: ftp 9.67.113.24 621
System:
      IBM FTP CS V1R5
      FTP: using TCPCS
      FTP.DATA FILE NOT FOUND.  USING HARDCODED DEFAULT VALUES.
      Connecting to 9.67.113.24, port 621
      220-FTPSERVE IBM FTP CS V1R2 at MVSVIC03.TCP.RALEIGH.IBM.COM,
19:03:
      on 2003-01-17
      220 Connection will close if idle for more than 5 minutes.
      NAME (<host>:tsuserid):
User: user121
System:
      >>>USER user121
      331 Send password please.
      Password:
      >>>PASS *****
      230 user121 is logged on. Working directory is "/u/user121".
      Command:
```

```

User: site file=jes
System:
    >>>SITE file=jes
    200 Site command was accepted
    Command:
User: put 'user121.jcl.cntl(mvsjob)'
System:
    >>>SITE FIXrecfm 80 LRECL=80 RECFM=FB BLKSIZE=27920
    200 Site command was accepted
    >>>PORT 9,67,112,25,4,37
    200 Port request OK.
    >>>STOR 'user121.jcl.cntl(mvsjob)'
    125 Sending Job to JES Internal Reader FIXrecfm 80
    250-It is known to JES as JOB02189.
    250 Transfer completed successfully.
    1066 bytes transferred in 3.118 seconds. Transfer rate 0.34 Kbytes/sec.
    Command:

```

```

User: dir
System:
    >>>PORT 9,67,112,25,4,38
    200 Port request OK.
    >>>LIST
    125 List started OK.
    USER121A JOB00067 INPUT
    250 List completed successfully.
    Command:
User: dir
System:
    >>>PORT 9,67,112,25,4,39
    200 Port request OK.
    >>>LIST
    125 List started OK.
    USER121A JOB00067 ACTIVE
    250 List completed successfully.
    Command:
User: dir
System:
    >>>PORT 9,67,112,25,4,40
    200 Port request OK.
    >>>LIST
    125 List started OK.
    USER121A JOB00067 OUTPUT 4 Spool Files
    250 List completed successfully.
    Command:

```



```

User: lcd 'user121.ftp.example.'
System:      Local directory name set to USER121.FTP.EXAMPLE.
             Command:
User: lpwd
System:      Local directory is USER121.FTP.EXAMPLE.
             Command:
User: dir
System:      >>>PORT 9,67,112,25,4,41
             200 Port request OK.
             >>>LIST
             125 List started OK.
             USER121A JOB00067 OUTPUT 4 Spool Files
             250 List completed successfully.
             Command:
User: get job00067.x spoolall
System:      >>>PORT 9,67,112,25,4,42
             200 Port request OK.
             >>>RETR job00067.x
             125 Sending all SPOOL files for requested JOBID.
             250 Transfer completed successfully.
             5935 bytes transferred in 4.755 seconds. Transfer rate 1.25 Kbytes/sec.
             Command:

```

```

User: get job00067.1 spool1
System:      >>>PORT 9,67,112,25,4,43
             200 Port request OK.
             >>>RETR job00067.1
             125 Sending data set USER121.USER121A.JOB00067.D000002.JESMSG LG
             250 Transfer completed successfully.
             1962 bytes transferred in 0.739 seconds. Transfer rate 2.65 Kbytes/sec.
             Command:
User: get job00067.2 spool2
System:      >>>PORT 9,67,112,25,4,44
             200 Port request OK.
             >>>RETR job00067.3
             125 Sending data set USER121.USER121A.JOB00067.D000003.JESYSMSG
             250 Transfer completed successfully.
             1982 bytes transferred in 2.123 seconds. Transfer rate 0.93 Kbytes/sec.
             Command:
User: get job00067.3 spool3
System:      >>>PORT 9,67,112,25,4,45
             200 Port request OK.
             >>>RETR job00067.3
             125 Sending data set USER121.USER121A.JOB00067.D000004.JESYSMSG
             250 Transfer completed successfully.
             1982 bytes transferred in 2.123 seconds. Transfer rate 0.93 Kbytes/sec.
             Command:
User: get job00067.4 spool4
System:      >>>PORT 9,67,112,25,4,46
             200 Port request OK.
             >>>RETR job00067.4
             125 Sending data set USER121.USER121A.JOB00067.D000103.?
             250 Transfer completed successfully.
             1227 bytes transferred in 0.380 seconds. Transfer rate 3.23 Kbytes/sec.
             Command:

```

```

User: get job00067.5 spool5
System:
    >>>PORT 9,67,112,25,47
    200 Port request OK.
    >>>RETR job00067.5
    550 Index 5 is greater than number of spool files for JOB00067
    Command:
User: dir
System:
    >>>PORT 9,67,112,25,4,50
    200 Port request OK.
    >>>LIST
    125 List started OK.
    user121A JOB00067 OUTPUT 4 Spool Files
    250 List completed successfully.
    Command:
User: delete job00067
System:
    >>>DELE job00067
    250 Cancel Successful
    Command:
User: dir
System:
    >>>PORT 9,67,112,25,4,51
    200 Port request OK.
    >>>LIST
    125 List started OK.
    No jobs found on Held queue
    250 List completed successfully.
    Command:
User: site filetype=seq
System:
    >>>SITE filetype=seq
    200 Site command was accepted
    Command:
User: quit
System:
    >>>QUIT
    221 Quit command received. Goodbye.
    READY

```

After executing the FTP commands, the following data sets now exist on MVSXA2:

```

USER121.FTP.EXAMPLE.SPOOLALL
USER121.FTP.EXAMPLE.SPOOL1
USER121.FTP.EXAMPLE.SPOOL2
USER121.FTP.EXAMPLE.SPOOL3
USER121.FTP.EXAMPLE.SPOOL4

```

Note: In most situations, the INPUT status is too fast to be captured by issuing DIR. However, if the ACTIVE or OUTPUT status of the job is captured, the INPUT status has been passed successfully.

The following are examples displayed by the shown DIR command.

DIR with JESJOBName=* JESOwner=* JESSTATUS=ALL JESENTRYLimit=200 shows all jobs in the system.

```

DIR
JOBNAME JOBID OWNER STATUS CLASS
USER1 TSU00017 USER1 INPUT A
USER1A JOB00001 USER1 INPUT A -HELD-
USER1A JOB00002 USER1 INPUT A -DUP-
USER2B JOB00022 USER2 ACTIVE D STEP=STEPNAME PROC=PROCSTEP CPUT= 7.27 ELAPT= 7.27
*MASTER* STC00002 +MASTER+ ACTIVE STEP= PROC= CPUT= 7.48 ELAPT= 7.48
USER3A JOB00061 USER3 OUTPUT D 3 spool files RC=0000
USER4A JOB00070 USER4 OUTPUT D 17 spool files ABEND=0806

```

DIR with JESJOBName=* JESOwner=USER1 JESSTATUS=ALL JESENTRYLimit=200 shows all jobs owned by USER1

```

DIR
JOBNAME JOBID OWNER STATUS CLASS
USER1 TSU00017 USER1 INPUT A
USER1A JOB00001 USER1 INPUT A -HELD-
USER1A JOB00002 USER1 INPUT A -DUP-

```

DIR with JESJOBName=* JESOwner=USER14 JESSTATUS=ALL JESENTRYLimit=200 shows all jobs owned by USER14

```

DIR
250 No tasks found for JESJOBName=*, JESSTATUS=ALL and JESOwner=USER14

```

DIR T* with JESJOBName=* JESOwner=USER1 JESSTATUS=ALL JESENTRYLimit=200 shows all TSO jobs.

```

DIR T*
JOBNAME JOBID OWNER STATUS CLASS
USER1 TSU00017 USER1 INPUT A

```

DIR with JESJOBName=* JESOwner=* JESSTATUS=ALL JESENTRYLimit=5 shows the first 5 jobs in the system

```

DIR
JOBNAME JOBID OWNER STATUS CLASS
USER1 TSU00017 USER1 INPUT A
USER1A JOB00001 USER1 INPUT A -HELD-
USER1A JOB00002 USER1 INPUT A -DUP-
USER2B JOB00022 USER2 ACTIVE D STEP=STEPNAME PROC=PROCSTEP CPUT= 7.27 ELAPT= 7.27
*MASTER* STC00002 +MASTER+ ACTIVE STEP= PROC= CPUT= 7.48 ELAPT= 7.48
JESENTRYLIMIT of 5 reached. Additional entries not displayed

```

If JESINTERFACELevel is set to 2, the DIR or LIST command for a specific jobid allows you to display specific SYSOUT data sets.

DIR JOB00061 with JESJOBName=* JESOwner=* JESSTATUS=ALL JESENTRYLimit=5 displays SYSOUT data sets from JOB00061.

```

DIR JOB00061
JOBNAME JOBID OWNER STATUS CLASS
USER3A JOB00061 USER3 OUTPUT D 3 spool files RC=0000
ID STEPNAME PROCSTEP C DDNAME REC-COUNT COMMENT
001 JESE H JESMSG LG 18
002 JESE H JESJCL 11
003 A JESYSMSG 22

```

If JESINTERFACELevel is set to 2, then the GET command should produce results similar to those below (JESJOBName=* JESOwner=* JESSTATUS=ALL JESENTRYLimit=200 displays SYSOUT data sets from JOB00061).

```

DIR JOB00061
JOBNAME  JOBID  OWNER   STATUS  CLASS
USER3A   JOB00061 USER3   OUTPUT  D 3 spool files RC=0000
          ID  STEPNAME PROCSTEP C DDNAME  REC-COUNT COMMENT
          001 JESE             H JESMSGLG      18
          002 JESE             H JESJCL      11
          003                  A JESYSMSG      22

DIR 'JOB00061.1'
JOBNAME  JOBID  OWNER   STATUS  CLASS
USER3A   JOB00061 USER3   OUTPUT  D 3 spool files RC=0000
          ID  STEPNAME PROCSTEP C DDNAME  REC-COUNT COMMENT
          001 JESE             H JESMSGLG      18

GET JOB00061.1
125 Sending data set USER3.USER3A.JOB00061.D0000002.JESMSGLG
250 Transfer completed successfully.
1012 bytes transferred in 0. 40 seconds. Transfer rate 25.30 Kbytes/sec.
GET 'JOB00022.1' (REP
125 Sending data set USER3.USER3A.JOB00022.D0000001.JESMSGLG
250 Transfer completed successfully.
1012 bytes transferred in 0. 40 seconds. Transfer rate 25.30 Kbytes/sec.

```

If JESINTERFACELevel is set to 2 then the MGET command should produce results similar to those below, which are identical to the GET of just the JOB00061.

At the end of each SYSOUT data set of a MGET, the following line is stored:
!! END OF JES SPOOL FILE !!

JESJOBName=* JESOwner=* JESSTATUS=ALL JESENTRYLimit=200 displays SYSOUT data sets from JOB00061.

```

DIR JOB00061
JOBNAME  JOBID  OWNER   STATUS  CLASS
USER3A   JOB00061 USER3   OUTPUT  D 3 spool files RC=0000
          ID  STEPNAME PROCSTEP C DDNAME  REC-COUNT COMMENT
          001 JESE             H JESMSGLG      18
          002 JESE             H JESJCL      11
          003                  A JESYSMSG      22

MGET JOB00061.*
125 Sending all spool files for Jobid JOB00061
250 Transfer completed successfully.
5541 bytes transferred in 4.92 seconds. Transfer rate 1.35 Kbytes/sec.

```

If MGET is specified with an asterisk, it works the same as in JESINTERFACELevel 1. MGET gets all jobs that match the JES filters. Also, in the example below, there are two input jobs for user1, no active jobs, and three output jobs. Care should be taken with the JES filters because an MGET from the client actually appears to the server as an NLST followed by several GETs. For example, if JESSTATUS is set to ALL and there are many jobs returned in the NLST that are in ACTIVE or INPUT status, then the MGET will not retrieve the number of output files expected and there will be no message that "250 No tasks found for JESJOBName...". (JESJOBName=* JESOwner=USER1 JESSTATUS=ALL JESENTRYLimit=1024.)

```

DIR
JOBNAME JOBID OWNER STATUS CLASS
USER1 TSU00017 USER1 INPUT A
USER1 JOB00022 USER1 ACTIVE D STEP=STEPNAME PROC=PROCSTEP CPUT= 7.27 ELAPT= 7.27
USER1A JOB00061 USER1 OUTPUT D 3 spool files RC=0000
USER1B JOB00070 USER1 OUTPUT D 5 spool files RC=0000
USER1C JOB00070 USER1 OUTPUT D 17 spool files ABEND=0806
MGET JOB00061.*
125 Sending all spool files for Jobid JOB00061
250 Transfer completed successfully.
5541 bytes transferred in 4.92 seconds. Transfer rate 1.35 Kbytes/sec.

SITE JESENTRYLIMIT=2
200 Site command was accepted
DIR
JOBNAME JOBID OWNER STATUS CLASS
USER1 TSU00017 USER1 INPUT A
USER1 JOB00022 USER1 ACTIVE D STEP=STEPNAME PROC=PROCSTEP CPUT= 7.27 ELAPT= 7.27
JESENTRYLIMIT of 2 reached. Additional entries not displayed.

```

Note that the DIR showed jobs TSU00017 and JOB00022, but the MGET is not able to retrieve them.

```

MGET
550 No spool files available for TSU00017
550 No spool files available for JOB00022
SITE JESSTATUS=OUTPUT
200 Site command was accepted
DIR
JOBNAME JOBID OWNER STATUS CLASS
USER1A JOB00061 USER1 OUTPUT D 3 spool files RC=0000
USER1B JOB00070 USER1 OUTPUT D 5 spool files RC=0000
MGET
125 Mlst started OK
250-JESENTRYLIMIT of 2 reached. Additional entries not received
250 Mlst completed successfully

125 Sending all spool files for requested Jobid JOB00061
250 Transfer completed successfully.
5541 bytes transferred in 0.394 seconds. Transfer rate 14.06 Kbytes/sec.

125 Sending all spool files for requested Jobid JOB00070
250 Transfer completed successfully.
5541 bytes transferred in 0.394 seconds. Transfer rate 14.06 Kbytes/sec.

```

Performing DB2 SQL queries with FTP

FTP enables you to submit a Structured Query Language (SQL) SELECT query to the DB2[®] subsystem and receive the results of the SQL query. FTP can perform this function as either the server or the client.

For information on installing the SQL query function for the FTP client or server, refer to the *z/OS Communications Server: IP Configuration Reference*.

SQL data types supported by FTP

FTP access to SQL supports the following data types:

- DATE
- TIME
- TIMESTAMP
- VARCHAR (variable length, up to 254 characters)

- CHAR (fixed length, up to 254 characters)
- DECIMAL
- INTEGER (full word)
- SMALLINT (half word)
- FLOAT (single or double precision)
- LONG VARCHAR (VARCHAR(*n*), where *n* is greater than 254)
- GRAPHIC
- VARGRAPHIC
- LONG VARGRAPHIC

Mixed data (double-byte character set and single-byte character set) is supported in CHAR, VARCHAR, and LONG VARCHAR data types, but column alignment in the output file might not be maintained.

Creating the input data set

Before performing a DB2 SQL query using FTP, you must create an MVS data set that contains the SQL query you want to perform.

You can create queries on the client and use the FTP PUT command to send the queries to the MVS system to be processed. Or, you can prepare a group of SQL queries on the MVS system and perform them regularly.

Note: FTP can process only one SQL query per file.

For example, a data set on an MVS system named `userid.SQL.IN` contains the following SQL query:

```
SELECT LASTNAME, EMPID, YEARS_EMPLOYED FROM EMPLOYEE_TABLE
WHERE YEARS_EMPLOYED > 25
```

You either created that data set on the MVS system with TSO, or you used the FTP PUT command to put the data set on the MVS system.

Setting the characteristics for the SQL query

After creating a data set to use for your query, you must log on to FTP and set the file type for the query:

```
SITE/LOCSITE FILEtype=SQL
```

There are several commands that are relevant to the client and server in SQL mode. The server commands use SITE, and the client commands use LOCSITE. The following list describes the commands:

SITE/LOCSITE DB2=

Specifies the name of the DB2 subsystem that you want to perform your queries. See “Specifying the DB2 subsystem to perform the query” on page 121 for more information about DB2 subsystems.

SITE/LOCSITE SPRead or NOSPRead

Specifies whether you want the output to be in spreadsheet or report format. See “Specifying the output format” on page 122 for more information about output format.

SITE/LOCSITE SQLCol=

Specifies whether you want the column headings to use the DB2 column names or labels. Valid values include Names, Labels, or Any. See “Assigning column headings for the SQL query result table” for more information about column headings.

To return to normal FTP processing after performing queries, or other processes, specify:

```
SITE/LOCSITE FILEtype=SEQ
```

On MVS systems, RECfm=VB is a recommended format that enables you to view the results of the SQL query. Issue the following command to specify that new data sets should be created with the RECfm=VB attribute:

```
SITE/LOCSITE RECFM=VB
```

To prevent the automatic sending of a SITE command that might override your SITE setting, toggle SENDSITE to OFF. For more information about the SENDSITE command, see “SENDSite subcommand—Toggle the sending of site information” on page 242.

Specifying the DB2 subsystem to perform the query

An MVS system can run several DB2 systems simultaneously, each known by a subsystem name of up to four characters. For example, you can have a DB2 test system called DB2T and a DB2 production system called DB2P.

FTP connects to a DB2 system to have it execute a DB2 query. You can specify what DB2 system FTP should connect to with the following SITE or LOCSITE parameter:

```
SITE/LOCSITE DB2=
```

For example, if you want the FTP server to have the DB2T system perform your queries, specify:

```
SITE DB2=DB2T
```

If you want the FTP client to have the DB2P system perform your queries, specify:

```
LOCSITE DB2=DB2P
```

The default DB2 system name is *DB2*. You can change the default with the DB2 parameter in the FTP.DATA data set. See “Changing local site defaults using FTP.DATA” on page 63 for more information about the FTP.DATA data set.

Assigning column headings for the SQL query result table

When you create a DB2 table, you can assign descriptive labels to the table columns. For example, a column name could be XCM554, but the label could be WEEKLY PAY. For information about assigning names and labels, refer to the DB2 DESCRIBE statement in the *DB2 SQL Reference*.

The SQLCol parameter of the SITE command enables you to specify whether you want names or labels to appear at the top of the columns in your output file. The default is Names. Issue the following command if you want a database column name to appear at the top of each column in your output file:

```
SITE/LOCSITE SQLCol=Names
```

Issue the following command if you want a label to appear at the top of each column:

```
SITE/LOCSITE SQLCol=Labels
```

If you specify the Labels parameter, and a column in your query does not have a label defined in the database, the FTP server supplies a column heading. For more information about column headings, see “FTP-supplied column headings.”

Issue the following command if you want either a label or a name to appear at the top of each column:

```
SITE/LOCSITE SQLCol=Any
```

If you specify the Any parameter, the label appears as the column heading. However, if the column does not have a label, the name appears at the top of the column.

FTP-supplied column headings

The FTP client and server provide column headings in the result table when DB2 does not. This occurs when a result table contains expression columns or when labels are requested and a database column that appears in the result table does not have a label defined.

FTP builds a column heading for expression columns. For example,

```
Select employee, salary/52 from ABC.Staff
```

results in two columns. The first column gets its name from DB2, while the second column is built by the server. The server uses the heading COL002 for the second column because it supports the SQL limit of 750 columns.

Specifying the output format

You have two choices for the format of your output data set: spreadsheet format and report format. The default is NOSPRead (report format), but you can change the default for your FTP server by changing the FTP.DATA data set. See “Changing local site defaults using FTP.DATA” on page 63 for more information.

Spreadsheet Format: You can have the output of the SQL query formatted to load directly into a spreadsheet program running on a PC or a workstation. To get the spreadsheet format, issue the following command:

```
SITE SPRead or LOCSITE SPRead
```

The SPRead format option puts a TAB character before the first character of each column entry, except the first column. See your spreadsheet program documentation for instructions about how to import the output of the SQL query.

Report Format: The NOSPRead format option puts one or more blank spaces between the columns, and it lists the SQL query, the column headings, and the resulting columns. Each section is separated with horizontal dashed lines. An output data set in NOSPRead, or report, format is easier to view and print.

To get the report format, issue the following command:

```
SITE NOSPRead or LOCSITE NOSPRead
```


The following is an example of the results contained in the NOSPRead format of the SQL.OUTPUT data set.

```
s-----+-----+-----+-----+-----+-----+-----+
SELECT * FROM DB2USER.PHONES
        WHERE FIRSTNAME LIKE 'BILL%'
        OR   FIRSTNAME LIKE 'WILL%'
h-----+-----+-----+-----+-----+-----+-----+
LASTNAME          FIRSTNAME          TIE  EXT  ALT  DEPT ROOM  NODE
d-----+-----+-----+-----+-----+-----+-----+
ACKERMAN          BILL              893   6266 7813 431   J2-A22 IBMABC
ADAMS             WILLIAM J.        892   2202 1716 681   33-943 IBMABC
ASTERMAN          WILLIAM C.        893   7244 7813 222   J4-A44 IBMVM2
BENDER            WILLIAM R.        892   4217 4766 490   45-556 IBMVM2
```

A lowercase letter in the first position of each dashed line specifies what part of the output follows, enabling a program to read and interpret the contents. For example, s indicates that the SQL query follows, h indicates a header, d indicates that the rest of the data set is the actual data, and e indicates that an error message follows.

The width of the output data set depends on the width of the results from the DB2 query.

Submitting the query

After you have created a data set that contains an SQL query, logged on to FTP, and set the appropriate SITE or LOCSITE parameters, you are ready to execute the contents of the data set. You can do this from either an FTP client or an FTP server.

Performing an SQL query from an FTP client

To have the FTP client perform SQL queries and have the results sent to an FTP server, specify:

```
LOCSITE FILEtype=SQL
```

Next, perform a PUT command specifying the name of the file on the client that contains the SQL query.

For example, if the client has a file named userid.SQL.IN that contains an SQL query, you can specify:

```
PUT SQL.IN SQL.OUT
```

The FTP client then submits the query found in SQL.IN to the DB2 subsystem on the client and sends the resulting rows of output to the server to be put into SQL.OUT on the server.

To return to normal FTP processing, specify:

```
LOCSITE FILEtype=SEQ
```

Performing an SQL query from an FTP server

To have the FTP server perform the query and have the results sent to the client, specify:

```
SITE FILEtype=SQL
```

Then perform a GET command specifying the name of the file on the server that contains the SQL query.

For example, if the server has a file named *userid.SQL.IN* that contains an SQL query, you can specify:
GET SQL.IN SQL.OUT

The FTP server then submits the query found in SQL.IN to the DB2 subsystem on the server and sends the resulting rows of output to the client to be put into SQL.OUT on the client.

Examples of SQL query output

This section shows examples of SQL query output using different options.

With NOSPRead and SQLCol=Names

The following output is from a query using NOSPRead and SQLCol=Names.

```
s-----+-----+-----+-----+-----+-----+-----+-----+
SELECT  EMPLOYEE,AGE
FROM    ABC.STAFF
WHERE   AGE < 60
h-----+-----+-----+-----+-----+-----+-----+-----+
EMPLOYEE                                AGE
d-----+-----+-----+-----+-----+-----+-----+-----+
Steve Jasinski                          23
Alison Cook                             22
```

With SPRead and SQLCol=Names

The following output is from a query with SPRead and SQLCol=Names.

Note: The period symbol (.) represents a TAB character.

```
EMPLOYEE          .AGE
Steve Jasinski    . 23
Alison Cook       . 22
```

The following output examples are for the query:

```
SELECT DISTINCT ABC.STAFF.TLA, ABC.STAFF.SALARY
FROM   ABC.STAFF, ABC.HOURS
WHERE  (ABC.STAFF.TLA = ABC.HOURS.TLA) AND
       (ABC.HOURS.TOTAL > 40)
```

With NOSPRead and SQLCol=Names

The following are output from queries using NOSPRead and SQLCol=Names.

```
s-----+-----+-----+-----+-----+-----+-----+-----+
SELECT DISTINCT ABC.STAFF.TLA, ABC.STAFF.SALARY
FROM   ABC.STAFF, ABC.HOURS
WHERE  (ABC.STAFF.TLA = ABC.HOURS.TLA) AND
       (ABC.HOURS.TOTAL > 40)
h-----+-----+-----+-----+-----+-----+-----+-----+
TLA    SALARY
d-----+-----+-----+-----+-----+-----+-----+-----+
ACO    20050.00
SJJ    19040.00
```

and

```
s-----+-----+-----+-----+-----+-----+-----+-----+
SELECT * FROM ABC.STAFF
h-----+-----+-----+-----+-----+-----+-----+-----+
EMPLOYEE                                TLA    AGE    SALARY
d-----+-----+-----+-----+-----+-----+-----+-----+
Steve Jasinski                          SJJ    23    28040.00
Alison Cook                             ACO    22    28040.00
Mark Ballam                             MFB    63    87420.55
```

With NOSPRead and SQLCol=Labels

The following output is from a query using NOSPRead and SQLCol=Labels.

```
s-----+-----+-----+-----+-----+-----+-----+
SELECT DISTINCT ABC.STAFF.TLA, ABC.STAFF.SALARY
FROM   ABC.STAFF, ABC.HOURS
WHERE  (ABC.STAFF.TLA = ABC.HOURS.TLA) AND
       (ABC.HOURS.TOTAL > 40)
h-----+-----+-----+-----+-----+-----+-----+
EMPLOYEE'S INITIALS    SALARY
d-----+-----+-----+-----+-----+-----+-----+
ACO                    20050.00
SJJ                    19040.00
```

With NOSPRead and SQLCol=Any

The following output is from a query using NOSPRead and SQLCol=Any.

```
s-----+-----+-----+-----+-----+-----+-----+
SELECT * FROM ABC.STAFF
h-----+-----+-----+-----+-----+-----+-----+
EMPLOYEE            EMPLOYEE'S INITIALS    AGE    SALARY
d-----+-----+-----+-----+-----+-----+-----+
Steve Jasinski      SJJ                                23    28040.00
Alison Cook          ACO                                22    28040.00
Mark Ballam         MFB                                63    87420.55
```

Chapter 5. FTP subcommands

The FTP subcommands are listed in Table 19. The minimum abbreviation, a description, and the page reference for each subcommand are also included. You must be in the FTP environment to use the FTP subcommands. See “Using FTP” on page 29 for more information.

Table 19. FTP subcommands

Subcommand	Description	Page
?	Provides information to use FTP.	172
!	Passes a z/OS UNIX System Services command to the local z/OS shell. This command must be issued while using FTP in the z/OS shell.	130
ACcount	Sends host-dependent account information.	131
APpend	Appends a data set on your local host to a file on the foreign host.	132
AScii	Sets the transfer type to ASCII.	134
BIG5	Sets the transfer type to BIG5. BIG is the minimum abbreviation for BIG5.	135
BIaNary	Sets the transfer type to IMAGE.	137
BLOck	Sets the data transfer mode to block mode. This is equivalent to specifying the MObE B subcommand.	138
CCc	Turns off integrity protection on the command channel.	139
CD	Changes the working directory.	140
CDUp	Changes to the parent of the current working directory.	143
CLear	Sets the protection level for data transfers to CLEAR.	145
CLose	Disconnects from the foreign host.	146
COMpress	Sets the data transfer mode to compressed mode. This is equivalent to specifying the MObE C subcommand.	147
CProtect	Sets the protection level on commands. CProtect CLear is equivalent to the CCc command.	148
CWd	Changes the working directory (Synonymous with CD).	140
DEBug	Enables or disables general internal tracing.	149
DELEte	Deletes a single file on the foreign host.	153
DELImit	Displays the delimiter character between the <i>file_name</i> and <i>file_type</i> .	154
DIr	Lists the directory entries for files on the foreign host.	155
DUMP	Enables or disables extended internal tracing.	159
EBcdic	Sets the transfer type to EBCDIC.	161
EUckanji	Sets the transfer type to EUCKANJI.	162
FEature	Queries FTP Server for features it supports.	164
File	Sets the file structure to file. This is equivalent to specifying the STRucture F subcommand.	165
Get	Copies a file from the foreign host to your local host.	166

Table 19. FTP subcommands (continued)

Subcommand	Description	Page
GLob	Toggles globbing (the expansion of metacharacters in file names) for the MDelete, MGet, and MPut subcommands.	168
HAngeul	Sets the transfer type to HANGEUL.	170
HElp	Displays help information for FTP.	172
Ibmkanji	Sets the transfer type to IBMKANJI.	173
JIS78kj	Sets the transfer type to JIS78KJ.	174
JIS83kj	Sets the transfer type to JIS83KJ.	175
Ksc5601	Sets the transfer type to KSC5601.	176
LANguage	Sets the language used for FTP replies from the server.	178
LCd	Changes the current directory on the local host.	179
LOCSItE	Specifies information that is used by the local host to provide service specific to that host system.	181
LOCSTat	Displays FTP status information for the local host.	200
LMkdir	Creates a PDS on the local host.	201
LPwd	Displays the name of the active working directory on the local host.	204
LS	Lists the names of files on the foreign host.	205
MDelete	Deletes multiple files on the foreign host.	207
MGet	Copies multiple files from the foreign host to your local host.	209
MKdir	Creates a directory on the foreign host.	213
MOde	Specifies the mode or data format of the transfer.	216
MPut	Copies multiple files on your local host to the foreign host.	217
NOop	Checks whether the foreign host is still responding.	219
Open	Opens a connection to a foreign host.	220
PAss	Supplies a password to the foreign host.	221
PRIVate	Sets the protection level for data transfers to PRIVATE.	222
PROMpt	Toggles interactive prompting for MDelete, MGet, and MPut commands. This function is similar to specifying the FTP command with the -i option, which turns off interactive prompting.	223
PROTect	Sets the protection level for data transfers on the data connections.	224
PROXy	Executes an FTP subcommand on a secondary control connection.	225
PUt	Copies a file on your local host to the foreign host.	228
PWd	Displays the name of the active working directory on the foreign host.	230
QUIt	Leaves the FTP command environment.	231
QUOte	Sends an uninterpreted string of data.	232
RECOrd	Sets the file structure to record. This is equivalent to specifying the STRucture R subcommand.	234

Table 19. FTP subcommands (continued)

Subcommand	Description	Page
REName	Renames a file on the foreign host.	235
REStart	Restarts a checkpointed data transfer.	236
RMdir	Removes a directory.	237
SAfe	Sets the protection level on data transfers to <i>safe</i> .	238
SChinese	Sets the transfer type to SCHINESE.	239
SENDPort	Enables or disables automatic transmission of the FTP server PORT command.	241
SENDSite	Enables or disables automatic transmission of the SItE subcommand.	242
SItE	Sends information to the foreign host using site-specific commands.	243
SJiskanji	Sets the transfer type to SJISKANJL.	267
SReStart	Restarts an interrupted stream mode data transfer.	269
STatus	Displays status information for the foreign host.	271
STREam	Sets the data transfer mode to stream mode. This is equivalent to specifying the MOdE S subcommand.	273
STRucture	Sets the file transfer structure.	274
SUnique	Toggles the storage methods.	275
SYstem	Displays the name of the foreign host operating system.	276
TChinese	Sets the transfer type to TCHINESE.	277
TSO	Passes a TSO command to the local host TSO environment.	279
TYPe	Specifies the transfer type.	280
UCs2	Changes the data transfer type to Unicode UCS-2. UC is the minimum abbreviation for UCs2.	284
User	Identifies you to a foreign host or changes your TSO user ID password.	285
Verbose	Enables or disables verbose mode.	287

! subcommand—Invoke a z/OS UNIX System Services function

Purpose

In a z/OS UNIX environment, use the ! subcommand to invoke z/OS UNIX functions.

Format

►►! *shell_command*◄◄

Parameters

shell_command

Specifying the ! subcommand with a shell command enables you to invoke z/OS UNIX, perform the subcommand, and return to the FTP environment.

If no shell command is specified, the ! subcommand invokes z/OS UNIX. There you can specify any number of shell commands before typing `exit` to return to the FTP environment.

ACct subcommand—Supply account information

Purpose

Use the ACct subcommand to supply account information to a host.

Format

►►—ACct—*account_information*—◄◄

Parameters

account_information

Specifies the account information required by the host. Refer to your foreign-host FTP server documentation for the information required by that host.

Usage

- The z/OS FTP server does not require any account information.
- You may have to use the ACct subcommand when the foreign host requires passwords for read and write access to its files or data sets. If you are not prompted by the foreign host for the passwords, use the ACct subcommand to send these passwords to the foreign host.

APpend subcommand—Append a local data set

Purpose

Use the APpend subcommand to append a local data set to a remote host.

Format

►►—APpend—*local_data_set*—*destination_file*—►►

Parameters

local_data_set

The name of the data set on your local host to be appended.

destination_file

The name of the file on the remote host to which your data set is appended. If the destination file does not already exist at the remote host, a new file is created. If the server is a z/OS UNIX server, the local file can be appended to an HFS file or an MVS data set.

Examples

In the following example, an FTP command is issued from MVSXA2 to MVSXA3. MVSXA2 has a data set MVSUSER.FTP.EXAMPLE with one member. The member, APPEND01, contains:

```
;
; THIS FILE ORIGINALLY RESIDED IN MVSXA2, AND
; WILL BE APPENDED TO A FOREIGN FILE IN MVSXA3.
;
```

MVSXA3 has a data set, MVSUSER.FTP.EXAMPLE, with one member, APPEND02. The member contains:

```
;
; THIS FILE ORIGINALLY RESIDED IN MVSXA3, AND
; WILL BE USED TO RECEIVE ANOTHER FILE FROM MVSXA2.
;
```

```
User: append
System:  Usage: APPEND localfile foreignfile
        Command:

User: lpwd
System:  Local directory is MVSUSER.
        Command:

User: append 'mvsuser.ftp.example(append01)' 'mvsuser.ftp.example(append02)'
System:  >>>SITE FIXrecfm 128 Lrecl=128 Recfm=FB BlockSize=6144
        200 Site command was accepted
        >>>PORT 1,1,2,2,4,16
        200 Port request OK.
        >>>APPE 'mvsuser.ftp.example(append02)'
        125 Appending to data set MVSUSER.FTP.EXAMPLE(APPEND02)
        250 Transfer completed successfully.
        520 bytes transferred in 1.100 seconds.
        Transfer rate 0.47 Kbytes/sec.
        Command:
```

Usage

- FTP maintains the attributes of a data set that is transmitted between a client and a server. However, when you use the APpend subcommand, FTP may truncate data records and you might lose data. If the data set name already exists at the receiving site and the logical record length (LRecl) of the data set at the receiving site is less than the LRecl of the transmitted data set, FTP truncates the transmitted data set.
- If the remote host is an MVS or VM host, and if the data set on the remote host has a fixed-record format, the format and record length of the data set on the remote host are always preserved.
- Records from the data set on your local host are truncated or padded with blank spaces when necessary.
- To append to a file on a remote host, you must define a working directory on that host, and you must have write privileges to the files in that directory.
- The z/OS FTP Server does not request that unused space be released from a data set created during APPEND processing. If you are using the z/OS FTP Server and wish for the Server to request that unused space be released on a newly-created data set, use the PUT subcommand instead of APPEND.

Context

- See “CD subcommand—Change the directory on the remote host” on page 140 for more information about working with current directories.
- See Appendix A, “Specifying data sets and files,” on page 393 for more information about naming conventions.
- APpend can be used with the PROXy subcommand to transfer files from a host on a secondary connection to a host on a primary connection. See “PROXy subcommand—Execute FTP subcommand on secondary control connections” on page 225 for more information.

AScii subcommand—Change the data transfer type to ASCII

Purpose

Use the AScii subcommand to change the data transfer type to ASCII.

Format

►►—AScii—◄◄

Parameters

There are no parameters for this subcommand.

Usage

Use the ASCII subcommand to direct FTP to translate outgoing files into ASCII before sending them to the other host, and to convert incoming files from ASCII to the file system code page before storing them.

Context

For more information about transfer methods, see Table 12 on page 51.

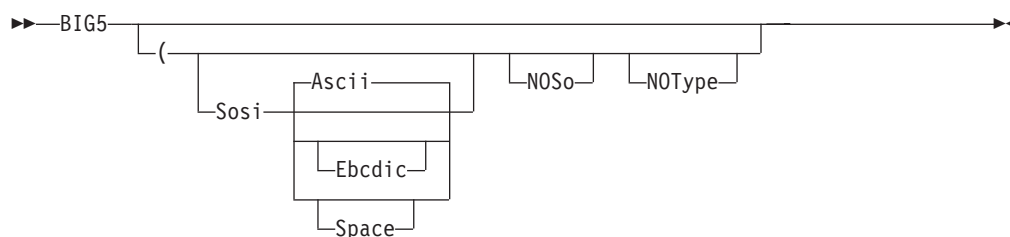
BIG5 subcommand—Change the data transfer type to BIG5

Purpose

Use the BIG5 subcommand to change the data transfer type to BIG5.

MVS FTP uses the same SBCS translate table for single-byte or double-byte data transfers. If you require an alternate SBCS table for a double-byte transfer, use the SItE/LOCSItE SBDataconn or SItE XLate subcommand to have the server (or client) change the SBCS translation for the data connection.

Format



Parameters

Sosi

Transferred data contains the shift-out and shift-in characters specified by one of the following parameters – Ascii, Ebcdic, or Space. If no parameter is specified, ASCII is used as the default.

If Sosi is not specified at all, shift-out or shift-in characters are not used in the transferred data.

Ascii

When combined with the Sosi parameter, causes shift-out and shift-in characters X'1E' and X'1F' to be used to delimit DBCS strings in ASCII data.

Ebcdic

When combined with the Sosi parameter, causes shift-out and shift-in characters X'1E' and X'1F' to be used to delimit DBCS strings in ASCII data.

Space

When combined with the Sosi parameter, causes shift-out and shift-in characters X'20' and X'20' (ASCII spaces) to be used to delimit DBCS strings in ASCII data.

NOSo

Specifies that the data transferred is pure DBCS (data with no SBCS characters) and is to be transferred to and from EBCDIC DBCS data that contains no shift-out or shift-in delimiters.

NOType

Suppresses the sending of the corresponding TType command to the server. Use this parameter when translation is to be done by the FTP client only.

BIG5 subcommand

Usage

- The BIG5 client subcommand is equivalent to the TYPE B 8 command.
- The minimum abbreviation for BIG5 is BIG.

Context

See “FTP with traditional DBCS support” on page 77 and “Support for MBCS languages” on page 80 for more information.

BINary subcommand—Change the data transfer type to Image

Purpose

Use the BINary subcommand to change the data transfer type to image (binary).

Format

►►—BINary—◄◄

Parameters

There are no parameters for this subcommand.

Usage

Use the image transfer type to transfer files between client and server without any translation of the file data. When using the image transfer type, data is sent as contiguous bits packed into 8-bit bytes. Use the image transfer type for efficient storage and retrieval of data sets or files, and for the transfer of binary data.

Context

For more information about data transfer methods, see Table 12 on page 51.

BBlock subcommand—Set the block data transfer mode

Purpose

Use the BBlock subcommand to set the data transfer mode to block mode. This is equivalent to specifying the MDe B subcommand. See “MDe subcommand—Set the data transfer mode” on page 216 for more information.

Format

►►—BBlock—◄◄

Parameters

There are no parameters for this subcommand.

CCc subcommand—Turn off integrity protection

Purpose

Use the CCc subcommand to turn off integrity protection on the control connection. This command must be integrity-protected, and must be preceded by a successful security mechanism negotiation.

Format

►►—CCc—◄◄

Parameters

There are no parameters for this subcommand.

Usage

Since turning off integrity protection potentially allows an attacker to insert commands onto the control connection, some FTP servers may refuse to honor this command.

CD subcommand—Change the directory on the remote host

Purpose

Use the CD subcommand to change the working directory or file group on the remote host.

Format

►►—CD—*directory*—◄◄

Parameters

directory

Specifies the name of a file directory, a fully qualified data set, or a prefix on the remote host.

Examples

Changing the directory of a z/OS FTP server

If the remote server is z/OS FTP, *directory* can specify either an HFS name, a common prefix for a group of MVS data sets, or the qualifiers of a Partitioned Data Set (PDS).

When the CD subcommand is issued, the *directory* specified is appended to the current working directory. For example, if the current working directory is TCPUSR14.TEST, and you issue the CD subcommand:

```
CD FILES
```

the new working directory becomes TCPUSR14.TEST.FILES.

To override the existing directory rather than append to the directory, issue the *directory* parameter within single quotation marks. For example, if the current working directory is TCPUSR14.TEST, and you issued the CD subcommand:

```
CD 'FTP.FILES'
```

the new working directory would be FTP.FILES. If the subdirectory name contains white space, such as NEW SUBDIRECTORY, then the syntax for the CD command would be as follows:

```
CD 'NEW SUBDIRECTORY'
```

The command syntax must specify the full subdirectory name (including the blank) delimited within single quotation marks.

If a PDS exists with the exact name of the current working directory, FTP considers the working directory to be that PDS. Otherwise, FTP considers the working directory to be a common prefix qualifier for sequential data sets.

If a PDS exists with the same name as the current working directory, but you want the current working directory to be treated as a common prefix for sequential data sets, specify the working directory with a period (.) at the end. For example, if a PDS named TCPUSR14.TEST exists, the subcommand:

```
CD 'TCPUSR14.TEST'
```

makes the PDS TCPUSR14.TEST the current working directory. A subsequent PUt of file name1 adds a member name1 to the TCPUSR14.TEST PDS. In contrast, the statement:

```
CD 'TCPUSR14.TEST.'
```

makes the current working directory, TCPUSR14.TEST., a prefix for sequential data sets. A subsequent PUt command used to copy data set name1 would create the sequential data set TCPUSR14.TEST.name1.

To back up one level of the current working directory, issue the CD subcommand with two periods (..) at the end. For example, if the working directory is jones.source, the statement,

```
CD ..
```

makes jones. the working directory. You can also use the CDUp command to back up one level of the current working directory. See “CDUp subcommand—Change to the parent of the working directory” on page 143 for more details.

The following sample commands and responses are displayed as a result of the CD subcommand.

For an MVS data set:

```
cd hsmtest
>>>CWD hsmtest
250 "'USER17.HSMTEST.'" is working directory name prefix.
Command:
```

For an HFS file:

```
cd '/u/user121/A/B/C'
>>>CWD '/u/user121/A/B/C'
250 HFS directory /u/user121/A/B/C is the current working directory
Command:
```

Changing the directory of a VM FTP server

If the remote host is using TCP/IP for VM, the directory can be specified in either of the following ways:

- *user_id minidisk_address*
- *user_id.minidisk_address*

For example, to access the 191 minidisk of user ID jones, enter one of the following:

- jones 191
- jones.191

Testing throughput with *DEV.NULL

If you have a z/OS FTP server, you can use the PUt command to copy a large number of files (or one large file) without having the files actually stored on a z/OS FTP server file system. This is useful for testing purposes because you do not have to worry about allocating the disk space on the server system.

To use this function, first change the working directory to *DEV.NULL by using one of the following commands:

- CD *DEV.NULL

CD subcommand

- CWD *DEV.NULL

This affects the working directory only for PUt commands. You then use the PUt command to copy the file to the server system. The input data set must be valid, and the output file can either be new or already exist. In either case, the file is not actually stored.

The following response shows information such as the number of bytes transferred and the rate of transfer.

To end the use of the *dev.null directory for PUt commands, issue another CHANGE Directory command.

```
Command:
cd *dev.null
>>>CWD *dev.null
250-Working directory for PUT is NULL Device;
250 for GET is HFS directory /u/user31
Command:
put a.b a.bbbbb
>>>SITE VARrecfm Lrecl=128 Recfm=VB BlockSize=6144
200 Site command was accepted
>>>PORT 14,0,0,0,4,14
200 Port request OK.
>>>STOR a.bbbbb
125 Storing data set in the Null directory (*dev.null).
250 Transfer completed successfully.
82 bytes transferred in 0.245 seconds. Transfer rate 0.33 Kbytes/sec.
Command:
quit
>>>QUIT
221 Quit command received. Goodbye.
```

Usage

You can also use the CWD and CW subcommands to change the current working directory. These subcommands are synonyms of the CD subcommand.

CDUp subcommand—Change to the parent of the working directory

Purpose

Use the CDUp subcommand as a special case of the CD subcommand to change the working directory to the next higher directory level. You can use it to simplify the implementation of programs for transferring directory trees between operating systems that have different syntaxes for naming the parent directory.

Format

►—CDUp—◄◄

Parameters

There are no parameters for this subcommand.

Examples

Change the working directory to the next higher directory level:

```
cd 'a.b.c.d'
>>>CWD 'a.b.c.d'
257 "'A.B.C.D.'" is working directory name prefix.
Command: pwd

>>>PWD
257 "'A.B.C.D.'" is working directory
Command: cdup

>>>CDUP
257 "'A.B.C.'" is working directory name prefix.
Command: pwd

>>>PWD
257 "'A.B.C.'" is working directory
Command: cdup

>>>CDUP
257 "'A.B.'" is working directory name prefix.
Command: pwd

>>>PWD
257 "'A.B.'" is working directory
```

Change the working directory to the next higher directory level for an HFS file:

CDUp subcommand

```
cd '/u/user121/A/B/C'
>>>CWD '/u/user121/A/B/C'
250 HFS directory /u/user121/A/B/C is the current working directory
Command: pwd

>>>PWD
257 "/u/user121/A/B/C" is the HFS working directory
Command: cdup

>>>CDUP
250 HFS directory /u/user121/A/B is the current working directory
Command: pwd

>>>PWD
257 "/u/user121/A/B" is the HFS working directory
Command: cdup

>>>CDUP
250 HFS directory /u/user121/A is the current working directory
Command: pwd

>>>PWD
257 "/u/user121/A" is the HFS working directory.
Command:
```

CLEar subcommand—Set the protection level for data transfers to CLEAR

Purpose

Use the CLEar subcommand to set the protection level for data transfers on the data connections to clear. This subcommand is equivalent to specifying the PROtect CLEar subcommand.

Format

►►—CLEar—◄◄

Parameters

There are no parameters for this subcommand.

Examples

To set the protection level to clear, enter:
clear

Usage

See the “PROtect subcommand—Set the protection level for data transfers” on page 224 for additional protection level information.

The CLEar subcommand is not valid when there is no active security mechanism.

CLOSE subcommand—Disconnect from a remote host

Purpose

Use the CLOSE subcommand to disconnect from the remote host and remain in FTP.

Format

►►—CLOSE—◄◄

Parameters

There are no parameters for this subcommand.

Usage

The FTP session remains active on your local host, but the session to the remote host is terminated. You can use the OPEN subcommand to establish a new session with either the same or a different remote host. If you establish a new session with the same remote host, values set by the SITE subcommand during the previous session are cleared. The remote host default values for the parameters of the SITE subcommand are used for the new session.

Context

- See “OPEN subcommand—Connect to the FTP server” on page 220 for information about the OPEN subcommand.
- CLOSE can be used with the PROXY subcommand to close a secondary control connection. See “PROXY subcommand—Execute FTP subcommand on secondary control connections” on page 225 for more information.

COMpress subcommand—Set the compressed data transfer mode

Purpose

Use the COMpress subcommand to set the data transfer mode to compressed mode. This is equivalent to specifying the MOde C subcommand. See “MOde subcommand—Set the data transfer mode” on page 216 for more information.

Format

►►—COMpress—◄◄

Parameters

There are no parameters for this subcommand.

CProtect subcommand— Set the protection level on commands

Purpose

Set the protection level on commands to *protection-level*.

Format

►►CProtect—[*protection-level*]—◄◄

Parameters

The valid protection levels are:

clear

Unprotected commands

safe

Commands integrity-protected by cryptographic checksum

private

Commands confidentiality and integrity-protected by encryption

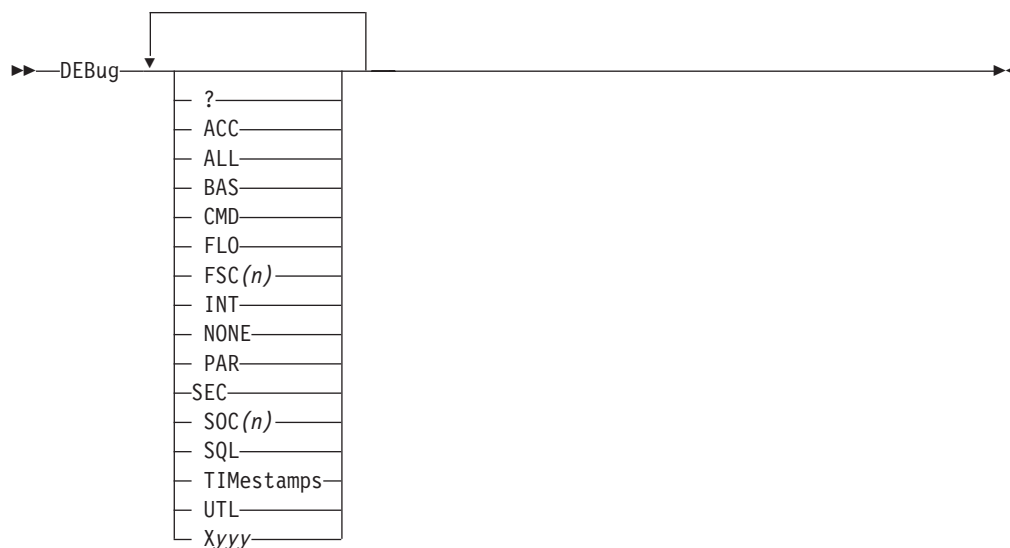
If an ADAT command succeeds, the default command protection level is *safe*; otherwise, the only possible level is *clear*. If no level is specified, the current level is used. CProtect CLear is equivalent to the CCc command.

DEBug subcommand—Set general trace options

Purpose

Use the DEBug subcommand to enable or disable general internal tracing.

Format



Parameters

One or more of the following options can be specified:

? Displays the status of the traces.

ACC

The ACC trace shows the details of the login process.

ALL

This parameter is used to set all of the trace points.

Note: Both the FSC and the SOC traces will be set to level 1 when the ALL parameter is processed.

BAS

This parameter is used to set a select group of traces that offer the best overall debug data without the detailed information of some of the traces. Specifying this parameter is the same as DEBUG CMD INT FSC SOC.

CMD

The CMD trace shows each command and the parsing of the parameters for the command.

FLO

The FLO trace shows the flow of control within FTP. It is useful to show which services of FTP are used for an FTP request.

FSC(*n*)

The FSC trace shows details of the processing of the file services subcommands

DEBug subcommand

APpend, PUt, Get, MGet, and MPut. This trace can generate very detailed information and therefore allows you to specify levels of detail for the trace points.

The level 1 tracing that is specified by entering FSC or FSC(1) is the level normally used unless more data is requested by TCP/IP service group. The level (*n*) can be a number from 1 to 8.

INT

The INT trace shows the details of the initialization and termination of the FTP session with the server.

NONE

This parameter is used to turn off all of the traces.

PAR

The PAR trace shows details of the FTP command parser. It is useful for debugging problems in the handling of the command parameters.

SEC

The SEC trace shows the processing of security functions such as TLS and GSSAPI negotiations.

SOC(*n*)

The SOC trace shows details of the processing during the setup of the interface between the FTP application and the network as well as details of the actual amounts of data that is processed.

This trace can generate very detailed information and therefore allows you to specify levels of detail for the trace points. The level (*n*) can be a number from 1 to 8.

SQL

The SQL trace shows details of the processing for SQL requests, such as requests when LOCSite FILETYPE=SQL is in effect.

TIMestamps

This is a special parameter used to request that each trace entry have a timestamp showing the time the entry was made. This is useful during long running file transfers to track the duration of the transfer and also to match client trace to the server trace, which also has a timestamp.

UTL

The UTL trace shows the processing of utility functions such as LCd and LOCSite.

Xyyy

This syntax is used to turn off (reset) a trace that is named by *yyy*. For example, DEBUG XPAR XACC will turn off the PAR and the ACC traces.

Examples

The following example shows sample client traces with DEBug.

```
debug none fsc soc time
Active client traces - FSC(1) SOC(1)
get a 'user33.abc111' (replace
11:21:33 CG0204 get: F=1 p=FSA ARTW=0000
11:21:33 CG3356 rcvFile: entered
11:21:33 MR1200 set_filename: entered with pathname 'user33.abc111'
11:21:33 CG2078 mvs_rcvFile: entered
11:21:33 CG1944 newGDGname: entered
11:21:33 MV0874 seq_create_file: entered with dsn=USER33.ABC111
11:21:34 MV1545 seq_create_file: ddname=SYS00009
```

```

1234567890123456789012345678901234567890123456789012345678901234567890
11:21:34 MV1605 seq create file: data set has recfm=50, lrecl=256, blksize=6233
11:21:34 CG2470 mvs_rcvFile: FASTIO pending for store_type = N
11:21:34 CG2473 mvs_rcvFile: ... recfm=VB, lrecl=256, blksize=6233
11:21:34 CG2560 mvs_rcvFile: request FASTIO with recfmU override for record form
    at VB
11:21:34 MF2540 seq_open_file: recfm is VB
11:21:34 MF2598 seq_open_file: BSAM 0 SYS00009 ()
11:21:34 MF2600 seq_open_file: ncp=29 DA=0 K0=0 DF=0
11:21:34 MF2658 seq_open_file: stream 46EE8 has maxreclen 256
11:21:34 SC0531 initDsConnection: entered
>>> PORT 9,67,113,57,4,32
200 Port request OK.
>>> RETR a
125 Sending data set /u/user33/a
11:21:34 SC0783 accDsConnection: entered
11:21:34 TI3053 WrtStreamFastIO: 0=2 HGPES=00001 BCTE=1000 RLB=50/256/6233
11:21:34 MF2441 seq_close_file: file closed
11:21:34 GV0150 releaseFile: release ddname - SYS00009
11:21:34 GV0171 releaseFile: dynfree() results- rc=0, errcode=0, infocode=0
11:21:34 SC1128 dataClose: entered
250 Transfer completed successfully.
820 bytes transferred in 0.005 seconds. Transfer rate 164.00 Kbytes/sec.
11:21:34 CU1821 write_smf_record: entered with type 16.
11:21:34 CU1275 write_smf_record_119: entered with type 16.
11:21:34 CU2084 write_smf_record: length of smfrecord: 224

```

Usage

By default, DEBug is off. When the FTP environment is entered, you can activate DEBug by any of the following methods:

- Use the TRACE or -d parameter on the FTP command.
- Code one or more DEBug statements in the client's FTP.DATA.
- Code the TRACE statement in the client's FTP.DATA.

Once FTP is started, you can change the DEBug settings with the DEBug subcommand.

- The trace supports the DEBug parameters 1 and 2 that are used with previous product releases. Specifying DEBug BAS provides the same tracing as parameter 1 formerly provided. The DUMP subcommand now provides the extended tracing that parameter 2 formerly provided.
- The state of the traces points is displayed as a response to the DEBug subcommand. To see the states without making a change, enter DEBug ?.
- The setting of the traces is additive as shown by the following:

```

DEBUG NONE CMD
EZA2851I Active traces: CMD
DEBUG PAR
EZA2851I Active traces: CMD PAR

```

- Entering DEBug with no parameters will toggle the trace on and off. The state of the traces when the trace is toggled off is remembered so that toggling it on restores the previous trace settings. If no traces were active previously, then toggling activates the BAS trace points

```

DEBUG NONE CMD
EZA2851I Active traces: CMD
DEB
EZA2851I Active traces: NONE
DEB
EZA2851I Active traces: CMD
DEB FSC
EZA2851I Active traces: CMD FSC(1)
DEB

```

DEBug subcommand

```
EZA2851I Active traces: NONE
DEB
EZA2851I Active traces: CMD FSC(1)
DEB NONE
EZA2851I Active traces: NONE
DEB
EZA2851I Active traces: CMD INT FSC(1) SOC(1)
```

- The timestamp option is demonstrated with the following example:

```
deb fsc(1)
PC0304 parseCmd: subcommand: deb
PC0307 parseCmd: parameter 1: fsc(1)
Active traces: CMD FSC(1)
Command:
deb time
PC0304 parseCmd: subcommand: deb
PC0307 parseCmd: parameter 1: time
Active traces: CMD FSC(1)
Command:
deb soc(1)
11:39:37 PC0304 parseCmd: subcommand: deb
11:39:37 PC0307 parseCmd: parameter 1: soc(1)
Active traces: CMD FSC(1) SOC(1)
Command:
```

- For the FSC and SOC trace options only one level of tracing can be defined at any time. However, when level 2 is defined, levels 1 and 2 are active. When level 3 is defined, levels 1, 2 and 3 are active. This progression also applies to levels 4 and 5.

```
deb fsc(2) soc(1)
Active traces: FSC(2) SOC(1)
Command:
deb fsc(1) soc(2)
Active traces: FSC(1) SOC(2)
Command:
```

Note: The DEBug FSC command will accept level values 6–8, but will only provide level 5 trace data. Likewise, DEBug SOC will accept level values 4–8, but will only provide level 3 trace data.

DELEte subcommand—Delete files

Purpose

Use the DELEte subcommand to delete a file on the remote host.

Format

►►—DELEte—*foreign_file*—◄◄

Parameters

foreign_file

Specifies the name of the file to be deleted on the remote host.

Context

See Appendix A, “Specifying data sets and files,” on page 393 for information about file naming conventions.

DELimit subcommand—Display the file name delimiter

Purpose

Use the DELimit subcommand to display the character that is used as the delimiter between the file name and the file type.

Format

►►—DELimit—◄◄

Parameters

There are no parameters for this subcommand.

Usage

- The DELimit subcommand should be used for information purposes only.
- You cannot change which character is used as the delimiter.

Dlr subcommand—Obtain a list of directory entries

Purpose

Use the Dlr subcommand to obtain a list of directory entries or a list of files in a file group on the remote host, or a list of the members of the partitioned data set, as well as auxiliary information about the files.

Format

```

>>>Dlr name (-DISK)

```

Parameters

name

Specifies the name of the directory or file group. The default is the current directory or file group.

(DISK)

Stores the results of the Dlr subcommand as data set FTP.DIROUTP in the local current working directory. If the local current working directory is an MVS PDS, the member DIROUTP is stored. If the local current working directory is an HFS directory, the results are stored in a file named diroutp.

Examples

- List the data sets with a common high-level qualifier as the current working directory:

```

>>>PORT 9,67,58,227,4,62
200 Port request OK.
>>>LIST
125 List started OK.
Volume Unit    Referred Ext UsedRecfm Lrecl BlkSz Dsorg Dsname
WRKLB2 3380    1997/07/02 1 1 F      80 80 PS TEST.A
WRKLB2 3380    1997/07/09 4 7 F      80 80 PO TEST.PDS
WRKLB2 3380    1997/07/09 2 3 VB     60 256 PO TEST.PDSV
WRKLB2 3380    1997/07/01 16 17 VB    200 32000 PS TEST.XYZ1
250 List completed successfully.
Command:

```

Note: The Dlr output for a RECFM=U data set for the FTP display always shows the same value for lrecl as it shows for blksize.

- List the files for an HFS directory:

Dlr subcommand

```
cd '/u/user121/ftp.example'

>>>CWD '/u/user121/ftp.example'
250 HFS directory /u/user121/ftp.example is the current working directory
Command:
dir
>>>PORT 9,67,112,25,4,61
200 Port request OK.
>>>NLST
125 List started OK
total 64
-rw-r----- 1 USER121 SYS1 6720 Feb 7 18:48 append02
-rw-r----- 1 USER121 SYS1 3360 Feb 6 18:51 file1
-rw-r----- 1 USER121 SYS1 3883 Feb 6 18:51 file2
-rw-r----- 1 USER121 SYS1 3883 Feb 6 18:51 file3
-rw-r----- 1 USER121 SYS1 7277 Feb 6 18:51 file4
-rw-r----- 1 USER121 SYS1 3360 Feb 6 18:51 file5
250 List completed successfully.
Command:
```

- List the members of a partitioned data set containing load modules:

```
cd 'sys1.linklib'
>>> CWD 'sys1.linklib'
250-Local directory might be a load library
250 "SYS1.LINKLIB" partitioned data set is working directory
Command:
dir d*
>>> PASV
227 Entering Passive Mode (127,0,0,1,4,112)
>>> LIST d*
125 List started OK
Name      Size  TTR  Alias-of AC ----- Attributes ----- Amode Rmode
DD         03DBD8 031506 IRRENV00 01 FO          RN RU          31    24
DELDSD     03DBD8 031506 IRRENV00 01 FO          RN RU          31    24
DELGROUP   03DBD8 031506 IRRENV00 01 FO          RN RU          31    24
DEUSER     03DBD8 031506 IRRENV00 01 FO          RN RU          31    24
DG         03DBD8 031506 IRRENV00 01 FO          RN RU          31    24
DMOCI001   000710 03370C          00 FO          RN RU          31    ANY
DMOCTCTL   000178 033715          01 FO          RN RU          31    ANY
DMOCTFIL   000028 03371D          01 FO          RN RU          31    ANY
DMOCTFMT   00ABC8 033725          01 FO          RN RU          31    ANY
DMOCTLOC   0006E8 03380C          01 FO          RN RU          31    ANY
DMOCTRCE   0008F8 033814          01 FO          RN RU          31    ANY
DMOCTSTR   000588 03381D          01 FO          RN RU          31    ANY
DMODA002   001318 033826          01 FO          RN RU          31    ANY
DMODA003   004618 033909          01 FO          RN RU          31    ANY
DMODA004   000658 033916          01 FO          RN RU          31    ANY
DMODIAG    001E58 03391F          00 FO          RN RU          31    24
DMOVS001   002110 033A04          01 FO          RN RU          31    ANY
DMOVS002   0003D8 033A0F          01 FO          RN RU          31    ANY
DU         03DBD8 031506 IRRENV00 01 FO          RN RU          31    24
250 List completed successfully.
Command:
```

- List the members of a partitioned data set from a text library:

```

cd 'tcpv3.tcpip.profiles'
>>>CWD 'tcpv3.tcpip.profiles'
257 "'TCPV3.TCPIP.PROFILES'" partitioned data set is working directory.
Command: dir

>>>PORT 9,67,112,25,4,32
200 Port request OK.
>>>LIST
125 List started OK.
Name      VV.MM    Created      Changed      Size  Init   Mod   Id
TST6MV1   01.05    1997/06/26   1996/07/10 06:38    16    16    0 USER34
TST6MV2   01.08    1997/05/23   1996/07/03 12:49    16    17    0 USER34
TST6MV3   01.19    1997/05/23   1996/07/10 06:34    16    17    0 USER34
TST6021   01.04    1997/03/04   1996/07/08 09:17    15    15    0 USER34
TST6121   01.10    1997/05/23   1996/07/10 06:26    16    17    0 USER34
250 List completed successfully.
***

```

Usage

- To make a file group the current working directory, use the CD command. The method you use to specify a directory or file group is host-dependent.
- The Dlr subcommand provides a complete list of directory entries and gives additional information about the files.
- You can use special characters for pattern matching when specifying the *name*. These characters depend on the host FTP server.
- Special characters you can use for the z/OS FTP server:
 - * A single asterisk by itself indicates that either a qualifier or one or more characters within a qualifier can occupy that position. An asterisk can precede or follow a set of characters. An asterisk as the last qualifier will indicate that 0 or more qualifiers can occupy that position.
 - ** A double asterisk indicates that 0 or more qualifiers can occupy that position. A double asterisk cannot precede or follow any characters. It must be preceded and followed by either a period or a blank.
 - % A single percent sign by itself indicates that exactly one alphanumeric or national character can occupy that position.
 - %...% One to eight percent signs (%) can be specified in each qualifier.

In DIRECTORYMode, ** is not allowed and % and * may be specified in the last qualifier only.

The following shows examples of how the z/OS FTP server special characters can be used.

Entry	Returns
VSAM.DATA.SET	VSAM.DATA.SET <i>only</i>
VSAM.DATA.SET%	VSAM.DATA.SET1 VSAM.DATA.SET2 - but not VSAM.DATA.SET30
VSAM.DATA.SET%%	VSAM.DATA.SET30 VSAM.DATA.SET31 - but not VSAM.DATA.SET1 or VSAM.DATA.SET2

Dlr subcommand

Entry	Returns
VSAM.*.SET	VSAM.DATA1.SET VSAM.DATA2.SET - but not VSAM.DATA.SET.KSDS
VSAM.*A	VSAM.A VSAM.BA VSAM.BBA - but not VSAM.B or VSAM.AB
VSAM.DATA.*	VSAM.DATA.SET1 VSAM.DATA.SET2 VSAM.DATA.SET.KSDS - but not VSAM.DATA1.SET
VSAM.DATA*	VSAM.DATA1 VSAM.DATA23 - but not VSAM.DATA.SET.KSDS
VSAM.DATA*.*	VSAM.DATA1 VSAM.DATA23 VSAM.DATA.SET1 VSAM.DATA1.SET VSAM.DATA.SET.KSDS
VSAM.**	VSAM VSAM.DATA.SET1 VSAM.DATA.SET2 VSAM.DATA.SET.KSDS - but not VSAM1.DATA.SET
**.*DATA	VSAM.DATA NONVSAM.WORK.DATA DATA - but not VSAM.DATA.SET
**	Will return all data sets within the current working directory. If the current working directory is null, this command has the potential to read all available catalogs to which the user has access. This can take a considerable length of time.

Context

- See Appendix A, “Specifying data sets and files,” on page 393 for more information about pattern matching and about specifying data sets and files.
- To get a list containing only the file names in a directory, use the LS subcommand (see “LS subcommand—Obtain a list of file names” on page 205).
- To make a file group the current working directory, see “CD subcommand—Change the directory on the remote host” on page 140.
- To change the local directory, see “LCd subcommand—Change the local working directory” on page 179.

DUMP subcommand—Set extended trace options

Purpose

Use the DUMP subcommand to enable or disable extended internal tracing.

Note: Extended tracing has the potential to generate a large amount of trace data and should not be set unless requested to debug a specific problem in the code.

Format



Parameters

One or more of the following options can be specified:

? Displays the status of the traces.

n Specifies the ID number of a specific extended trace point that is to be activated in the FTP code. The number has a range of 1–99.

ALL

This parameter is used to set all of the trace points.

FSC

Activates all of the extended trace points in the file services code. The ID numbers for FSC are 20 to 49.

NONE

This parameter is used to turn off all of the traces.

SOC

Activates all of the extended trace points in the network services code. The ID numbers for SOC are 50 to 59.

SQL

Activates all of the extended trace points in the SQL services code. The ID numbers for SQL are 70 to 79.

Xyyy

This syntax is used to turn off (reset) a trace that is named by *yyy*. For example, DUMP X21 X22 XSQL will reset the extended trace points 21 and 22 and all of the SQL trace points.

Examples

The following is an example of a dump trace.

DUMP subcommand

```
dump 21 22
Active client dumpIDs - 21 22
get a 'user33.abc111' (replace
12:38:31 MV0456 (21) TU_DSN ....
0A31D1E4 00020001 000DE4E2 C5D9F3F3 4BC1C2C3 *.....USER33.ABC*
0A31D1F4 F1F1F100 00000000 00000000 00000000 *111.....*
0A31D204 - 0A31D223 All zeros (0x20 bytes)12:38:31 MV0512 (21) TU_STATS ...:
0A31D150 00040001 00010100 *.....*
12:38:31 MV0521 (21) TU_DISP ...:
0A31D158 00050001 00010800 *.....*
12:38:31 MV2113 (22) RN PA=
0A3296C0 14070000 00000000 0A3296D8 00000000 *.....oQ....*
0A3296D0 00000000 *.....*
12:38:31 MV2115 (22) RN DD=
0A3296B0 00010001 0008E2E8 E2F0F0F0 F0F94B4B *.....SYS00009..*
0A3296C0 14070000 0000 *.....*
12:38:31 MV2117 (22) RN DSN=
0A3296EC 00050001 000DE4E2 C5D9F3F3 4BC1C2C3 *.....USER33.ABC*
0A3296FC F1F1F14B 60614B4B 4B4B4B4B 4B4B4F6B *111.-/.....,*
0A32970C 6C6D6E6F 4B4B4B4B 4B4B4B4B 4B4B7A7B *%>?.....:##*
0A32971C 7C7D7E4B *@'=.*
>>> PORT 9,67,113,57,4,59
200 Port request OK.
>>> RETR a
125 Sending data set /u/user33/a
250 Transfer completed successfully.
820 bytes transferred in 0.005 seconds. Transfer rate 164.00 Kbytes/sec
```

Usage

The setting of the traces is additive. This is demonstrated by the following example:

```
dump none 21
EZA2850I Active dumpIDs: 21
dump 22
EZA2850I Active dumpIDs: 21 22
```

Entering dump with no parameters is the same as entering dump with the ? parameter.

The range of 99 extended trace points is defined to allow easy extension of the trace points by the TCP/IP service team. Additional trace points can be added to the code without any changes to the external mechanism to control the traces.

Refer to Diagnosing FTP client problems with tracing in *z/OS Communications Server: IP Diagnosis Guide* for more information about FTP client tracing.

EBcdic subcommand—Change the data transfer type to EBCDIC

Purpose

The EBcdic subcommand enables you to change the data transfer type to EBCDIC.

Format

►►—EBcdic—◄◄

Parameters

There are no parameters for this subcommand.

Usage

Use the EBcdic subcommand to direct FTP to transfer data with no translation.

Context

For more information about transfer methods, see Table 12 on page 51.

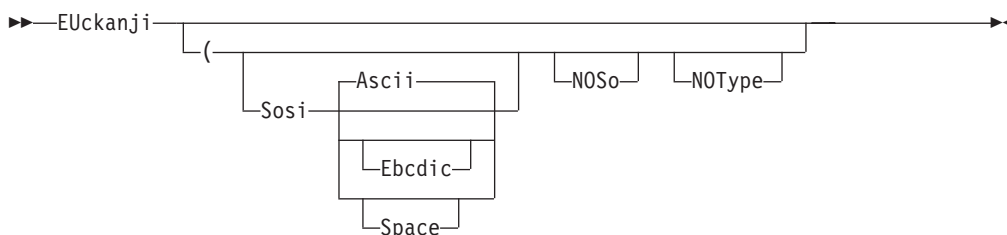
EUckanji subcommand—Change the data transfer type to EUCKANJI

Purpose

Use the EUckanji subcommand to change the data transfer type to Extended UNIX Code (EUC) kanji.

MVS FTP uses the same SBCS translate table for single-byte or double-byte data transfers. If you require an alternate SBCS table for a double-byte transfer, use the SItc/LOCSItc SBDatconn or SItc XLate subcommand to have the server (or client) change the SBCS translation for the data connection.

Format



Parameters

Sosi

Transferred data contains the shift-out and shift-in characters specified by one of the following parameters – Ascii, Ebcdic or Space. If no parameter is specified, ASCII is used as the default.

If Sosi is not specified at all, shift-out or shift-in characters are not used in the transferred data.

Ascii

When combined with the Sosi parameter, causes shift-out and shift-in characters X'1E' and X'1F' to be used to delimit DBCS strings in ASCII data.

Ebcdic

When combined with the Sosi parameter, causes shift-out and shift-in characters X'0E' and X'0F' to be used to delimit DBCS strings in ASCII data.

Space

When combined with the Sosi parameter, causes shift-out and shift-in characters X'20' and X'20' (ASCII spaces) to be used to delimit DBCS strings in ASCII data.

NOSo

Specifies that the data transferred is pure DBCS (data with no SBCS characters) and is to be transferred to and from EBCDIC DBCS data that contains no shift-out or shift-in delimiters.

NOType

Suppresses the sending of the corresponding TType command to the server. Use this parameter when translation is to be done by the FTP client only.

Usage

The EUckanji client subcommand is equivalent to the TYPE B 2 server command.

Context

See “FTP with traditional DBCS support” on page 77 and “Support for MBCS languages” on page 80 for more information.

FEature subcommand—Query FTP server for features it supports

Purpose

Ask the FTP server which features it supports. FTP clients use this command to determine which languages the server supports, and which features the server supports.

Format

►►—FEature—◄◄

Parameters

There are no parameters for this subcommand.

Usage

The minimum abbreviation for the feature subcommand is fe.

File subcommand—Set the file structure to File

Purpose

Use the File subcommand to set the file structure to File. This is equivalent to specifying the STRucture F subcommand. See “STRucture subcommand—Set the file structure” on page 274 for more information.

Format

►►—File—◄◄

Parameters

There are no parameters for this subcommand.

- If FTP does not support directory content transfers in partitioned data sets, it is not possible to FTP load modules.
- If the data set is migrated, it will be replaced regardless of the replace option.
- If the name specified for *local_file* is not acceptable to your local host, the file is not transferred.
- To get a file from the remote host, you must have a defined working directory on that host and you must have read privileges to the files in this working directory.
- If the data set has been preallocated, you must specify DSORG=PS on the DCB statement in the JCL.

Context

- See Appendix A, “Specifying data sets and files,” on page 393 for more information about naming conventions.
- See “CD subcommand—Change the directory on the remote host” on page 140 and “ACCT subcommand—Supply account information” on page 131 for more information about working directories.
- Get can be used with the PROXY subcommand to transfer files from a host on a primary connection to a host on a secondary connection. See “PROXY subcommand—Execute FTP subcommand on secondary control connections” on page 225 for more information.

GLob subcommand—Toggle expansion of metacharacters

Purpose

Use the GLob subcommand to toggle globbing (the expansion of metacharacters in file names) for the MDelete, MGet, and MPut subcommands.

Format

►►—GLob—◄◄

Parameters

There are no parameters for this subcommand.

Examples

Assume that the files m1 and m1* exist in the directory /u/user33/mpp1.

```
Command:
pwd
>>> PWD
257 "/u/user33/mpp1" is the HFS working directory

Command:
lpwd
Local directory name set to hierarchical file /u/user33

Command:
prompt
Interactive mode is off
```

```
Command:
mget m1*
>>> PORT 9,67,113,57,4,43
200 Port request OK.
>>> NLST m1*
125 List started OK
250 List completed successfully.
>>> PORT 9,67,113,57,4,44
200 Port request OK.
>>> RETR m1
125 Sending data set /u/user33/mpp1/m1
250 Transfer completed successfully.
200 bytes transferred in 0.050 seconds. Transfer rate 4.00 ...
Kbytes/sec.
>>> PORT 9,67,113,57,4,45
200 Port request OK.
>>> RETR m1*
125 Sending data set /u/user33/mpp1/m1*
250 Transfer completed successfully.
200 bytes transferred in 0.020 seconds. Transfer rate 10.00 ...
Kbytes/sec.
```

```

Command:
delete /u/user33/m1
>>> DELE /u/user33/m1
250 /u/user33/m1 deleted.

Command:
delete /u/user33/m1*
>>> DELE /u/user33/m1*
250 /u/user33/m1* deleted.

Command:
glob
Globbing off

Command:
mget m1*
>>> PORT 9,67,113,57,4,46
200 Port request OK.
>>> RETR m1*
125 Sending data set /u/user33/mpp1/m1*
250 Transfer completed successfully.
200 bytes transferred in 0.010 seconds. Transfer rate 20.00 ...
Kbytes/sec.

```

With globbing off, at most one file will match the pattern. Also, the NLST command is not sent to look for pattern matches.

Usage

GLob acts as a toggle that turns metacharacter expansion on or off. By default, GLob is on.

Context

For more information about globbing, refer to *z/OS UNIX System Services User's Guide*.

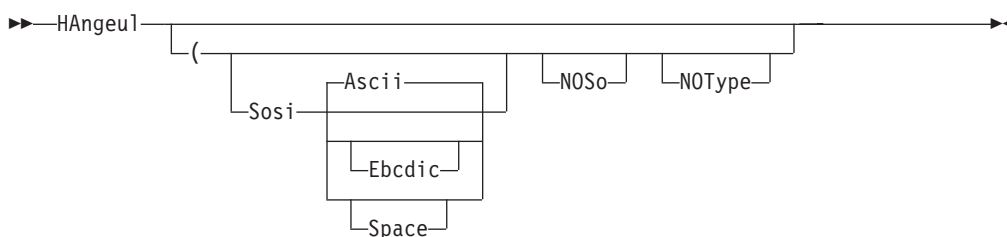
HAngeul subcommand—Change the data transfer type to HANGEUL

Purpose

Use the HAngeul subcommand to change the data transfer type to Hangeul.

MVS FTP uses the same SBCS translate table for single-byte or double-byte data transfers. If you require an alternate SBCS table for a double-byte transfer, use the SIt e/LOCSIt e SBDat aconn or SIt e XLat e subcommand to have the server (or client) change the SBCS translation for the data connection.

Format



Parameters

Sosi

Transferred data contains the shift-out and shift-in characters specified by one of the following parameters – Ascii, Ebcdic or Space. If no parameter is specified, ASCII is used as the default.

If Sosi is not specified at all, shift-out or shift-in characters are not used in the transferred data.

Ascii

When combined with the Sosi parameter, causes shift-out and shift-in characters X'1E' and X'1F' to be used to delimit DBCS strings in ASCII data.

Ebcdic

When combined with the Sosi parameter, causes shift-out and shift-in characters X'0E' and X'0F' to be used to delimit DBCS strings in ASCII data.

Space

When combined with the Sosi parameter, causes shift-out and shift-in characters X'20' and X'20' (ASCII spaces) to be used to delimit DBCS strings in ASCII data.

NOSo

Specifies that the data transferred is pure DBCS (data with no SBCS characters) and is to be transferred to or from EBCDIC DBCS data that contains no shift-out or shift-in delimiters.

NOType

Suppresses the sending of the corresponding TYP e command to the server. Use this parameter when translation is to be done by the FTP client only.

Usage

The HAngeul client subcommand is equivalent to the TYPE B 5 server command.

Context

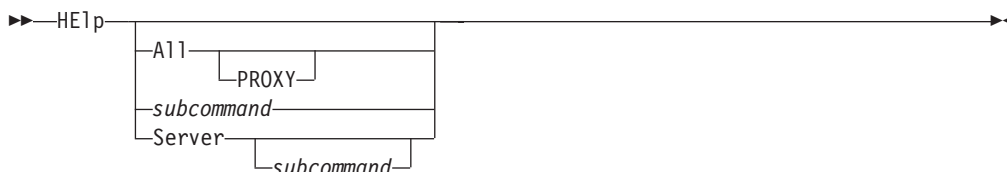
See “FTP with traditional DBCS support” on page 77 for more information.

HElp and ? subcommands—Display help information

Purpose

Use the HElp command to get assistance with the FTP subcommands.

Format



Parameters

All

The client displays a description of all the subcommands it implements.

PROXY

When used, displays a description of all subcommands available on the proxy subcommand.

subcommand

Displays a description of the specified subcommand. The subcommand name can be abbreviated to its minimum abbreviation.

Server

Displays the help that the foreign host offers for the specified subcommand.

If you do not specify a subcommand, FTP displays a list of the commands that the foreign host recognizes.

Usage

- If you enter the HElp subcommand without a parameter, you see the HElp FTP MENU, which lists the subcommands recognized by the FTP client and a description of the help information available.
- If you enter the ? subcommand by itself, you see introductory information about FTP.

Note: To receive help from a server on a secondary control connection, enter PROXY HElp SERVER. See “PROXY subcommand—Execute FTP subcommand on secondary control connections” on page 225 for more information.

Ibmkanji subcommand—Change the data transfer type to IBMKANJI

Purpose

Use the Ibmkanji subcommand to change the data transfer type to IBM kanji.

Format

►—Ibmkanji [(-NOType)]

Parameters

(NOType

Suppresses sending of the TYpe command for host servers that do not support this data transfer type.

Usage

This subcommand causes no conversion to be performed on the transferred file. It has exactly the same effect as the EBcdic TYpe command alias.

Context

See “FTP with traditional DBCS support” on page 77 for more information.

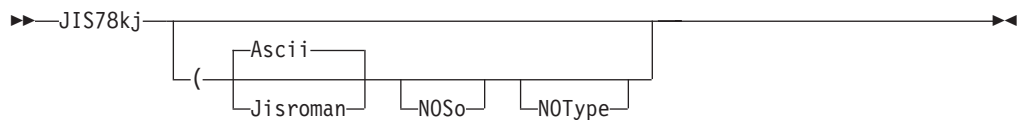
JIS78kj subcommand—Change the data transfer type to JIS78KJ

Purpose

Use the JIS78kj subcommand to change the data transfer type to JIS78KJ (1978 edition).

MVS FTP uses the same SBCS translate table for single-byte or double-byte data transfers. If you require an alternate SBCS table for a double-byte transfer, use the SIt e/LOCSIt e SBDat aconn or SIt e XLat e subcommand to have the server (or client) change the SBCS translation for the data connection.

Format



Parameters

Ascii

Use ASCII shift-in escape sequence ESC (B in the transferred data.

If neither Ascii nor Jisroman is specified, the ASCII shift-in sequence is used.

Jisroman

Use Jisroman shift-in escape sequence ESC (J in the transferred data.

NOSo

Specifies that the data transferred is pure DBCS (data with no SBCS characters) and is to be transferred to or from EBCDIC DBCS data that contains no shift-out or shift-in delimiters.

NOType

Suppresses the sending of the corresponding TYP e command to the server. Use this parameter when translation is to be done by the FTP client only.

Usage

- The JIS78kj or JIS78kj (ASCII client subcommands are equivalent to the TYPE B 4 A server command.
- The JIS78kj (JISROMAN client subcommand is equivalent to the TYPE B 4 R server command.
- The JIS78kj (JISROMAN NOSO client subcommand is equivalent to the TYPE B 4 R N server command.

Context

See “FTP with traditional DBCS support” on page 77 and “Support for MBCS languages” on page 80 for more information.

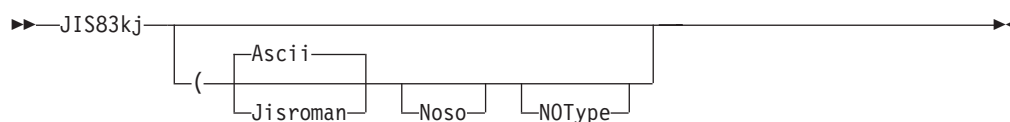
JIS83kj subcommand—Change the data transfer type to JIS83KJ

Purpose

Use the JIS83kj subcommand to change the data transfer type to JIS83KJ (1983 edition).

MVS FTP uses the same SBCS translate table for single-byte or double-byte data transfers. If you require an alternate SBCS table for a double-byte transfer, use the SIt e/LOC SIt e SBDataconn or SIt e XLate subcommand to have the server (or client) change the SBCS translation for the data connection.

Format



Parameters

Ascii

Use ASCII shift-in escape sequence ESC (B in the transferred data.

If neither Ascii nor Jisroman is specified, the ASCII shift-in sequence is used.

Jisroman

Use Jisroman shift-in escape sequence ESC (J in the transferred data.

NOSo

Specifies that the data transferred is pure DBCS (data with no SBCS characters) and is to be transferred to or from EBCDIC DBCS data that contains no shift-out or shift-in delimiters.

NType

Suppresses the sending of the corresponding TYP e command to the server. Use this parameter when translation is to be done by the FTP client only.

Usage

- The JIS83kj or JIS83kj (ASCII client subcommands are equivalent to the TYPE B 3 A server command.
- The JIS78kj (JISROMAN client subcommand is equivalent to the TYPE B 3 R server command.

Context

See “FTP with traditional DBCS support” on page 77 and “Support for MBCS languages” on page 80 for more information.

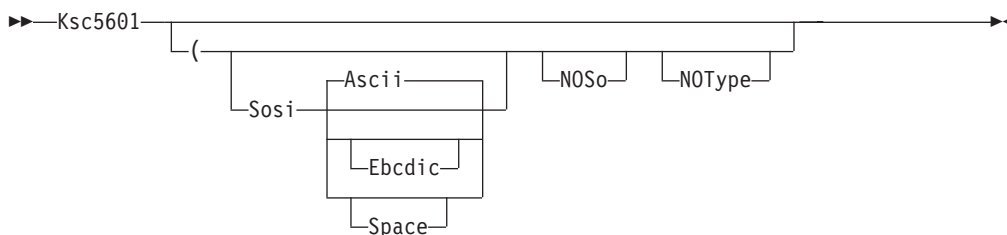
Ksc5601 subcommand—Change the data transfer type to KSC-5601

Purpose

Use the Ksc5601 subcommand to change the data transfer type to KSC-5601.

MVS FTP uses the same SBCS translate table for single-byte or double-byte data transfers. If you require an alternate SBCS table for a double-byte transfer, use the SItc/LOCSItc SBDatconn or SItc XLtce subcommand to have the server (or client) change the SBCS translation for the data connection.

Format



Parameters

Sosi

Transferred data contains the shift-out and shift-in characters specified by one of the following parameters — Ascii, Ebcdic or Space. If no parameter is specified, ASCII is used as the default.

If Sosi is not specified at all, shift-out or shift-in characters are not used in the transferred data.

Ascii

When combined with the Sosi parameter, causes shift-out and shift-in characters X'1E' and X'1F' to be used to delimit DBCS strings in ASCII data.

Ebcdic

When combined with the Sosi parameter, causes shift-out and shift-in characters X'0E' and X'0F' to be used to delimit DBCS strings in ASCII data.

Space

When combined with the Sosi parameter, causes shift-out and shift-in characters X'20' and X'20' (ASCII spaces) to be used to delimit DBCS strings in ASCII data.

NOSo

Specifies that the data transferred is pure DBCS (data with no SBCS characters) and is to be transferred to or from EBCDIC DBCS data that contains no shift-out or shift-in delimiters.

NOType

Suppresses the sending of the corresponding TType command to the server. Use this parameter when translation is to be done by the FTP client only.

Usage

The Ksc5601 client subcommand is equivalent to the TYPE B 6 server command. See “FTP with traditional DBCS support” on page 77 for more information.

Context

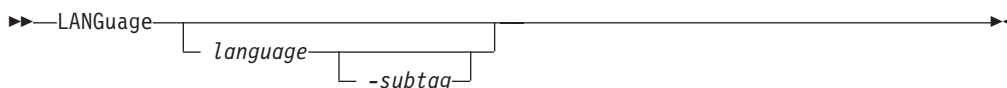
See “Support for MBCS languages” on page 80 for more information.

LANGuage subcommand—Set the language used for FTP replies from the server

Purpose

Request the language to be used for FTP server replies, or reset the language in use to the server's default language.

Format



Parameters

language

A 2-character code as specified by RFC 1766 identifying the language to be used for FTP replies. RFC 1766 defines these codes as those listed in ISO 639. See Appendix E, “Related protocol specifications (RFCs),” on page 415 for information about accessing RFCs.

-subtag

A 2-character code as specified by RFC 1766 identifying a variation of language. RFC 1766 defines these codes as ISO 3166 alpha-2 country codes. See Appendix E, “Related protocol specifications (RFCs),” on page 415 for information about accessing RFCs.

Usage

- The language subcommand is equivalent to the LANG *language -subtag* command.
- LANGuage with no parameters sets the language for FTP replies to the server's default language. For most FTP servers, the default is US English encoded in 7-bit ASCII.
- LANGuage with a parameter requests the server to use *language* for FTP replies. As specified in RFC 2640, it also directs the server and client to use UTF-8 encoding of pathnames on the control connection.
- This subcommand is not available unless EXTENSIONS UTF8 is encoded in FTP.DATA.
- The subcommand is not available if you have disabled UTF-8 encoding with a LOCSite command or FTP start option.

Context

The client should use the FEature subcommand to determine which languages the server offers prior to using the LANGuage subcommand to request a language for FTP replies. See “FEature subcommand—Query FTP server for features it supports” on page 164 for information about using the FEature subcommand.

LCd subcommand—Change the local working directory

Purpose

Use the LCd subcommand to change the current working directory on the local host.

Format

- In a TSO Environment:

►►—LCd—*qualifier*—————►►

- In a z/OS UNIX System Services Environment:

►►—LCd—*qualifier*—————►►

Parameters

qualifier

Specifies either a common prefix for a group of sequential data sets or the qualifiers of a PDS.

Note: In a z/OS UNIX environment, you can omit the qualifier on the LCd subcommand. Doing so changes the current working directory to your home directory. If you do not have a home directory, the working directory is not changed, and no message is issued.

Examples

- Change the local current working directory:

```
lcd ftp.test1
```

Local directory name set to partitioned data set USER14.FTP.TEST1.
Command:

- When the LCd subcommand is issued, *qualifier* is appended to the current local working directory. For example, if the current local working directory is TCPUSR14.TEST and you issue the LCd subcommand LCD FILES, the new working directory becomes TCPUSR14.TEST.FILES.
- To override the existing directory rather than append to the directory, issue the *qualifier* in single quotation marks ('). For example, if the current local working directory is TCPUSR14.TEST and you issued the LCd subcommand LCD 'FTP.FILES', the new working directory is FTP.FILES.
- If a PDS exists with the exact name of the current local working directory, FTP considers the working directory to be that PDS. Otherwise, FTP considers the working directory to be a common prefix qualifier for sequential data sets. If a PDS exists with the same name as the current local working directory, but you want the current local working directory to be treated as a common prefix for sequential data sets, specify the working directory with a period (.) at the end. For example, if a PDS named TCPUSR14.TEST exists, the subcommand LCD 'TCPUSR14.TEST' makes the PDS TCPUSR14.TEST the current local working directory. A subsequent Get command used to copy data set name1 would add the member name1 to the TCPUSR14.TEST PDS. In contrast, the statement LCD

LCd subcommand

'TCPUSR14.TEST.' would make the current local working directory TCPUSR14.TEST., a prefix for sequential data sets. A subsequent Get command used to copy data set name1 would create the sequential data set TCPUSR14.TEST.name1.

- To back up one level of the current local working directory, issue the LCd subcommand with two periods (..) at the end. For example, if the working directory is jones.source, the statement LCD .. makes jones. the working directory.

Testing throughput with *DEV.NULL

You can use the Get subcommand to copy a large number of files (or one large file) without having the files actually stored in the client's file system. This is useful for testing purposes because you do not have to worry about allocating the disk space on the client system.

To use this function, first change the working directory to *DEV.NULL by entering the following subcommand:

```
LCD *DEV.NULL
```

This affects the working directory only for Get commands. You then use the Get command to copy the file to the client system. The input data set must be valid, and the output file can either be new or already exist. In either case, the file is not actually stored.

The following response shows information such as the number of bytes transferred and the rate of transfer.

```
Command:
lcd *dev.null
Working Directory for GET is NULL Device
for PUT is HFS directory /tmp
Command:
get 'user2.junk(junk)' example
>>> EPSV
229 Entering Extended Passive Mode (||||1034|)
>>> RETR 'user2.junk(junk)'
125 Sending data set USER2.JUNK(JUNK)
250 Transfer completed successfully.
65 bytes transferred in 0.070 seconds. Transfer rate 0.93 Kbytes/sec.
Command:
```

To end the use of the *dev.null directory for Get commands, issue another change local working directory subcommand.

Usage

When you enter an FTP session, the working directory on the local host is set according to the environment in which the FTP client is invoked: \$HOME in z/OS UNIX, your MVS user ID in TSO.

LOCSite subcommand—Specify site information to the local host

Purpose

Use the LOCSite subcommand to specify information that is used by the local host to provide services specific to that host system.

Format

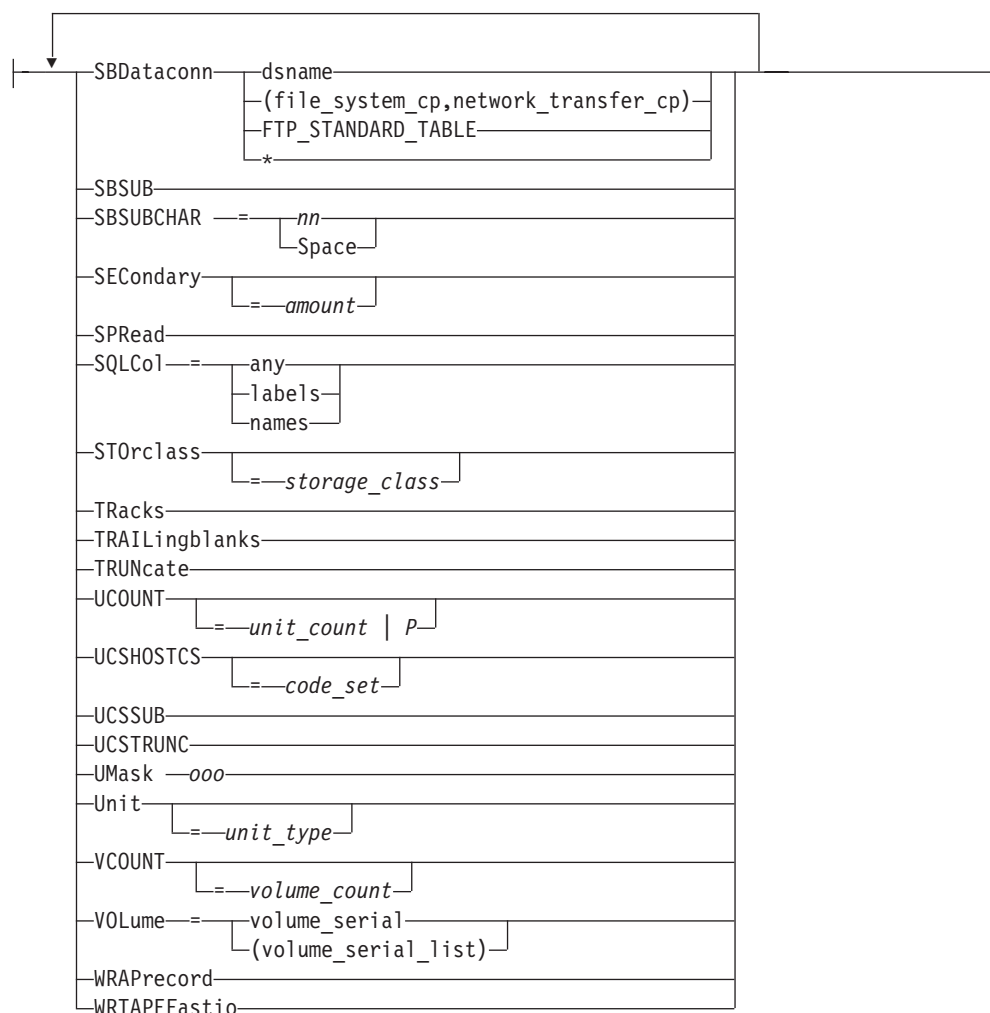
►►LOCSite | options |◀◀

options:

ASAttrans	
AUTOMount	
AUTOREcall	
BLKsize	<code>==size</code>
BLOCKS	
BLOCKSize	<code>==size</code>
BUfno	<code>5</code> <code>number</code>
CHKptint	<code>0</code> <code>number</code>
CHKPTrefix	<code>home</code> <code>userid</code> <code>local</code>
CHMod	<code>ooo filename</code> <code>symbolic filename</code>
CONDdisp	<code>Catlg</code> <code>Delete</code>
CTRLConn	<code>7BIT</code> <code>iconv_ascii</code> <code>FTP_STANDARD_TABLE</code> <code>*</code>
CYlinders	
DATAclass	<code>==data_class</code>
DATASetmode	
DB2	<code>db2_name</code>
DCbdsn	<code>==data_set_name</code>
Directory	<code>==size</code>
DIRECTORYMode	
ENCODING	<code>SBCS</code> <code>MBCS</code>
EPSV4	

LOCSite subcommand

FILEtype	=	__type
FWFriendly		
ISPFSTATS		
LRec1		
		__length
MBDATACONN	=	(file_system_codepage,network_transfer_codepage)
MGmtclass		
		__mgmtclass
MIGratevol		
		__volume_ID
NOASAtans		
NOAUTOMount		
NOAUTOREcall		
NOEPSV4		
NOFWFriendly		
NOISPFSTATS		
NOQUOTESoverride		
NORDW		
NORESTGet		
NOSBSUB		
NOSPREad		
NOTRAILINGblanks		
NOTRUNcate		
NOUCSSUB		
NOUCSTRUNC		
NOWRAPrecord		
NOWRTAPEFastio		
PDSTYPE	=	
		PDS
		PDSE
PRImary		
		__amount
PROGRESS	=	10
		number
Qdisk		
		__volume_serial
QUOTESoverride		
RDW		
READTAPEFormat		
		__tape_format
RECFm		
		__format
RESTGet		
RETPd		
		__days



Parameters

ASATrans

Permits the FTP client to interpret characters in the first column of ASA files being transferred as print control characters.

AUTOMount

Permits automatic mounting of volumes for data sets on volumes that are not mounted. If AUTOMount is specified and an unmounted volume is needed, a message is automatically issued to the MVS operator console requesting that the volume be mounted. The MVS operator must then mount the volume and reply to the message before FTP can proceed.

AUTORecall

Permits automatic recall of migrated data sets.

BLKsize

Specifies the block size of a newly allocated data set. BLKsize is functionally equivalent to BLOCKSize. The BLOCKSize parameter is obsolete, but it is accepted to provide compatibility with previous releases of z/OS TCP/IP.

When specified without a *size*, no block size is used when allocating the new data set. When specified without a *size*, the equal sign (=) is optional.

LOCSite subcommand

Specify BLKsize with no value if you are also specifying DATAclass=*data_class* and you want the SMS data class to provide the BLKsize value, or if you are specifying DCbdsn=*data_set_name* and you want to use the block size from the DCBDSN data set. If BLKsize=*size* is specified with either the DATAclass or DCbdsn parameter, the value specified by the LOCsite BLKsize parameter overrides the DATAclass or DCbdsn block size.

Notes:

1. If you specify BLKsize without a size, FTP does not specify the block size when allocating new data sets.
2. Be especially careful specifying both BLKsize= and Blocks. While there are conditions where this is tolerated, if a valid BLKsize cannot be determined, the data set will not be created when the allocation is attempted.

size

Specifies the block size of a newly allocated data set. The valid range is 0–32 760.

BLKsize=0 is a special case. When BLKsize=0 is specified, the operating system attempts to determine a block size for the new data set. FTP does not create the new data set unless the system is able to establish a nonzero block size.

BLocks

Specifies that primary and secondary space allocations are in blocks.

If both PRImary and SEConDary are specified as 0, and an SMS data class has been specified, the space allocation is determined by the SMS data class and the BLocks parameter is ignored.

BLOCKSIze

Specifies the block size of a newly allocated data set. BLOCKSIze is functionally equivalent to BLKsize. BLOCKSIze is obsolete but it is accepted to provide compatibility with previous releases of z/OS TCP/IP. See the BLKsize parameter for more information.

BUfno

Specifies the number of access method buffers that is used when data is read from or written to a data set. The valid range is 1–35. The default value is 5.

CHKptint

Specifies the checkpoint interval for the sending site in a file transfer request. If the checkpoint interval is 0, no checkpointing occurs and no marker blocks are transmitted. The default value is 0.

CHKptint must be set by LOCsite when the client site is the sending site for the file transfer (PUt command). Do not increase the checkpoint interval above 0 for a PUt unless the receiving site supports the REStart command and is able to process checkpoint markers in the file transfer data stream.

CHKptint is valid only for block and compressed modes of data transfer.

number

Specifies the checkpoint interval for the sending site in a file transfer request. This value is used to determine when checkpoint marker blocks are to be transmitted so that transmission can be restarted based on the information in the last marker.

A large checkpoint interval means that a large amount of data is sent between markers and therefore few markers are sent. A smaller checkpoint interval means that less data is sent in between markers and therefore more markers are sent.

The costs involved with using a nonzero checkpoint interval are:

- The markers themselves are transmitted, which means more bytes are being sent across the network (approximately 44 bytes per marker).
- For each marker that is sent by the client, a reply must be sent by the server on the control connection. The reply acknowledges the marker and provides the server's corresponding marker.

To estimate the appropriate checkpoint interval, use the following formula. You need to know the record length of the file you are transferring and how much data you think can be transmitted reliably.

$$\text{CHKPTINT} = \frac{\text{amount of data in interval}}{\text{record length of the file}}$$

Do not execute a CHKptint more often than once every 200KB. For example, if the file you are transferring has 80-byte records:

$$\begin{aligned}\text{CHKPTINT} &= 200\text{KB} / 80 \text{ bytes} \\ &= 200 * 1024 \text{ bytes} / 80 \text{ bytes} \\ &= 2560\end{aligned}$$

CHKPTPrefix

Specifies a key which is used to determine the *hlq* of the checkpoint data set. The name will be *hlq.FTP.CHKPOINT* or *hlq.pds_name(CHKPOINT)*.

home

The default.

userid

Creates the data set 'userid.FTP.CHKPOINT'.

local

Creates a file named *current_path.FTP.CHKPOINT* or, if the path happens to be a PDS, then the file name is *current_path.pds_name(CHKPOINT)*.

Note the exceptions for z/OS UNIX and BATCH jobs in the following chart using 'path' for current path and 'FN' for FTP.CHKPOINT:

Parameter	z/OS UNIX	Batch	TSO
Home	path.FN	userid.FN	tso_prefix.FN
Userid	userid.FN	userid.FN	userid.FN
Local	path.FN	path.FN	path.FN
Local with path=pdse	N/A	path.pds_na (CHKPOINT)	path.pds_na (CHKPOINT)

CHMod

Changes the permission bits for a file.

ooo filename

ooo is an octal mask representing the permissions you want to assign to filename. Form the octal mask by OR'ing the constants corresponding to the permission bits you want set:

400

User read

LOCSite subcommand

200	User write
100	User execute (or list directory)
040	Group read
020	Group write
010	Group execute
004	Other read
002	Other write
001	Other execute

You cannot use the LOCSITE subcommand CHMod parameter to set the following permission bits:

- Set-user-ID bit
- Set-group-ID bit
- Sticky bit

Refer to the *z/OS UNIX System Services User's Guide* and the *z/OS UNIX System Services Command Reference* for more information about file permissions.

symbolic filename

symbolic represents the permissions you want to apply to *filename*.

Note: *symbolic* is specified as follows:

{u|g|o|a}{=|+|-}{r|w|x|rw|rx|wx|rwx}

where u, g, o, a, =, +, -, r, w, and x are as defined for the z/OS UNIX chmod command.

If *filename* does not begin with a slash character (/), it is appended to the current working directory. If *filename* does begin with a slash character (/), it is interpreted as a complete directory name.

The file name specified must be an HFS file name for a single file and cannot contain a wildcard (*) for multiple files. The setting of QUOTESoverride is ignored and all quotation marks are treated as part of the file name.

The CHMOD keyword must be the only or last keyword on a LOCSite subcommand.

CONDdisp

Specifies the disposition of the data set if a retrieve operation for a new data set ends before all of the data is written.

Catlg

Specifies that a data set is kept and cataloged when an FTP file transfer ends prematurely.

Delete

Specifies that a data set is deleted when an FTP file transfer ends prematurely.

Delete is ignored if the file transfer failed as a result of the FTP client being terminated or if the client has received checkpoint information during data transfer.

CTRLConn

Specifies the ASCII code page to be used for control connections. The valid subcommands are:

```
LOCSITE CTRLConn=7BIT
LOCSITE CTRLConn=iconv_ascii
LOCSITE CTRLConn=FTP_STANDARD_TABLE
LOCSITE CTRLConn=*
```

See “Support for SBCS languages” on page 76 for more information.

7BIT

Indicates 7-bit ASCII is to be used.

iconv_ascii

Is a name recognized by iconv to indicate an ASCII code page. For a list of code pages supported by iconv, refer to code set converters in the *z/OS C/C++ Programming Guide*.

FTP_STANDARD_TABLE

Indicates that the FTP internal tables, which are the same as the tables that are shipped in TCPXLBIN(STANDARD), are to be used on the control connection.

* Indicates that the ASCII used at initialization is to be used.

Note: Setting the control connection code page using LOCSite CTRLCONN disables UTF-8 encoding of the control connection. You must start the client again to restore UTF-8 encoding.

CYLinders

Specifies that primary and secondary space allocations are in cylinders.

If both PRImary and SECondary are specified as 0, and an SMS data class has been specified, the space allocation is determined by the SMS data class and the CYlinders parameter is ignored.

DATAclass

Specifies the SMS data class, as defined by your organization, for the target host. Specifying DATAclass with no parameter value cancels the dataclass specification. The equal sign (=) is optional in this case.

See “Specifying values for new data sets” on page 81 for more information about specifying attributes when allocating new data sets.

data_class

Specifies the SMS data class, as defined by your organization, for the target host. If values are specified for any of the following LOCSite parameters, the values specified by the LOCSite parameter override the value specified in the SMS dataclass:

- BLKsize

LOCSite subcommand

- Directory
- LRecl
- PRImary
- RECfm
- RETpd
- SECondary

If the DCbdsn parameter is specified on the LOCSite subcommand, the LRecl, RECfm, BLOCKSize, and RETpd (if specified) of the DCBDSN data set overrides the values specified in the data class.

If the MGMTclass parameter is specified on the LOCSite subcommand, and the requested management class specifies a retention period, the retention period value of the management class may override the retention period value of the dataclass.

DATASetmode

Specifies that all the data set qualifiers below the current directory are treated as entries in the directory (disables DIRECTORYMode).

DB2

Specifies the name of the DB2 subsystem.

db2_name

The name of the DB2 subsystem.

DCbdsn

Specifies the name of the MVS data set to be used as a model for allocation of new data sets. Specifying DCbdsn with no parameter value cancels the DCbdsn specification.

data_set_name

Specifies the name of the data set. The file name must be an MVS data set name. HFS file names are not allowed on the DCbdsn parameter. The setting of QUOTEsOverride is ignored. If the file name is enclosed in single quotation marks, it overrides the current working directory; otherwise it is appended to the current working directory.

Notes:

1. Specify the LOCSite parameters RECfm, LRecl, and BLKsize with no values to allow characteristics from the model DCB to be used.
2. To override the model characteristics of RECfm, LRecl, BLKsize, or RETpd, specify a value on the LOCSite command.
3. If MGMTclass is specified, the RETpd value of the MGMTclass may override the RETpd value.

Specifying a GDG data set with a relative index produces an error message. The following examples are unsupported specifications:

```
LOCSITE DCBDSN=MYGDG(0)
LOCSITE DCBDSN=MYGDG(-nnn) or
LOCSITE DCBDSN=MYGDG(+nnn)
```

See “Steps for using a DCBDSN model to create a new data set” on page 83 for more information about DCbdsn.

Directory

Specifies the number of directory blocks to be allocated for the directory of a PDS.

Specify Directory=0 to allocate without specifying the number of directory blocks. Specify Directory=0 when you are also specifying DATAClass=*dataclass* and you want the SMS dataclass to provide the Directory *size*.

The *size* you specify with the Directory parameter overrides the DATAClass directory specification.

size

Specifies the number of directory blocks to be allocated for the directory of a PDS. The valid range is 1–16 777 215. A *size* of 0 indicates that the directory blocks should be taken from the SMS data class.

DIRECTORYMode

Specifies that only the data set qualifier immediately below the current directory is treated as an entry in the directory. In directory mode, this data set qualifier is the only one used by the MPut subcommand.

DIRECTORYMode has no effect on files residing in an HFS.

ENCODING

Indicates the kind of encoding that is used for conversions between codepages for data transfers. See “Support for SBCS languages” on page 76 and “Support for MBCS languages” on page 80 for more information.

SBCS

Single Byte encoding. Code pages are specified using the SBADATACONN statement. This is the default value.

MBCS

Multibyte encoding. Code pages are specified using the MBADATACONN statement.

EPSV4

Specifies the client is to attempt to use the EPSV command to establish a data connection on an IPv4 session instead of referring to the FWFRIENDLY setting.

See RFC 2428 for information about the EPSV command. If the server rejects the EPSV command, the client refers to the FWFRIENDLY setting to determine how to establish the data connection. When the client is setting up proxy transfer data connections, it will try the EPSV and EPRT commands on IPv4 sessions; if a server rejects the EPSV or EPRT command, the client will try the PASV or PORT command instead.

If the server rejects either the EPSV or the EPRT command during the session, the client won’t send EPSV to the server again, even when EPSV4 is specified.

FILEtype

Specifies the file type of the data set.

type

The file type of the data set can be:

Type	Description
------	-------------

SEQ	Sequential or partitioned data sets
-----	-------------------------------------

SQL	SQL query function
-----	--------------------

FWFriendly

Specifies that the FTP client is firewall-friendly. This means that data connections will be set up from the FTP client to the FTP server.

LOCSite subcommand

Note: When the FTP server has an IPv6 address, data connections are always set up from the FTP client to the FTP server without reference to the FWFriendly setting.

ISPFSTATS

Allows FTP to create or update ISPF Member statistics when Get or MGet subcommands are issued.

LRecl

Used to specify the logical record length (LRecl) of a newly allocated data set.

Specify LRecl with no value when you are also specifying DATAclass=*data_class* and you want the SMS dataclass to provide the LRecl value, or when you are specifying DCbdsn=*data_set_name* and you want to use the LRecl from the DCBDSN data set. If LRecl=*length* is specified with either DATAclass or DCbdsn, the length specified by the LOCSite LRecl parameter overrides the DATAclass or DCbdsn LRecl.

length

Specifies the logical record length of a newly allocated data set. The valid range is 0–32 760. A special value of x (LRecl=x) is also supported to indicate that a logical record length can exceed 32 760 for variable-length spanned records.

Specifying LRecl=0 has the same effect as specifying LRecl with no parameters.

MBDATACONN=(*file_system_codepage,network_transfer_codepage*)

Specifies the codepages for the file system and for the network transfer used when the client does data conversion during a data transfer. This parameter affects the conversion of multibyte character set (MBCS) data (including support for DBCS code pages) and is used when the ENCODING=MBCS is also specified.

See “Support for MBCS languages” on page 80 for more information.

file_system_codepage

Specifies the name of the file system codepage.

network_transfer_codepage

Specifies the name of the network transfer codepage.

MGmtclass

Used to specify the SMS management class as defined by your organization for the target host. Specifying MGmtclass with no *mgmtclass* cancels the mgmtclass specification. The equal sign (=) is optional in this case.

mgmtclass

Specifies the SMS management class as defined by your organization for the target host. If the mgmtclass specified has a setting for RETpd, the value specified by the mgmtclass may override the setting of the LOCSite RETpd parameter, the RETpd value of a model data set if the DCbdsn parameter is specified, and the RETpd value defined in an SMS data class if DATAclass is specified. See “Specifying values for new data sets” on page 81 for more information about specifying attributes when allocating new data sets.

MIGratevol

Specifies the volume ID for migrated data sets if they do not use IBM storage management systems. If you do not specify MIGratevol, the default *volume_serial* is MIGRAT.

volume_ID

The volume ID for migrated data.

NOASATrans

Treats ASA file transfers as regular file transfers; that is, the ASA characters are treated as part of the data and are not converted to print control characters.

NOAUTOMount

Prevents automatic mounting of volumes for data sets on volumes that are not mounted.

NOAUTOREcall

Prevents automatic recall of migrated data sets.

Note: A migrated data set can be deleted even though NOAUTOREcall is specified, because migrated data sets are not recalled for deletion.

NOEPSV4

Prevents the client from using the EPSV command to establish a data connection on an IPv4 session. See RPC 2428 for information about the EPSV command. When NOEPSV4 is set, the client refers to the FWFRIENDLY setting to determine how to establish the data connection. When the client is setting up proxy transfer data connections, the client will use only PASV and PORT commands with IPv4 servers.

NOFWFriendly

Specifies that the FTP client is not firewall friendly. This means that data connections will be set up from the FTP server to the FTP client. This is the default behavior for FTP data connections.

Note: When the FTP server has an IPv6 address, data connections are always set up from the FTP client to the FTP server without reference to the FWFriendly setting.

NOISPFSTATS

Does not allow FTP to create or update ISPF Member statistics when Get or MGet subcommands are issued.

NOQUOTESoverride

A single quote at the beginning of the file name, as well as all other single quotation marks contained in the file name, is treated as part of the actual file name. The entire file name, including the leading single quotation mark, is appended to the current working directory.

NORDW

Specifies that variable record descriptor words (RDWs) are discarded during FTP transmission of variable format data sets. This applies to transfers in stream mode only.

NORESTGet

Prevents opening the checkpoint data set for a Get request. Thus, checkpoint will not be active or recognized. Using this parameter when opening the checkpoint data set might cause a problem.

NOSBSUB

Specifies that substitution is not allowed for data bytes that cannot be translated in a single-byte character translation. This causes a data transfer failure if a character cannot be translated during the transfer.

NOSPRead

Specifies that the output is in report format rather than spreadsheet format when the file type is SQL.

NOTRAILINGblanks

Specifies that the FTP client does not preserve the trailing blanks that are in a fixed format data set when the data is sent to a foreign host.

NOTRUNcate

Specifies that truncation is not permitted. The FTP client will set an error and fail file transfer if a record that is longer than LRECL of the new file is detected.

Note: If WRAPRECORD is set then the data is wrapped, not truncated, no error will be set, and the file transfer will continue.

NOUCSSUB

In Unicode-to-EBCDIC conversion, the data transfer is terminated if any Unicode character cannot be converted into the EBCDIC code set.

NOUCSTRUNC

In Unicode-to-EBCDIC conversion, truncation of EBCDIC data is not allowed. The data transfer is aborted if the logical record length of the receiving data set is too small to contain the data after conversion to EBCDIC.

Note: The setting of the CONDDisp parameter determines what happens to the target data set if the transfer is aborted.

NOWRAPrecord

Indicates that data is truncated if no new line character is encountered before the logical record length of the receiving file is reached.

Note: If NOTRUNcate is also set, an error will be set and the file transfer will fail.

NOWRTAPEFastio

Indicates that ASCII Stream data that is being written to tape must be written using the LE Run-Time Library.

PDSTYPE

Specifies whether the FTP client creates local MVS directories as partitioned data sets or as partitioned data sets extended.

When specified without a value, FTP will not specify to z/OS whether to allocate a new MVS directory as a PDS or a PDSE. When specified without a value, the equal sign (=) is optional.

PDS

Allocate directories as partitioned data sets.

PDSE

Allocate directories as partitioned data sets extended.

PROGRESS

Specifies the interval between progress report messages generated by the FTP client during a file transfer (inbound or outbound). If the progress interval is zero, no progress messages are generated. The default value is 10.

number

Specifies the interval (in seconds) between progress report messages

generated in the FTP client during an inbound or outbound file transfer. A value of zero turns progress reporting off in the FTP client. The default value is 10 seconds.

The messages that are generated as part of progress reporting are EZA2509I and EZA1485I. These messages are generated automatically at 10-second intervals by the FTP client in releases prior to V1R6. Beginning in V1R6, the default behavior is the same as in prior releases, but the length of the interval and whether to generate the messages can be configured by using the PROGRESS parameter setting on the LOCSITE subcommand or by specifying the PROGRESS statement in FTP.DATA.

PRImary

Used to specify the amount of tracks, blocks, or cylinders for primary allocation. When specified with a value of 0, no primary value is used when allocating the data set.

Specify PRImary with 0 when you are also specifying DATAClass=*data_class* and you want the SMS dataclass to provide the PRImary *amount*.

To enable the SMS data class to determine the space allocation, both PRImary and SECondary must be specified as 0. The tracks, blocks, cylinders setting is ignored in this case. If PRImary with *amount* not equal to 0 is specified with DATAClass, the value specified by the LOCSite PRImary parameter overrides the DATAClass space allocation.

amount

Specifies the amount of tracks, blocks, or cylinders for primary allocation. For allocating partitioned data sets, this is the amount that is allocated for the primary extent.

For allocating sequential data sets this is the maximum amount that is allocated for the primary extent. If a lesser amount is needed to hold the data being transferred, only the amount actually needed to hold the data is allocated. The valid range is 1–16 777 215.

Qdisk

Used to display statistics about available space on a volume. If Qdisk is entered without a specific *volume_serial*, statistics about available space are displayed for each volume that is defined with "Use Attribute=storage".

volume_serial

Displays statistics about available space on a specific volume.

QUOTESoverride

Specifies single quotation mark at the beginning and end of a file name should override the current working directory instead of being appended to the current working directory. This is the way single quotation marks are used in all previous MVS FTP servers, and is the default. Any single quotation mark inside the beginning and ending quotation mark are treated as part of the file name.

QUOTESoverride indicates the usage of single quotation mark appearing at the beginning of, or surrounding, a file name. The setting of this keyword affects all FTP subcommands that have a path name as a parameter except keywords on the LOCSite subcommand.

RDW

Specifies that variable record descriptor words (RDWs) are treated as if they were part of the record and not discarded during FTP transmission of variable format data sets. This applies to transfers in stream mode only.

Note: RDW information is stored in binary. Transfer files in binary mode to avoid translation problems that can occur if you transfer this binary field in EBCDIC or ASCII.

READTAPEFormat

Used to provide information about an input data set on tape. If specified without the *tape_format* (which is the default), processing of input tapes will not take advantage of the record format information prior to open. The equal sign (=) is optional in this case.

READTAPEFormat has no effect on, and is not affected by DATAclass, DCbdsn, LRecl, RECFm, or any other parameters associated with creating a data set.

tape_format

Specifies the format of the records on the input tape data set. Valid formats are:

- F** Fixed record length
- V** Variable record length
- S** Spanned records
- X** Logical record length is undefined (Lrecl X)
- blank** Unspecified

The formats are mutually exclusive. Spanned implies variable, and Lrecl X implies spanned. If specified, the *tape_format* must be the most inclusive identifier in the list that matches the tape. If it is not the most inclusive identifier, an error message will be issued. For example, if *tape_format* is **S** (spanned), and the tape contains records with undefined length (Lrecl X), the request will fail. An unspecified format will avoid this type of error. However, the following should be considered:

- Specify a value for READTAPEFormat in all the following cases. Failure to specify a format will likely cause errors in processing the tape.
 - The record length is undefined (Lrecl X).
 - The records are spanned (Recfm is VBS, VS).
 - The records are variable (Recfm is V, VB, VBA) and RDW is specified.
- Specify a value for READTAPEFormat for all input tapes with one of the listed formats to ensure best results.

RECFm

Used to specify the record format of a data set. When specified without the *format*, no record format is used when allocating the data set. The equal sign (=) is optional in this case.

Specify RECFm with no value when you are also specifying DATAclass=*data_class* and you want the SMS dataclass to provide the RECFm *format*, or when you are specifying DCbdsn=*data_set_name* and you want to use the record format from the DCBDSN data set.

If RECFm=*format* is specified with either DATAclass or DCbdsn, the value specified by the LOCSite RECFm parameter overrides the DATAclass or DCbdsn record format.

format

Specifies the record format of a data set. Valid record formats are: F, FA, FB, FBA, FBM, FBS, FBSA, FBSM, FM, FS, FSA, FSM, U, UA, UM, V, VA, VB, VBA, VBM, VBS, VBSA, VBSM, VM, VS, VSA, and VSM. The

characters used to specify these record formats have the following meanings:

Code	Description
F	Fixed record length
V	Variable record length
U	Undefined record length
B	Blocked records
S	Spanned records (if variable) / standard records (if fixed)
A	Records contain ISO/ANSI control characters
M	Records contain machine code control characters

RESTGet

Allows opening the checkpoint data set for the Get request. This is the default when the RESTGet statement has not been added to the FTP.DATA file.

RETPd

Used to specify the number of days that a newly allocated data set should be retained.

Specify RETPd with no value when you are also specifying `DATAclass=data_class` or `MGmtclass=mgmtclass` and you want SMS to provide the RETPd value, or when you are specifying `DCbdsn=data_set_name` and you want to use the RETPd from the DCBDSN data set. If more than one of the LOCSite parameters (RETPd, MGmtclass, DATAclass, or DCbdsn) are specified, the order of precedence (highest to lowest) is:

1. MGmtclass
2. RETPd
3. DCbdsn
4. DATAclass

If a retention period is associated with an SMS management or data class, or with a model DCBDSN data set, the value of the retention period may be overridden to another nonzero value, but it cannot be overridden to have no retention period specified for the newly created data sets.

days

Specifies the number of days that a newly allocated data set should be retained. The valid range is 0–9999. A value of 0 indicates a retention period of 0 days so that the data set expires the same day as it was created.

SBDDataconn

Specifies the conversions between file system and network code pages to be used for data transfers.

```
LOCSITE SBDDataconn=dsname
LOCSITE SBDDataconn=(file_system_cp,network_transfer_cp)
LOCSITE SBDDataconn=FTP_STANDARD_TABLE
LOCSITE SBDDataconn=*
```

See “Support for SBCS languages” on page 76 for more information.

dsname

Specifies the fully qualified name of an MVS data set or HFS file that contains the EBCDIC-to-ASCII and ASCII-to-EBCDIC translate tables generated by the CONVXLAT utility.

Notes:

1. The name must *not* be enclosed in quotation marks. If quotation marks appear, they are treated as part of the name. (QUOTESoverride is ignored.)
2. The HFS name is case sensitive. The MVS name is not.
3. The name cannot begin with a left parenthesis [(.]
4. The SBDataconn keyword must be the only keyword or the last keyword on a LOCSite subcommand.

file_system_cp

Specifies the name of the file system code page recognized by iconv. For a list of code pages supported by iconv, refer to code set converters in the *z/OS C/C++ Programming Guide*.

network_transfer_cp

Specifies the network transfer code page recognized by iconv. For a list of code pages supported by iconv, refer to code set converters in the *z/OS C/C++ Programming Guide*.

FTP_STANDARD_TABLE

Indicates that the FTP internal tables, which are the same as the tables that are shipped in TCPXLBIN(STANDARD), are to be used on the data connection.

- * Indicates the translate tables set up at initialization for the data connection must be used.

SBSUB

Specifies that substitution is allowed for data bytes that cannot be translated in a single byte character translation. The substitution character is specified by the SBSUBCHAR parameter.

SBSUBCHAR *nn*

Specifies the value that is used for substitution when SBSUB is also specified. The value is one of the following:

SPACE

When the target codeset is ASCII, replace untranslatable characters with X'20' during SBCS data transfers. When the target codeset is EBCDIC, replace untranslatable characters with X'40' during SBCS data transfers.

- nn* Replace untranslatable characters with *nn* during SBCS data transfers, where *nn* is a hexadecimal value from 00 to FF.

SECondary

Specifies the amount of tracks, blocks, or cylinders for secondary allocation.

Specify SECondary=0 when you are also specifying DATAClass=*dataclass* and you want the SMS dataclass to provide the SECondary value. To enable the SMS data class to determine the space allocation, both PRImary and SECondary must be specified as 0. The tracks, blocks, cylinders setting is ignored in this case. If SECondary is specified as other than 0 with DATAClass, the value specified by the Site SECondary parameter overrides the DATAClass space allocation.

amount

Specifies the amount of tracks, blocks, or cylinders for secondary allocation. The valid range is 0–16 777 215. If you specify an *amount* of 0, FTP allocates without specifying secondary space.

SPRead

Specifies that the output is in spreadsheet format when the file type is SQL.

SQLCol

Specifies the column headings of the SQL output file.

any

The label of the DB2 SQL table column heading is the first choice for column heading, but if there is no label, the name becomes the column heading.

labels

Labels are the DB2 SQL table column headings. If any of the columns do not have labels, FTP supplies a column heading in the form of COLnnn.

names

Uses the names of the DB2 SQL table column headings. The labels are ignored.

STOrclass

Specifies the SMS storage class as defined by your organization for the target host. Cancels the storage class specification when specified without a *storage_class* parameter value. The equal sign (=) is optional in this case.

See “Specifying values for new data sets” on page 81 for more information about specifying attributes when allocating new data sets.

storage_class

Specifies the SMS storage class as defined by your organization for the target host.

When an SMS storage class is in use, any of the attributes specified there can be overridden by a different specification by the user. To avoid overriding the setting in the SMS storage class, specify BLKSize, LRecl, PDSTYPE, PRImary, RECFm, SEConDary, UCOUNT, Unit, VCOUNT, or VOLume with no associated value. This removes any value specified on a prior LOCSITE command or in FTP.DATA, and the affected attributes are not included on the allocation. To override a setting in the SMS storage class, specify the desired value with the appropriate keyword.

TRacks

Specifies that primary and secondary space allocations are in tracks.

If both PRImary and SEConDary are specified as 0, and an SMS data class has been specified, the space allocation is determined by the SMS data class and the TRacks parameter is ignored.

TRAILingblanks

Specifies that the FTP client preserves the trailing blanks in a fixed format data set when the data is sent to a foreign host.

TRUNcate

Specifies that truncation is permitted. The FTP client does not set an error when a truncated record is detected and the file transfer continues.

UCOUNT

Specifies how many devices to allocate concurrently to support the allocation request.

unit_count

Specifies number of devices to allocate. Valid value is 1–59. When specified without a value, the FTP server does not specify a unit count when allocating data sets.

LOCSite subcommand

P Parallel mount request.

The setting for UCOUNT may be overridden by the SMS storage class, if one is specified. Therefore, it is recommended that UCOUNT not be coded if an SMS storage class is in use.

UCSHOSTCS

Specifies the EBCDIC code set to be used when converting to and from Unicode. If you do not specify a *code_set*, the current code set is used.

code_set

Name of the EBCDIC code set to be used when converting to and from Unicode.

UCSSUB

In Unicode-to-EBCDIC conversion, the EBCDIC substitution character is used to replace any Unicode character that cannot successfully be converted. Data transfer continues.

UCSTRUNC

In Unicode-to-EBCDIC conversion, truncation of EBCDIC data is allowed. The data transfer continues even if EBCDIC data is truncated.

UMask

Defines the file mode creation mask. The file mode creation mask defines which permission bits are *not* to be set on when a file is created. When a file is created, the permission bits requested by the file creation are compared to the file mode creation mask, and any bits requested by the file creation which are not allowed by the file mode creation mask are turned off.

The format of the UMask keyword is UMask *ooo*.

When a file is created, the specified permission bits for the file are 666 (-rw-rw-rw-). If the file mode creation mask is 027, the requested permissions and the file mode creation mask are compared:

```
110110110  - 666
000010111  - 027
-----
11010000   - 640
```

The actual permission bits set for the file when it is created is 640 (-rw-r-----).

Notes:

1. The default value for UMask is 027.
2. You cannot use FTP to create HFS files with execute permissions. If you require execute permissions, use the LOCSite CHMod command to change permissions after the file has been created.

Unit

Specifies the unit type for allocation of new data sets.

unit_type

The unit type (for example, 3380) for the allocation of new data sets on direct access devices. If *unit_type* is not specified, the unit type used for allocation is set back to the system default.

VCOUNT

Specifies the number of volumes an allocated data set may span. When specified without a *volume_count* value, the FTP server uses a volume count of 50 when allocating data sets.

volume_count

Valid values are from 1–255.

VOLume

Specifies the volume serial number for allocation of new data sets.

volume_serial

The serial number of the volume to use for allocation.

volume_serial_list

A list of one or more volume serial numbers for allocation. Delimit each volume serial number from the previous one with a comma.

If VOLume is specified without a *volume_serial_list* or *volume_serial* parameter, no volumes are specified by the FTP client during the allocation of a new data set, and the installation default is used.

WRAPrecord

Indicates that data is wrapped to the next record if no new line character is encountered before the logical record length of the receiving file is reached.

WRTAPEfastio

Indicates that ASCII Stream data that is being written to tape is allowed to be written using BSAM I/O.

Usage

- Because more than one parameter can be specified with the LOCSite subcommand, *parameter* can be repeated many times, with each *parameter* separated by a blank space.
- Issue the HELp LOCSite subcommand to display a list of services available on the local host.
- The site-dependent information set with the LOCSite subcommand remains active until you issue a new LOCSite subcommand. The new LOCSite subcommand adds to or changes the parameters established by previous LOCSite subcommands.
- If you specify one or more incorrect parameters with the LOCSite subcommand, an error message specifying the incorrect parameter is displayed. All correct parameters are set, regardless of any incorrect parameters, and do not need to be reissued.

Context

- See “HELp and ? subcommands—Display help information” on page 172 for more information about the HELp subcommand.
- To check the effect of the LOCSite command on the attributes at the local host, see “LOCStat subcommand—Display local status information” on page 200.

LOCStat subcommand—Display local status information

Purpose

Use the LOCStat subcommand to display local status information.

Format

►►—LOCStat—◄◄

Parameters

There are no parameters for this subcommand.

Examples

The following example shows the output from a LOCStat subcommand.

```
Command: locstat
Trace: FALSE, Send Port: TRUE
Send Site with Put command: TRUE
Connected to:9.67.113.57, Port: 6321, logged in
Local Port: 1045
Proxy connection to:9.67.112.25, Port: 6121, logged in
Proxy Local Port: 1046
Data type:a, Transfer mode:s, Structure:f
Automatic recall of migrated data sets.
Automatic mount of direct access volumes.
Data set mode. (Do not treat each qualifier as a directory.)
Primary allocation 2 cylinders, Secondary allocation 3 cylinders
Partitioned data sets will be created with 23 blocks
FileType is SEQ (Sequential - the default).
Number of access method buffers is 1.
Mgmtclass for the new data sets is MGMT1
Storclass for the new data sets is STOR1
Dataclass for the new data sets is DATA1
RDW's from VB/VBS files are retained as part of data.
Retention period is 2
DB2 subsystem name is DB2
Valid of Migrated Data Sets is MIGRAT
Data sets will be allocated like data set 'USER33.TEST.S.A'
Trailing blanks in records read from RECFM F data sets are discarded.
Record format: FB, Lrecl: 80, Blocksize: 8000.
Data sets will be allocated on CPDLB0
Data sets will be allocated using unit SYSDA
Wrapping data into next record.
Checkpoint interval is 10000
Prompting: ON, Globbing: ON
ASA control characters transferred as C control character sequences
New data sets deleted if a store operation terminates abnormally
Single quotes will override the current working directory
UMASK value is 027
Using 'USER33.FTP.DATA' for local site configuration parameteres
Command:
```

LMkdir subcommand—Create a directory on the local host

Purpose

Use the LMkdir subcommand to create a PDS, PDSE, or HFS directory on the local host. This subcommand provides you with an easy way to create a directory in the local host for data transfer.

Format

```

▶▶—LMkdir—directory—└┐—(—like—remote_directory—)

```

Parameters

directory

Specifies the name of the PDS, PDSE, or HFS directory to be created.

remote_directory

Specifies the name of a remote MVS PDS or PDSE that is to be a model for the directory to be created. This parameter is valid only when *directory* is a PDS or PDSE name. If you specify this parameter, the local site variables will change, and FTP will open and read the remote data set.

Examples

In this example, before LMkdir is issued, the local host had the following data sets:

- MVSUSER.ISPF.ISPPROF
- MVSUSER.JCL.CNTL
- MVSUSER.SMFTEST
- MVSUSER.TCPIP.DATA

```

User: ftp 1.1.2.3
System: IBM FTP CS/390 V2R10 1997 314 01:11 UTC
        220-EZAFTSRV IBM CS/390 V2R10 at EMU.ABC.OZ, 17:04:12 on 08/03/97
        220 Connection will close if idle for more than 5 minutes.
        NAME (<host>:tsouserid):

User: mvsuser
System: >>>USER mvsuser
        331 Send password please.
        Password:
        >>>PASS *****
        230 MVSUSER is logged on.
        Command:

```

```

User: lpwd
System: Local directory is MVSUSER.
        Command:

User: lcd ftp
System: Local directory name set to MVSUSER.FTP.
        Command:

User: lmkdir example
System: MVSUSER.FTP.EXAMPLE created.
        Command:

```

MVSUSER.FTP.EXAMPLE has now been created. You can get the same result directly with the LMKDIR 'MVSUSER.FTP.EXAMPLE' command.

LMkdir subcommand

This example illustrates the use of the (like parameter:

```
Command:
lmkdir 'mvsuser.example.linklib' (like 'sys1.linklib'
>>> XDSI 'sys1.linklib'
200 SITE PDSTYPE=PDS RECFM=U BLKSIZE=32760 DIRECTORY=800 LRECL=0 PRIMARY=482 SECONDARY=30 CYLINDERS
local site variables have changed
MVSUSER.EXAMPLE.LINKLIB created.
Command:
```

After the LMkdir subcommands were issued, the local host had the following data sets under MVSUSER:

- MVSUSER.FTP.EXAMPLE
- MVSUSER.ISPF.ISPPROF
- MVSUSER.JCL.CNTL
- MVSUSER.SMFTEST
- MVSUSER.TCPIP.DATA
- MVSUSER.EXAMPLE.LINKLIB

Usage

- FTP provides no subcommand to display a list of local directory entries. You should use TSO ISPF facility to check whether the directory is created by the LMkdir subcommand.
- If you are running FTP in a z/OS UNIX environment, you can use the ! command to check the status of HFS directories.
- The *directory* value is appended to the local current working directory to form the name of the created PDS, PDSE, or HFS directory. To override the local current working directory, specify an absolute HFS pathname:

/directory

or a fully qualified name in quotes:

'directory'

When *directory* is a PDS or a PDSE name, the data set characteristics of the newly allocated PDS or PDSE are determined by the settings of the local site variables.

- You can use the (like parameter of the lmkdir subcommand to specify a PDS or PDSE on the server host that has characteristics you want the local directory to have.
 - The (like option is valid only when both client and server are z/OS V1R5 or later, and the working directory for both the client and server is an MVS high level qualifier (HLQ).
 - If you use the (like parameter, the local site variables will change.
 - The FTP client will set the local site variables for you so the new PDS or PDSE is created with characteristics similar to the remote directory. The client, however, can only approximate certain characteristics of the data set such as space type, primary, and secondary. For complete control over these characteristics, do not use the (like parameter.
 - FTP must open and read the remote directory to determine its characteristics. If this is not acceptable, do not use the (like parameter.
 - Only the 3390 device architecture is supported. If the (like parameter is used for directories residing on other types of devices, unpredictable results will occur. Use of the (like parameter when the source or target directories do not reside on a 3390 architecture device is not recommended.

- If the remote data set is migrated, the server will inspect the AUTORECALL setting to determine whether to recall the data set or fail the request. If AUTORECALL is true, FTP will attempt to recall the data set; otherwise it will fail the request. Similarly, if the remote data set is not mounted, the server will inspect the AUTOMOUNT setting to determine whether to mount the data set or fail the request. If AUTOMOUNT is true, the server will attempt to mount the data set; otherwise, it will fail the request. You can change the server's AUTOMOUNT and AUTORECALL settings with the SITE subcommand. Choosing AUTOMOUNT or AUTORECALL could result in a long delay as the server waits for the data set to become available.

Context

- See "LOCSite subcommand—Specify site information to the local host" on page 181 and "LOCStat subcommand—Display local status information" on page 200 for information about setting and displaying the data set characteristics.
- See "Site subcommand—Send site-specific information to a host" on page 243 for information about setting the AUTOMOUNT and AUTORECALL values.

LPwd subcommand—Display the current working-level qualifier

Purpose

Use the LPwd subcommand to display the name of the current working directory on the local host.

Format

►►—LPwd—◄◄

Parameters

There are no parameters for this subcommand.

Examples

Display the name of the current working directory:

```
lpwd
Local directory is partitioned data set USER14.FTP.TEST1.
Command:
```

LS subcommand—Obtain a list of file names

Purpose

Use the LS subcommand to list only the names of a set of remote files, file group, or directory.

Format

```

▶▶—LS—┬──┴──┬──┴──▶▶
        │   │   │
        │   └──┴──┬──┴──┬──┴──▶▶
        │   name  (—Disk—

```

Parameters

name

Specifies the set of remote files whose names are to be listed. The default is the entire current directory or file group.

Disk

Stores the results of the LS subcommand in the *user_id*.FTP.LSOUTPUT data set. The results are not displayed on the screen.

Note: If the local current working directory is an HFS directory, the results are stored in a file named LSOUTPUT.

Examples

The following is a sample response that is displayed as a result of the LS subcommand.

```

>>>PORT 9,67,58,227,4,63
200 Port request OK.
>>>NLST
125 List started OK.
A.X
CHR.TXT
OBEY.TCPIP
PROFILE.EXEC
SPF.ISPPROF
USERTRAN.TCPXLBIN
250 List completed successfully.
Command:

```

The following is a sample entry and response that is displayed as a result of the LS subcommand listing HFS files.

```
cd '/u/user121/ftp.example'

>>>CWD '/u/user121/ftp.example'
250 HFS directory /u/user121/ftp.example is the current working directory
Command:
ls
>>>PORT 9,67,112,25,4,62
200 Port request OK.
>>>NLST
125 List started OK
append02
file1
file2
file3
file4
file5
250 List completed successfully.
Command:
```

Usage

- To make a file group the current working directory, use the CD subcommand. The method you use to specify a directory or file group is host-dependent.
- You can use special characters for pattern matching when specifying the *name*. These characters depend on the host FTP server. See “DlR subcommand—Obtain a list of directory entries” on page 155 for information about using special characters with the z/OS FTP server.
- If the current local directory is a PDS, only a member named LSOUTPUT is created. If the current local directory is not a PDS, the local directory, not the user ID, is used as the high-level qualifier for the data set name.
- If the local current working directory is an HFS directory, the results are stored in a file named LSOUTPUT.
- LS lists entries only for data sets and file types that FTP can process (see Appendix A, “Specifying data sets and files,” on page 393 for a list). GDG base, VSAM, and ATL library entries are among the types not included in the LS output. See “DlR subcommand—Obtain a list of directory entries” on page 155 to list entries for all types of data sets or files.

Context

- See Appendix A, “Specifying data sets and files,” on page 393 for more information about pattern matching and about specifying data sets and files.
- To make a file group the current working directory, see “CD subcommand—Change the directory on the remote host” on page 140.
- To get a list of complete directory entries with auxiliary information about the files, see “DlR subcommand—Obtain a list of directory entries” on page 155.
- To change the local directory, see “LCd subcommand—Change the local working directory” on page 179.

MDelete subcommand—Delete multiple files

Purpose

Use the MDelete subcommand to delete multiple files.

Format



Parameters

foreign_file

Specifies the name of the file to be deleted on the remote host.

Because more than one file can be deleted with the MDelete subcommand, the *foreign_file* parameter of the MDelete subcommand can be repeated many times, with each *foreign_file* separated by a blank space.

Examples

The following is a sample entry and the response that is displayed as a result of the MDelete subcommand for multiple HFS files.

```

cd '/u/user121/ftp.example'

>>>CWD '/u/user121/ftp.example'
250 HFS directory /u/user121/ftp.example is the current working directory
Command:
mdelete file1 file2 file3
>>>PORT 9,67,112,25,4,75
200 Port request OK.
>>>NLST file1
125 List started OK
250 List completed successfully.
>>>PORT 9,67,112,25,4,77
200 Port request OK.
>>>NLST file2
125 List started OK
250 List completed successfully.
>>>PORT 9,67,112,25,4,76
200 Port request OK.
>>>NLST file3
125 List started OK
250 List completed successfully.
>>>DELE file1
250 /u/user121/ftp.example/file1 deleted.
>>>DELE file2
250 /u/user121/ftp.example/file2 deleted.
>>>DELE file3
250 /u/user121/ftp.example/file3 deleted.
Command:
  
```

Usage

- If you specify one or more incorrect foreign files with the MDelete subcommand, an error message specifying the incorrect foreign file is displayed. All correct foreign files are deleted, regardless of any incorrect foreign files, and the MDelete subcommand does not need to be reissued for these files.

MDelete subcommand

- HFS file names require special handling for certain special characters. All special characters that the operating system requires to be preceded by an escape character in commands issued to the shell must be preceded by the backslash (\) escape character, except for the single quote ('), double quote ("), or blank ().

Context

See Appendix A, “Specifying data sets and files,” on page 393 for more information about naming conventions.

MGet subcommand—Copy multiple files

Purpose

Use the MGet subcommand to copy multiple files from a remote host to your local host and create a corresponding number of local files.

Format



Parameters

foreign_file

Specifies the name of the file to be retrieved from the remote host.

Because more than one file can be copied with the MGet subcommand, the *foreign_file* parameter of the MGet subcommand can be repeated many times, with each *foreign_file* separated by a blank space. You can use special characters for pattern matching when specifying the *foreign_file* with the MGet subcommand. These characters are dependent on the foreign host FTP server.

REPLACE

Causes a data set on your local host to be overwritten if it already exists. If the data set already exists, and you do not use the replace parameter, the existing data set is not overwritten. A message informing you of this is displayed.

If the data set already exists and you specify REPLACE, the data in the file is overwritten, but not reallocated. This means the local data set retains its existing characteristics.

Examples

The following is a sample entry and response that is displayed as a result of the MGet subcommand for multiple HFS files.

MGet subcommand

```
cd '/u/user121/ftp.example'

>>>CWD '/u/user121/ftp.example'
250 HFS directory /u/user121/ftp.example is the current working directory
Command:
mget file1 file2 file3
>>>PORT 9,67,112,25,4,90
200 Port request OK.
>>>NLST file1
125 List started OK
250 List completed successfully.
>>>PORT 9,67,112,25,4,91
200 Port request OK.
>>>NLST file2
125 List started OK
250 List completed successfully.
>>>PORT 9,67,112,25,4,92
200 Port request OK.
>>>NLST file3
125 List started OK
250 List completed successfully.
>>>PORT 9,67,112,25,4,93
200 Port request OK.
>>>RETR file1
125 Sending data set /u/user121/ftp.example/file1
250 Transfer completed successfully.
3464 Bytes transferred in 1.031 seconds. Transfer rate 3.36 kbytes/sec.
>>>PORT 9,67,112,25,4,94
200 Port request OK.
>>>RETR file2
125 Sending data set /u/user121/ftp.example/file2
250 Transfer completed successfully.
3993 Bytes transferred in 0.923 seconds. Transfer rate 4.33 kbytes/sec.
>>>PORT 9,67,112,25,4,95
200 Port request OK.
>>>RETR file3
125 Sending data set /u/user121/ftp.example/file3
250 Transfer completed successfully.
3993 Bytes transferred in 0.791 seconds. Transfer rate 5.05 kbytes/sec.
Command:
```

The following is a sample entry and response that is displayed as a result of the MGet subcommand using a wildcard character in the file name.


```

Command:
mget file*
>>>PORT 9,67,113,57,5,123
200 Port request OK.
>>>NLST file*
125 List started OK
250 List completed successfully.
Mget file1 (Yes|No|Quit|Stop prompting)? s
>>>PORT 9,67,113,57,5,124
200 Port request OK.
>>>RETR file1
125 Sending data set /u/user31/file1
250 Transfer completed successfully.
164 bytes transferred in 0.310 seconds. Transfer rate 0.53 Kbytes/sec.
>>>PORT 9,67,113,57,5,125
200 Port request OK.
>>>RETR file2
125 Sending data set /u/user31/file2
250 Transfer completed successfully.
164 bytes transferred in 0.270 seconds. Transfer rate 0.61 Kbytes/sec.
>>>PORT 9,67,113,57,5,126
200 Port request OK.
>>>RETR file3
125 Sending data set /u/user31/file3
250 Transfer completed successfully.
164 bytes transferred in 0.280 seconds. Transfer rate 0.59 Kbytes/sec.
Command:

```

Usage

- When you use the MGet subcommand, FTP may truncate data records and you might lose data if:
 - You are creating a new data set at the client and the value of LRecl, as shown by the LOCStat command, is a value less than the LRecl of a received data set, FTP truncates the received data set.
 - The data set name already exists at the client and the logical record length (LRecl) of the data set at the client is less than the LRecl of the transmitted data set, FTP truncates the transmitted data set.

You can encounter this situation when you use MGet with the REPLACE option.
- If the name specified for *foreign_file* is not acceptable to your local host, the file is not transferred. To get a file from the remote host, you must have a defined working directory on that host, and you must have read privileges to the files in this working directory.
- If you specify one or more incorrect foreign files with the MGet subcommand, an error message specifying the incorrect foreign file is displayed. All correct foreign files are retrieved, regardless of any incorrect foreign files, and do not need to be reissued.
- HFS file names require special handling for certain special characters. Except for single quote ('), double quote ("), or blank (), all special characters that the operating system requires to be preceded by an escape character in commands issued to the shell must be preceded by the backslash (\) escape character.
- The MGet command is not applicable to generation data groups (GDGs).
- MGet can be used with the PROXy subcommand to transfer files from a host on a primary connection to a host on a secondary connection. See “PROXy subcommand—Execute FTP subcommand on secondary control connections” on page 225 for more information.
- If the data set is migrated, it will be replaced regardless of the replace option.

MGet subcommand

- MGET will remove any directory information from remote filenames. This will cause all the files to be saved in the same HFS directory when transferring into the HFS. The directory structure of the remote host will not be preserved.

Context

- See “CD subcommand—Change the directory on the remote host” on page 140 for more information about working directories.
- See Appendix A, “Specifying data sets and files,” on page 393 for more information about naming conventions.

MKdir subcommand—Create a directory on the remote host

Purpose

Use the MKdir subcommand to create a directory on the remote host.

Format

```
➤—MKdir—directory—└┐(—like—local_directory—┘
```

Parameters

directory

Specifies the name of the directory to be created.

local_directory

Specifies the name of a local directory that is to be a model for the remote directory. *local_directory* must be an MVS directory. If you specify this parameter, the remote site variables will change, and *local_directory* will be read.

Examples

In this example, a directory is created on the remote host (1.1.2.3 in this example). Both EXAMPLE and FTP.EXAMPLE are created in the remote host, showing the difference between specifying and omitting quotation marks in the directory name.

```
User: ftp 9.67.113.24.621
System:  IBM FTP CS V1R5
        FTP: using TCPCS
        FTP.DATA FILE NOT FOUND.  USING HARDCODED DEFAULT VALUES.
        Connecting to 1.1.2.3, port 21
        220-EZAFTSRV IBM FTP CS V1R2 at EMU.ABC.OZ, 15:34:32 on 2000-08-03.
        220 Connection will not timeout.
        NAME (<host>:tsouserid):

User: user121
System:  >>>USER user121
        331 Send password please.
        Password:

User:
        >>>PASS *****
        230 USER121 is logged on.  Working directory is '/u/user121'.
        Command:
```

MKDir subcommand

```
User: dir
System: >>>PORT 9,67,112,25,4,96
        200 Port request OK.
        >>>LIST
        125 List started OK.
        total 2768
        -rwxr-xr-t      2 USER121 SYS1      389120 Feb  5 16:03 ftpdka
        -rwxr-xr-t      2 USER121 SYS1     962560 Feb  5 16:04 ftpsrvka
        -rw-r-----      1 USER121 SYS1      11648 Jan 20 14:30 g.s
        drwxr-x---      3 USER121 SYS1         0 Oct 21 17:50 msg
        -rw-r-----      1 USER121 SYS1      1458 Jan 10 19:25 s.k
        drwxr-x---      2 USER121 SYS1         0 Feb  6 15:59 tcpip
        drwxr-x---      2 USER121 SYS1         0 Feb  6 17:29 test
        250 List completed successfully.
        Command:

User: mkdir example
System: >>>MKD example
        257 "/u/user121/example" created.
        Command:
```

```
User: dir
System: >>>PORT 9,67,112,25,4,97
        200 Port request OK.
        >>>LIST
        125 List started OK.
        total 2768
        drwxr-xr--      2 USER121 SYS1         0 Feb  7 19:57 example
        -rwxr-xr-t      2 USER121 SYS1      389120 Feb  5 16:03 ftpdka
        -rwxr-xr-t      2 USER121 SYS1     962560 Feb  5 16:04 ftpsrvka
        -rw-r-----      1 USER121 SYS1      11648 Jan 20 14:30 g.s
        drwxr-x---      3 USER121 SYS1         0 Oct 21 17:50 msg
        -rw-r-----      1 USER121 SYS1      1458 Jan 10 19:25 s.k
        drwxr-x---      2 USER121 SYS1         0 Feb  6 15:59 tcpip
        drwxr-x---      2 USER121 SYS1         0 Feb  6 17:29 test
        250 List completed successfully.
        Command:

User: mkdir '/u/user121/ftp.example'
System: >>>MKD '/u/user121/ftp.example'
        257 "/u/user121/ftp.example" created.
        Command:
```

```
User: dir
System: >>>PORT 9,67,112,25,4,98
        200 Port request OK.
        >>>LIST
        125 List started OK.
        total 2800
        drwxr-x---      2 USER121 SYS1         0 Feb  7 19:57 example
        drwxr-x---      2 USER121 SYS1         0 Feb  7 19:57 ftp.example
        -rwxr-xr-t      2 USER121 SYS1      389120 Feb  5 16:03 ftpdka
        -rwxr-xr-t      2 USER121 SYS1     962560 Feb  5 16:04 ftpsrvka
        -rw-r-----      1 USER121 SYS1      11648 Jan 20 14:30 g.s
        drwxr-x---      3 USER121 SYS1         0 Oct 21 17:50 msg
        -rw-r-----      1 USER121 SYS1      1458 Jan 10 19:25 s.k
        drwxr-x---      2 USER121 SYS1         0 Feb  6 15:59 tcpip
        drwxr-x---      2 USER121 SYS1         0 Feb  6 17:29 test
        250 List completed successfully.
        Command:
```

Usage

- The MKDir subcommand sends a request to the remote host FTP server to create a directory with name *directory* in the current working directory. When the request is sent to an MVS server, a PDS or PDSE is created if either a fully qualified MVS data set name is entered (for example, 'USER33.TEST.PDS'), or if

the current working directory is an MVS data set name. For example, if the current working directory is USER33.TEST, a command MKdir PDS creates a PDS or PDSE named USER33.TEST.PDS.

- For an MVS server, the data set characteristics used to allocate the new PDS or PDSE are determined by the settings of the Site parameters of the server.
- You can use the (like parameter on the mkdir subcommand to specify a local MVS directory that has characteristics you want the remote directory to have.
 - The (like option is valid only if both client and server are z/OS, and the current working directory for both client and server is an MVS high level qualifier (HLQ).
 - The client will send a SITE command to the server for you so that the new directory is similar to the local directory. The client, however, can only approximate certain characteristics of the directory such as space type, primary, and secondary. For complete control over these characteristics, do not use the (like parameter. The SITE command will change the remote site variables to match the characteristics of the existing directory. For complete control over the remote site variables, do not use the (like parameter.
 - Only the 3390 device architecture is supported. Unpredictable results will occur if the source or target directory reside on devices that use a different architecture.
 - FTP must read the local directory to determine its characteristics. Do not use the (like parameter if this is not acceptable.
 - The sendsite setting is ignored when the (like parameter is specified. The client will send a SITE command to the server to change the remote site variables.
 - The (like option is recommended for interactive use only.
 - If the local data set is migrated, FTP will check the local AUTORECALL setting to determine whether to recall the data set or fail the request. If AUTORECALL is true, FTP will try to recall the migrated data set. If AUTORECALL is false, FTP will fail the mkdir request. You can change the current AUTORECALL setting with the locsite subcommand. Choosing AUTORECALL might result in a long delay as the server waits for the data set to become available.
 - If the local data set is not mounted, FTP will check the local AUTOMOUNT setting to determine whether to mount the data set or fail the request. If AUTOMOUNT is true, FTP will try to mount the data set. If AUTOMOUNT is false, FTP will fail the mkdir request. You can change the current AUTOMOUNT setting with the locsite subcommand. Choosing AUTOMOUNT might result in a long delay as the server waits for the data set to become available.

Context

- See “Site subcommand—Send site-specific information to a host” on page 243 for information about setting the Site parameters.
- See “Status subcommand—Retrieve status information from a remote host” on page 271 for information about displaying the Site parameters.
- See “SENDSite subcommand—Toggle the sending of site information” on page 242 for information about sendsite subcommand.
- See “LOCSite subcommand—Specify site information to the local host” on page 181 for information about changing the AUTORECALL and AUTOMOUNT settings.

Use the **MMode** subcommand to define how bits of data are to be transmitted.

- B** Sets the block mode. In block mode, data is transmitted as a series of data blocks, preceded by one or more header bytes. Block mode preserves the logical record boundaries of the data set or file. When MMode is set to B, the data transfer type must be EBCDIC.

Specifying MMode B is equivalent to specifying the BLock subcommand.
- C** Sets the compressed mode. In compressed mode, data is transmitted as a series of data blocks, preceded by one or more header bytes. Compressed mode preserves the logical record boundaries of the data set or file. In compressed mode, data is transmitted without repetitive characters and blanks. When MMode is set to C, the data transfer type must be EBCDIC.

Note: Because additional processing time is required for both the sender and receiver to compress or decompress the data, evaluate the time factor before you compress a file.

Specifying MMode C is equivalent to specifying the COMpress subcommand.
- S** Sets the stream mode. In stream mode, data is transmitted as a stream of bytes. Any data transfer type can be used with stream mode. Stream mode is efficient because data block information is not transferred.

Specifying MMode S is equivalent to specifying the STREam subcommand.

- To use MDe C, the receiving host must support the compressed data mode.
- Data compression increases CPU processing costs even if the amount of data transferred is not large.

- For the syntax of the BLock, COMpress, and STREam subcommands, see “BBlock subcommand—Set the block data transfer mode” on page 138, “COMpress subcommand—Set the compressed data transfer mode” on page 147, or “STREam subcommand—Set the stream data transfer mode” on page 273.
- For more information about transfer methods, see Table 12 on page 51.

MPut subcommand—Copy multiple data sets to the remote host

Purpose

Use the MPut subcommand to copy multiple data sets from your local host to the remote host.

Format



Parameters

local_data_set

Specifies the name of the file on your local host being sent to the remote host.

Because more than one data set can be copied with the MPut subcommand, the *local_data_set* parameter of this subcommand can be repeated many times, with each *local_data_set* separated by a blank space. You can use the asterisk (*) character for pattern matching when specifying the *local_data_set* with the MPut subcommand.

Examples

The following is a sample entry and response that is displayed as a result of the MPut subcommand to send selected files.

```

Command:
mput file*
Mput FILE1 (Yes|No|Quit|Stop prompting)? yes
>>>PORT 9,67,113,57,5,128
200 Port request OK.
>>>STOR FILE1
125 Storing data set /u/user31/temp/FILE1
250 Transfer completed successfully.
164 bytes transferred in 0.010 seconds. Transfer rate 16.40 Kbytes/sec.
Mput FILE2 (Yes|No|Quit|Stop prompting)? no
Mput FILE3 (Yes|No|Quit|Stop prompting)? yes
>>>PORT 9,67,113,57,5,129
200 Port request OK.
>>>STOR FILE3
125 Storing data set /u/user31/temp/FILE3
250 Transfer completed successfully.
164 bytes transferred in 0.010 seconds. Transfer rate 16.40 Kbytes/sec.
Command:
dir
>>>PORT 9,67,113,57,5,130
200 Port request OK.
>>>LIST
125 List started OK
total 16
-rw-r----- 1 USER31 SYS1      162 Aug 14 13:20 FILE1
-rw-r----- 1 USER31 SYS1      162 Aug 14 13:21 FILE3
250 List completed successfully.
Command:
  
```

Usage

- FTP maintains the attributes of a data set that is transmitted between a client and a server. However, when you use the MPut subcommand, FTP may truncate data records and you might lose data, if:
 - You are creating a new file at the server and the value of LRecl, as shown by the STatus subcommand, is a value less than the LRecl of the transmitted data set and SENDSite has been set to OFF, FTP truncates the transmitted data set.
 - The data set name already exists at the receiving site and the logical record length (LRecl) of the data set at the receiving site is less than the LRecl of the transmitted data set, FTP truncates the transmitted data set.
- By default, if you use the MPut subcommand, the remote host creates files with the same names as those specified in *local_data_set* and overwrites any existing files with those names.

To put files on the remote host with unique file names, you must have set unique storage on before issuing the MPut command. Use the SUnique subcommand to change the storage method.
- To send a data set to the remote host, you must have a defined working directory on the remote host and write privileges to the files in this working directory.
- If you specify one or more incorrect parameters with the MPut subcommand, an error message specifying the incorrect parameter is displayed. All correct files are transferred, regardless of any incorrect parameters, and do not need to be reissued.
- The MPut command is not applicable to GDGs.

Context

- See “SUnique subcommand—Changes the storage method” on page 275 for information about changing the storage method on the remote host.
- See Appendix A, “Specifying data sets and files,” on page 393 for more information about naming conventions.
- MPut can be used with the PROXy subcommand to transfer files from a host on a secondary connection to a host on a primary connection. See “PROXy subcommand—Execute FTP subcommand on secondary control connections” on page 225 for more information.

NOop subcommand—Test the connection

Purpose

Use the NOop subcommand to determine whether the foreign host is still responding.

Format

►►—NOop—◄◄

Parameters

There are no parameters for this subcommand.

Examples

- If the foreign host is responding, you receive one of the following responses:

200 OK or 200 NOOP command successful.
- If the foreign host does not respond or is not connected, you receive appropriate error messages, such as:

EZA1534I Control connection with *ipaddr* dies.
EZA1457I You must first issue the 'OPEN' command.

Usage

You can use the NOop command to keep a connection alive that would otherwise be disconnected if it were idle for longer than the system timeout period.

Open subcommand—Connect to the FTP server

Purpose

Use the Open subcommand to open a connection to the remote host FTP server in the following situations:

- If, after closing a connection, you want to open another connection without leaving the FTP environment.
- If you were unable to open a connection when you specified a *foreign_host* with the FTP command.

Format



Parameters

host_name

Specifies the host name or IP address of the foreign host.

port_number

Identifies a port on the foreign host. The default is well-known port 21.

Usage

If you are already connected to a host, you must disconnect from the host before you can connect to a different host with the Open subcommand. The only exception to this is if you are using the PROXY Open command. See “PROXY subcommand—Execute FTP subcommand on secondary control connections” on page 225 for more information.

Context

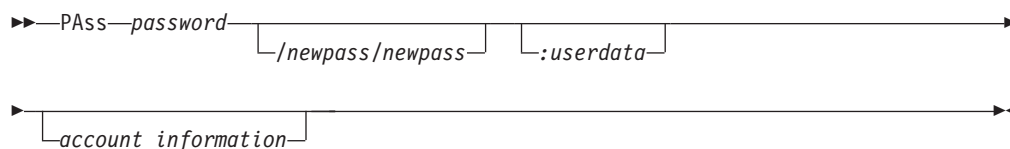
See “CLOSe subcommand—Disconnect from a remote host” on page 146 for more information about closing a connection.

PAss subcommand—Supply a password

Purpose

Use the PAss subcommand to supply a password to a host.

Format



Parameters

password

Specifies your password on the remote host.

/newpass/newpass

Resets a password.

:userdata

The optional user data must be separated from the password information by a colon (:) and can be any combination of up to 200 nonblank characters and numbers except the colon. Care should be taken when using the backslash character (\) in combination with other characters which might be interpreted as an escape sequence by the C compiler.

account_information

An optional parameter that will be supplied to the remote FTP server if the server requests account information after receiving the password.

Usage

- The PAss subcommand must be preceded by the User subcommand. For some sites, the password completes your identification for access control on the remote host.
- On z/OS hosts, a PAss command is automatically generated by the User command. If you do not enter the password as part of the user command, you are prompted for it.
- The optional user data is used by the z/OS FTP server as a character string that is passed to the server's FTCHKPWD user exit routine.

Context

See "User subcommand—Identify yourself to a host or change your TSO user ID password" on page 285 for more information.

PRivate subcommand—Set the protection level for data transfers to PRIVATE

Purpose

Use the PRivate subcommand to set the protection level for data transfers on the data connections to private. This subcommand is equivalent to specifying the PROtect PRivate subcommand.

Format

►►—PRivate—◄◄

Parameters

There are no parameters for this subcommand.

Examples

To set the protection level to private, enter:

private

Usage

- This subcommand is not valid when there is no active security mechanism.
- Data transmissions are confidentiality and integrity protected by encryption.

PROMpt subcommand—Toggle interactive prompting for M* commands

Purpose

Use the PROMpt subcommand to toggle interactive prompting for MDelete, MGet, and MPut commands. Prompting is the default action unless the FTP session was started with the **-i** option, which turns off interactive prompting.

Format

►►—PROMpt—◄◄

Parameters

There are no parameters for this subcommand.

Examples

The following example shows using the MPut command with interactive prompting on.

```
Command:
mput file*
Mput FILE1 (Yes|No|Quit|Stop prompting)? yes
>>>PORT 9,67,113,57,5,128
200 Port request OK.
>>>STOR FILE1
125 Storing data set /u/user31/temp/FILE1
250 Transfer completed successfully.
164 bytes transferred in 0.010 seconds. Transfer rate 16.40 Kbytes/sec.
Mput FILE2 (Yes|No|Quit|Stop prompting)? no
Mput FILE3 (Yes|No|Quit|Stop prompting)? yes
>>>PORT 9,67,113,57,5,129
200 Port request OK.
>>>STOR FILE3
125 Storing data set /u/user31/temp/FILE3
250 Transfer completed successfully.
164 bytes transferred in 0.010 seconds. Transfer rate 16.40 Kbytes/sec.
Command:
```

Context

See “Using FTP” on page 29 for more information about the **-i** option.

PROtect subcommand—Set the protection level for data transfers

Purpose

Use the PROtect subcommand to set the protection level for data transfers on the data connections.

Format



Parameters

CLEAR

Data transmissions are not protected. Specifying PROtect CLEAR is equivalent to specifying the CLEAr subcommand.

PRIVATE

Data transmissions are confidentially and integrity protected. Specifying PROtect PRIVATE is equivalent to specifying the PRIVate subcommand.

SAFE

Data transmissions integrity are protected by cryptographic checksum.

Examples

To set the protection level to private, enter:

```
prot private
```

Usage

This subcommand is not valid when there is no active security mechanism.

PROXy subcommand—Execute FTP subcommand on secondary control connections

Purpose

Use the PROXy subcommand to execute an FTP subcommand on secondary control connections. PROXy enables the FTP client to connect simultaneously to two remote FTP servers and then to establish a data connection between the two servers for the purpose of transferring files between those servers.

Format

►►—PROXy—*subcommand*—►►

Parameters

subcommand

The name of any FTP subcommand except those listed in the first note in “Usage” on page 226. The first PROXy *subcommand* should be Open, which establishes the secondary server connection.

The following subcommands behave differently when prefaced by the PROXy subcommand:

- Open establishes the secondary server connection.
- CClose closes the secondary server connection.
- Get and MGet transfer files from the host on the primary connection to the host on the secondary connection.
- PUt, MPut, and APpend transfer files from the host on the secondary connection to the host on the primary connection.

Examples

The following example shows a proxy open to establish connection to a secondary server.

```
Command:
proxy open 9.67.113.57 6321
Connecting to: 9.67.113.57 port: 6321.
220-FTPDJG1 IBM FTP CS V1R4 at MVS164, 13:06:23 on 2003-01-14.
220 Connection will not timeout.
NAME (9.67.113.57:USER33): user34
>>>USER user34
331 Send password please.
PASSWORD:
>>>PASS
230 USER34 is logged on. Working directory is "USER34."
```

The following example shows the commands for a proxy get between IPv4 nodes:

- PASV to the secondary server
- PORT to the primary server
- RETR to the primary server
- STOR to the secondary server

Two 250 replies are received by the client, one from each server.

PROXy subcommand

```
Command:
proxy get m1 mx
>>>PASV
227 Entering Passive Mode (9,67,113,57,5,121)
>>>PORT 9,67,113,57,5,121
200 Port request OK.
>>>RETR m1
125 Sending data set /u/user33/mpp1/m1
>>>STOR mx
125 Storing data set USER34.MX
250 Transfer completed successfully.
250 Transfer completed successfully.
Command:
```

The following shows a proxy open to establish connection to a secondary server with an IPv6 address:

```
Command:
  proxy open local167v6
  Connecting to: Local167v6 fec9:c2d4::9:67:115:12 port: 21.
  220-Welcome to my test system.
  220-You are logged on from fec9:c2d4::9:67:115:13
  220 Connection will not timeout.
Command:
  user user2
  >>> USER user2
  331 Send password please.
  PASSWORD:

  >>> PASS
  230 USER2 is logged on. Working directory is "/".
```

This example shows the commands for a proxy PUt between IPv6 nodes:

- EPSV to the secondary server
- EPRT to the primary server
- STOR to the primary server
- RETR to the secondary server

As in the first example, two 250 replies are received by the client.

```
Command:
proxy put bob testfile
Load module transfer does not support load module rename
>>> EPSV
229 Entering Extended Passive Mode (|||1027|)
>>> EPRT |2|fec9:c2d4::9:67:115:12|1027|
200 EPRT request OK
>>> STOR testfile
125 Storing data set /tmp/myTest/testfile
>>> RETR bob
125 Sending data set /tmp/myTest/bob
250 Transfer completed successfully.
250 Transfer completed successfully.
Command:
```

Usage

- The following subcommands are not valid proxy subcommands:
 - DEBug
 - DUMP
 - DELimit
 - GLob

- LANGuage
- LCd
- LMkdir
- LOCSItE
- LOCSTat
- LPwd
- PROMpt
- QUIt
- REStart
- SENDPort
- SENDSite
- SRestart
- SUnique
- TSO
- Verbose
- To receive help from a server on a secondary control connection, enter PROXy HELp SERVER.
- Data transfer in PROXy mode can be restricted if the server is set up to reject PORT and EPRT commands with certain parameters. Refer to the *z/OS Communications Server: IP Configuration Guide* for more details.
- If an open subcommand is entered as a proxy subcommand by the client and the session is currently protected by a security mechanism (for example, TLS), then the subcommand is rejected with the following message:
Proxy open is not supported with security mechanisms
- If the connection to one server is IPv4 and the connection to the other is IPv6, proxy transfers may not be possible. The two servers must have the ability to connect to each other as well as to the client. A z/OS FTP server cannot be the primary server in a proxy transfer unless the connection from the client to each of the servers is of the same protocol.
- Data transfer in PROXy mode can be restricted if the server is set up to reject the redirection of the passive (PASV) data connection using PASSIVEDATACONN NOREDIRECT. Refer to the *z/OS Communications Server: IP Configuration Reference* for more details.

PUt subcommand—Copy data sets to the remote host

Purpose

Use the PUt subcommand to copy data sets from your local host to the remote host.

Format

```
➤➤—PUt—local_file—└──foreign_file──┘──➤➤
```

Parameters

local_file

Specifies the name of the file on your local host being sent to the remote host.

foreign_file

Specifies the name that the delivered data set is given on the remote host. If the *foreign_file* name is not specified, the *foreign_file* name is the same as the *local_file* name.

Usage

- FTP maintains the attributes of a data set that is transmitted between a client and a server. However, when you use the PUt subcommand, FTP may truncate data records and you might lose data, if one of the following occurs:
 - If you are creating a new file at the server and the value of LRecl, as shown by the STatus subcommand, is a value less than the LRecl of the transmitted data set and SENDSite subcommand has been set to OFF, then FTP truncates the transmitted data set.
 - If the data set name already exists at the receiving site and the logical record length (LRecl) of the data set at the receiving site is less than the LRecl of the transmitted data set, then FTP truncates the transmitted data set.
- If FTP does not support directory content transfers in partitioned data sets, it is not possible to FTP load modules.
- When a PUt is issued, FTP automatically sends a SItE subcommand containing record format information for the file or data set. To toggle this off, you must first issue a SENDSite subcommand. See “SEnDSite subcommand—Toggle the sending of site information” on page 242 for more detailed information.
- If the remote host already has a file with the name specified by *foreign_file*, the remote host overwrites the existing file. If the remote host does not have a file with the same name specified by *foreign_file*, the remote host creates a new file.
- To put files on the remote host with unique file names, you must have set unique storage on before issuing the PUt command. Use the SUnique subcommand to change the storage method.
- To send a data set to the remote host, you must have a defined working directory on the remote host and write privileges to the files in this working directory.

UPDATE authority is the minimum required for write access. To ensure that the newly created data set can be written to before the data set has been allocated and opened, FTP will validate that the user ID has at least UPDATE authority. If

this fails, then FTP will be able to issue a reply to the client which is indicative of the failure. If open is allowed to continue and it fails due to lack of authority, then the reply will not be as definitive.

Context

- See “SUnique subcommand—Changes the storage method” on page 275 for information about changing the storage method on the remote host.
- See Appendix A, “Specifying data sets and files,” on page 393 for more information about naming conventions.
- PUt can be used with the PROXy subcommand to transfer files from a host on a secondary connection to a host on a primary connection. See “PROXy subcommand—Execute FTP subcommand on secondary control connections” on page 225 for more information.

PWd subcommand—Display the current working directory

Purpose

Use the PWd subcommand to display the name of the current working directory on the remote host.

Format

►►—PWd—◄◄

Parameters

There are no parameters for this subcommand.

Examples

Display the name of the current working directory:

```
pwd
>>>PWD
257 "'USER17.HSMTEST.'" is working directory
Command:
```

Display the name of the current HFS working directory:

```
pwd
>>>PWD
257 "/u/user121/example" is the HFS working directory.
Command:
```

QUIT subcommand—Leave the FTP environment

Purpose

Use the QUIT subcommand to disconnect from the foreign host and end the FTP session.

Format

►►—QUIT—◄◄

Parameters

There are no parameters for this subcommand.

Usage

- The QUIT subcommand ends the FTP session with the remote host and exits FTP on the local host. To establish a new session, use the FTP command.
- In a z/OS UNIX environment, you can also press Ctrl-C to end an FTP session.
- When running with both a primary and a secondary server (by using the PROXY subcommand), the QUIT subcommand disconnects both sessions.

Context

See “Using FTP” on page 29 for information about the FTP command.

QUOte subcommand—Send an uninterpreted string of data

Purpose

Use the QUOte subcommand to send an uninterpreted string of data to the server port on the foreign host.

The QUOte subcommand bypasses the FTP interface of your local host. You can use the QUOte subcommand to send commands that the remote server understands, but that the local host does not understand.

Format

►►—QUOte—*string*—◄◄

Parameters

string

Specifies the data to be sent verbatim to the remote host FTP server.

Examples

- For example, QUOTE TYPE B 1 causes the FTP server to change its transfer type to Shift JIS kanji, without changing the transfer type in the FTP client. The client in this example should be set to the ASCII transfer type before the QUOte subcommand is issued.
- The following example shows the screen display when setting the DBCS transfer type to JIS78KJ, shift-in JISROMAN, and then setting it to HANGEUL using EBCDIC SO/SI characters. The example shows an MVS TCP/IP FTP client connected to an MVS TCP/IP FTP server. All three methods of setting the DBCS transfer type are shown.

```

User: jis78kj (jisroman
System: >>>TYPE b 4 r
        200-Representation type is kanji JIS 1978 shift-in JISROMAN
        200 Standard DBCS control used
        Command:
User: type b 4 r
System: >>>TYPE b 4 r
        200-Representation type is kanji JIS 1978 shift-in JISROMAN
        200 Standard DBCS control used
        Command:
User: jis78kj (jisroman notype
System: Command:
User: quote type b 4 r
System: >>>type b 4 r
        200-Representation type is kanji JIS 1978 shift-in JISROMAN
        200 Standard DBCS control used
        Command:
User: hangeul (sosi ebcdic
System: >>>TYPE b 5 s e
        200-Representation type is Hangeul
        200-SO/SI characters X'0E'/X'0F' used
        200 Data transfer is mixed SBCS/DBCS
        Command:
User: type b 5 s e
System: >>>TYPE b 5 s e
        200-Representation type is Hangeul
        200-SO/SI characters X'0E'/X'0F' used
        200 Data transfer is mixed SBCS/DBCS
        Command:
User: hangeul (sosi ebcdic notype
System: Command:
User: quote type b 5 s e
System: >>>type b 5 s e
        200-Representation type is Hangeul
        200-SO/SI characters X'0E'/X'0F' used
        200 Data transfer is mixed SBCS/DBCS
        Command:

```

Usage

- No parsing or validity checking is performed on the character string you enter by FTP on your local host. If the character string you send to the FTP server is part of a required sequence of commands, you are required to provide this sequence correctly, or the results are unpredictable.
- The QUOte subcommand can be used to generate any of the DBCS TYpe commands supported by the server. This subcommand is used when the FTP server supports the DBCS TYpe command, but the FTP client does not.

RECORD subcommand—Set the file structure to record

Purpose

Use the RECORD subcommand to set the file structure to record. This is equivalent to specifying the STRUCTURE R subcommand. See “STRUCTURE subcommand—Set the file structure” on page 274 for more information.

Format

►►—RECORD—◄◄

Parameters

There are no parameters for this subcommand.

REName subcommand—Rename files

Purpose

Use the REName subcommand to rename a file on the remote host.

Format

►►—REName—*original_name*—*new_name*—◄◄

Parameters

original_name

Specifies the current name of the file.

new_name

Specifies the new name of the file.

Usage

- For MVS data sets, if the file specified by the *new_name* already exists, the existing file is not replaced by the new file.
- For HFS files, if the file specified by *new_name* already exists, the existing file is replaced.

REStart subcommand—Restart a checkpointed data transfer

Purpose

Use the REStart subcommand to restart a checkpointed data transfer.

Format

►►—REStart—◄◄

Parameters

There are no parameters for this subcommand.

Usage

- The REStart subcommand restarts the last checkpoint file transfer request at the point of the last valid checkpoint stored in the checkpoint data set. See FTP.DATA CHKPTPREFIX statement to determine the check point data set name. The file transfer environment (such as file transfer mode, type, and the *hlq* of the checkpoint data set name) which was in effect at the time of the last checkpoint file transfer request must be reestablished before issuing the REStart subcommand.
- The REStart subcommand can be used when a checkpointed file transfer request fails because of some temporary condition such as the loss of the connection between the client and the server.
- The checkpoint file name is formed using the CHKPTPrefix value and the current working directory. Refer to the description of CHKPTPrefix under the “LOCSite subcommand—Specify site information to the local host” on page 181 or “Changing local site defaults using FTP.DATA” on page 63.

Context

For more information about checkpointing a file transfer request, see the description of the CHKptint parameter on page 247 or page 184.

RMdir subcommand—Remove a directory on the remote host

Purpose

Use the RMdir subcommand to remove a directory on the remote host.

Format

►►—RMdir—*directory*—————►◄

Parameters

directory

Specifies the name of the directory to be removed.

Usage

- The RMdir subcommand sends a request to the remote host FTP server to remove a directory with name *directory* from the current remote directory.
- The RMdir subcommand can be used to delete a PDS.

SAfe subcommand—Set the protection level to safe

Purpose

Set the protection level on data transfers to "safe". Data transmissions are integrity-protected by cryptographic checksum.

Format

►►—SAfe—◄◄

Parameters

There are no parameters for this subcommand.

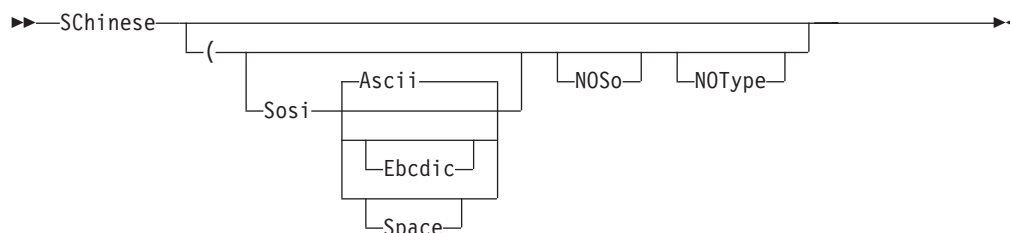
SChinese subcommand—Change the data transfer type to SCHINESE

Purpose

Use the SChinese subcommand to change the data transfer type to Simplified Chinese.

MVS FTP uses the same SBCS translate table for single-byte or double-byte data transfers. If you require an alternate SBCS table for a double-byte transfer, use the Site/LOCSite SBDataconn or Site XLate subcommand to have the server (or client) change the SBCS translation for the data connection.

Format



Parameters

Sosi

Transferred data contains the shift-out and shift-in characters specified by the one of the following parameters — Ascii, Ebcdic, or Space. If no parameter is specified, ASCII is used as the default.

If Sosi is not specified at all, shift-out or shift-in characters are not used in the transferred data.

Ascii

When combined with the Sosi parameter, causes shift-out and shift-in characters X'1E' and X'1F' to be used to delimit DBCS strings in ASCII data.

Ebcdic

When combined with the Sosi parameter, causes shift-out and shift-in characters X'0E' and X'0F' to be used to delimit DBCS strings in ASCII data.

Space

When combined with the Sosi parameter, causes shift-out and shift-in characters X'20' and X'20' (ASCII spaces) to be used to delimit DBCS strings in ASCII data.

NOSo

Specifies that the data transferred is pure DBCS (data with no SBCS characters) and is to be transferred to or from EBCDIC DBCS data that contains no shift-out or shift-in delimiters.

NOType

Suppresses the sending of the corresponding TType command to the server. Use this parameter when translation is to be done by the FTP client only.

SChinese subcommand

Usage

The SChinese client subcommand is equivalent to the TYPE B 9 server command.

Context

See “FTP with traditional DBCS support” on page 77 and “Support for MBCS languages” on page 80 for more information.

SENDPort subcommand—Toggle the sending of port information

Purpose

Use the SENDPort subcommand to toggle the automatic sending of the PORT command.

Format

►►—SENDPort—◄◄

Parameters

There are no parameters for this subcommand.

Usage

- By default, the SENDPort subcommand is turned on when you start an FTP session. Each time you use the SENDPort subcommand, it is turned alternately on and off.
- FTP does not send PORT commands for data transfer when you disable PORT commands by toggling the function off.
- SENDPort is useful for communication with those FTP implementations that ignore PORT commands, but show (incorrectly) that the PORT command has been accepted.
- To determine if the sending of port information is enabled or disabled on your local host, use the LOCSTat subcommand.
- The sendport setting is ignored during proxy transfer.

Context

See “LOCSTat subcommand—Display local status information” on page 200 for more information about LOCSTat subcommand.

SENDSite subcommand—Toggle the sending of site information

Purpose

Use the SENDSite subcommand to toggle the automatic sending of the SItE subcommands when sending a data set to a foreign host.

Format

►►—SENDSite—◄◄

Parameters

There are no parameters for this subcommand.

Usage

- By default, the SENDSite subcommand is turned on when you start an FTP session. Each time you use the SENDSite subcommand, it is turned alternately on and off.
When turned on, FTP sends a SItE subcommand containing record format information for the file or data set when you issue the PUt or MPut subcommand.
- SENDSite is useful when you want to PUt a file to the remote host and have the file created with the same characteristics as defined at the local host.
- If you are using either an SMS data class or a model DCB at your MVS server to provide the logical record length or record format, you must toggle the SENDSite setting off at the client. Otherwise, the SItE information that is sent automatically by the client overrides the values provided by the SMS dataclass or model DCB.
- To determine if the sending of site information is enabled or disabled on your local host, use the LOCSTat subcommand.
- The sendsite setting is always ignored if you issue a mkdir subcommand with the (like parameter. The client must send a SITE command to the server to set the server's site variables before allocating the directory.

Context

- See “LOCSTat subcommand—Display local status information” on page 200 for information about the LOCSTat subcommand.
- See “MKDir subcommand—Create a directory on the remote host” on page 213 for information about the MKDir subcommand.

Site subcommand—Send site-specific information to a host

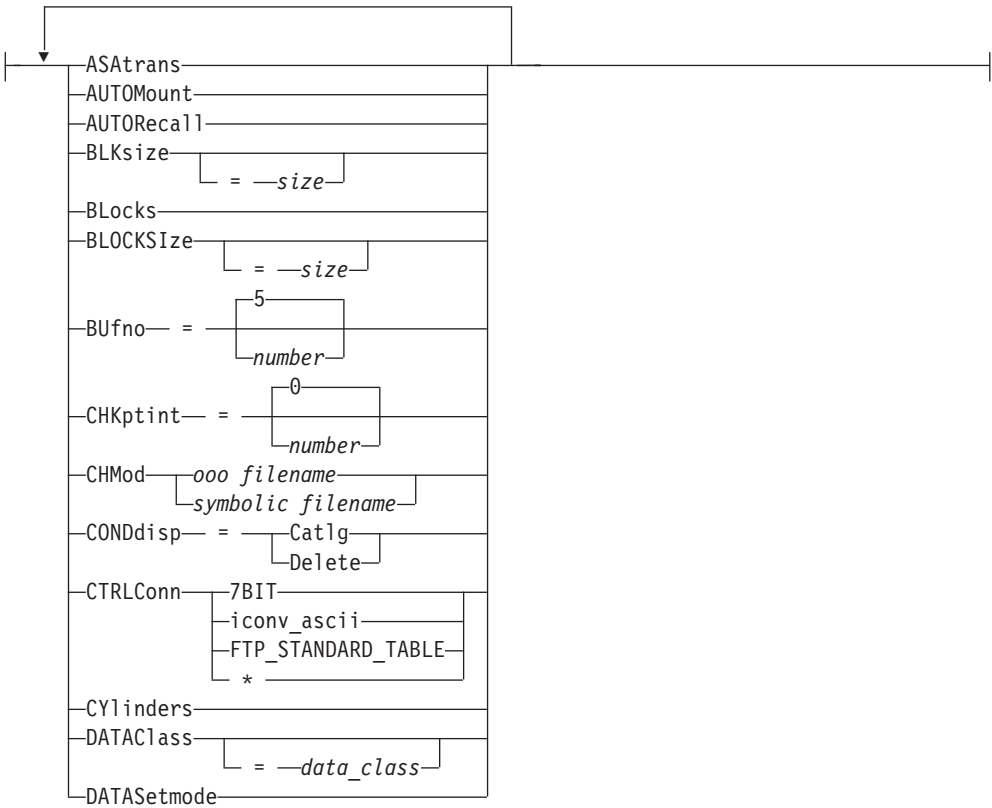
Purpose

Use the Site subcommand to send information that is used by the remote host to provide services specific to that host system.

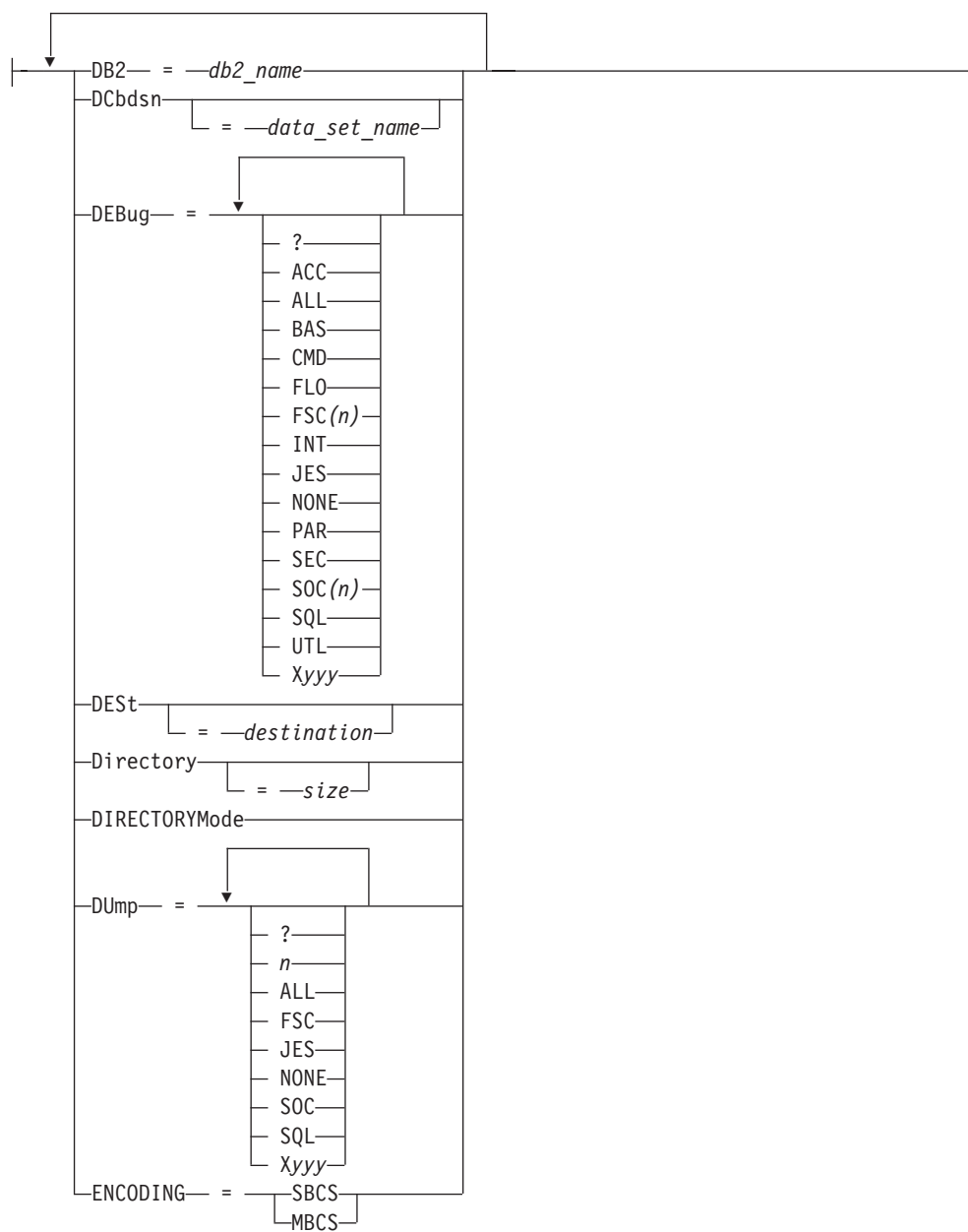
Format

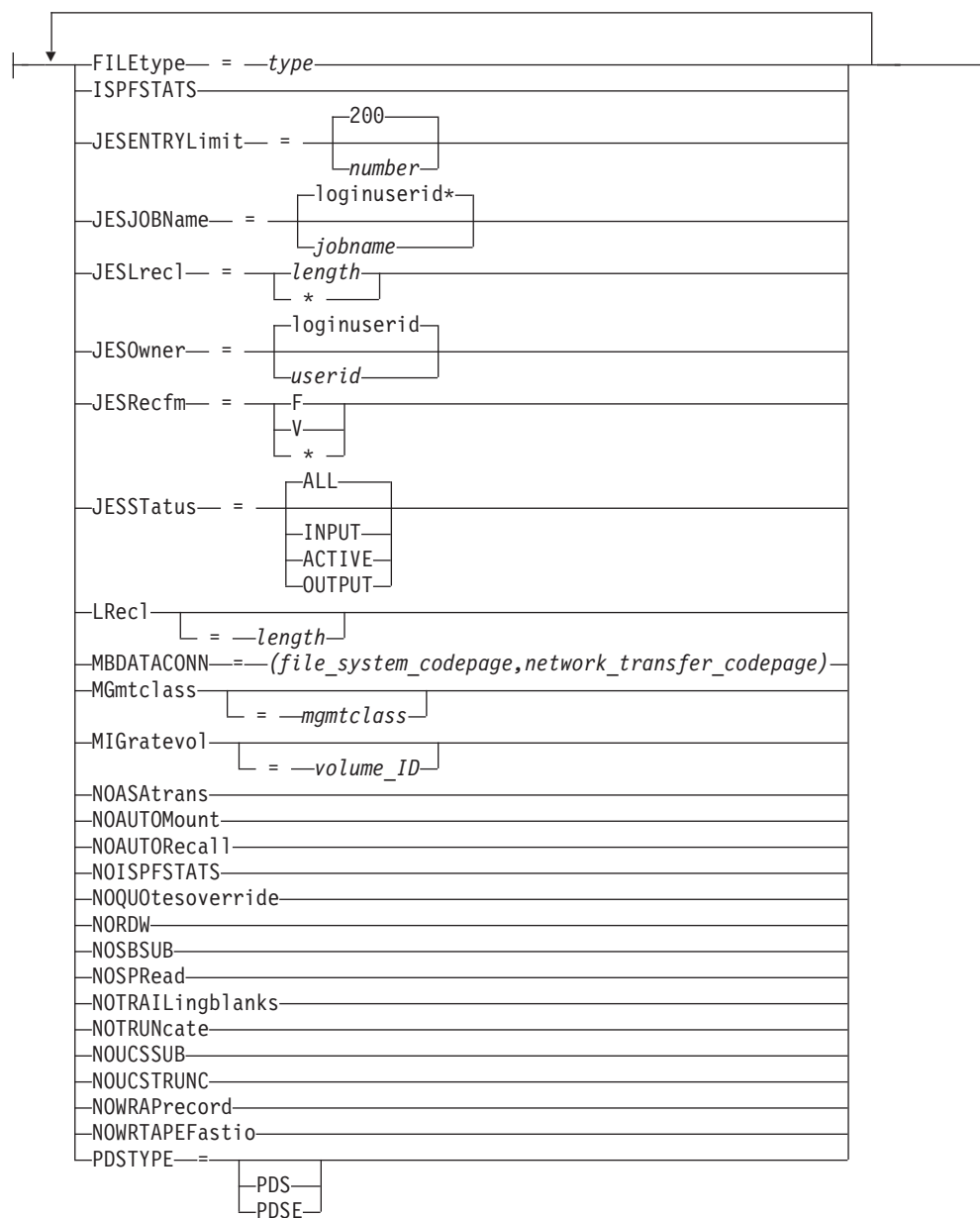
►►Site | options |◀◀

options:

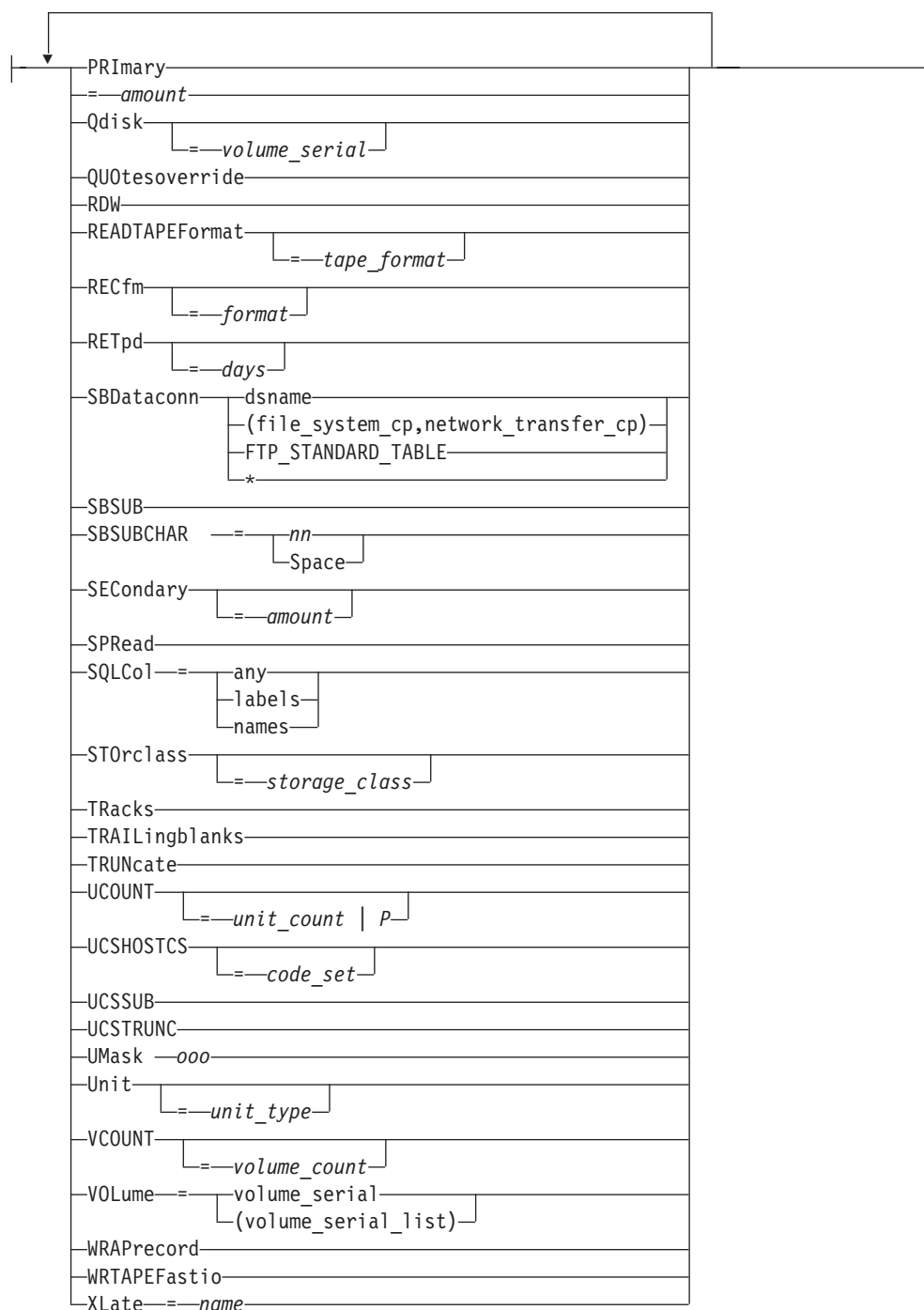


Sltc subcommand





Slte subcommand



Parameters

ASATrans

Permits the FTP server to interpret the characters in the first column of ASA files being transferred as print control characters.

AUTOMount

Permits automatic mounting of volumes for data sets on volumes that are not mounted. If AUTOMount is specified and an unmounted volume is needed, a message is automatically issued to the MVS operator console requesting that

the volume be mounted. The MVS operator must then mount the volume and reply to the message before FTP can proceed.

AUTORecall

Permits automatic recall of migrated data sets.

BLKsize

Specifies the block size of a newly allocated data set. BLKsize is functionally equivalent to BLOCKSize. The BLOCKSize parameter is obsolete, but it is accepted to provide compatibility with previous releases of z/OS TCP/IP.

When specified without a *size*, no block size is used when allocating the new data set. When specified without a *size*, the equal sign (=) is optional.

Specify BLKsize with no value if you are also specifying DATAClass=*data_class* and you want the SMS data class to provide the BLKsize value, or if you are specifying DCbdsn=*data_set_name* and you want to use the block size from the DCBDSN data set. If BLKsize=*size* is specified with either the DATAClass or DCbdsn parameters, the value specified by the Site BLKsize parameter overrides the DATAClass or DCbdsn block size.

Notes:

1. If you specify BLKsize without a size or with a size of 0, FTP does not specify the block size when allocating new data sets.
2. Be especially careful specifying both BLKsize= and BLOCKs. While there are conditions where this is tolerated, if a valid BLKsize cannot be determined, the data set will not be created when the allocation is attempted.

size

Specifies the block size of a newly allocated data set. The valid range is 0–32 760.

BLKsize=0 is a special case. When BLKsize=0 is specified, the operating system attempts to determine a block size for the new data set. FTP does not create the new data set unless the system is able to establish a nonzero block size.

BLOCKs

Specifies that primary and secondary space allocations are in blocks.

If both PRImary and SECondary are unspecified, and an SMS data class has been specified, the space allocation is determined by the SMS data class and the BLOCKs parameter is ignored.

BLOCKSize

Specifies the block size of a newly allocated data set. BLOCKSize is functionally equivalent to BLKsize. BLOCKSize is obsolete but it is accepted to provide compatibility with previous releases of z/OS TCP/IP. See the BLKsize parameter for more information.

BUfno

Specifies the number of access method buffers that is used when data is read from or written to a data set. The default value is 5.

number

The number of buffers used. The valid range is 1–35.

CHKptint

Specifies the checkpoint interval for the sending site in a file transfer request. If the checkpoint interval is 0, no checkpointing occurs and no marker blocks are transmitted. The default value is 0.

Slte subcommand

Use Slte to set CHKptint when the FTP server is the sending site (Get command). It will not be useful to change the checkpoint interval to more than 0 in a Get unless the receiving site is able to process checkpoint markers in the file transfer data stream.

CHKptint is valid only for block and compressed modes of data transfer.

number

The checkpoint interval for the sending site in a file transfer request. This value is used to determine when checkpoint marker blocks are to be transmitted so that transmission can be restarted based on the information in the last marker.

A large checkpoint interval means that a large amount of data is sent in between markers and therefore few markers are sent. A smaller checkpoint interval means that less data is sent between markers and therefore more markers are sent.

The cost involved with using a nonzero checkpoint interval is the markers themselves are transmitted, which means more bytes are being sent across the network (approximately 44 bytes per marker).

To estimate the appropriate checkpoint interval, use the following formula. You need to know the record length of the file you are transferring and how much data you think can be transmitted reliably.

$$\text{CHKPTINT} = \frac{\text{amount of data in interval}}{\text{record length of the file}}$$

Do not execute a CHKptint more often than once every 200KB. The following are examples of a file you are transferring with 80-byte records.

$$\begin{aligned}\text{CHKPTINT} &= 200\text{KB} / 80 \text{ bytes} \\ &= 200 * 1024 \text{ bytes} / 80 \text{ bytes} \\ &= 2560\end{aligned}$$

CHMod

Changes the permission bits for a file.

ooo filename

ooo is an octal mask representing the permissions you want to assign to filename. Form the octal mask by OR'ing the constants corresponding to the permission bits you want set:

400	User read
200	User write
100	User execute (or list directory)
040	Group read
020	Group write
010	Group execute
004	Other read

002

Other write

001

Other execute

You cannot use the SITE subcommand CHMod parameter to set the following permission bits:

- Set-user-ID bit
- Set-group-ID bit
- Sticky bit

Refer to the *z/OS UNIX System Services User's Guide* and the *z/OS UNIX System Services Command Reference* for more information about file permissions.

symbolic filename

symbolic represents the permissions you want to apply to *filename*.

Note: *symbolic* is specified as follows:

{u|g|o|a}{=|+|-}{r|w|x|rw|rx|wx|rwx}

where u, g, o, a, =, +, -, r, w, and x are as defined for the z/OS UNIX chmod command.

If *filename* does not begin with a slash character (/), it is appended to the current working directory. If *filename* does begin with a slash character (/), it is interpreted as a complete directory name.

The file name specified must be an HFS file name for a single file and cannot contain a wildcard (*) for multiple files. The setting of QUOTesoverride is ignored and all quotation marks are treated as part of the file name.

The CHMOD keyword must be the only or last keyword on a SITE subcommand.

CONDdisp

Specifies the disposition of the data set if a store operation for a new data set ends before all of the data is written.

Catlg

Specifies that a data set is kept and cataloged when an FTP file transfer ends prematurely.

Delete

Specifies that a data set is deleted when an FTP file transfer ends prematurely.

Delete is ignored if the file transfer failed as a result of the FTP server being terminated or if the server has received checkpoint information during data transfer.

CTRLConn

Specifies the ASCII code page to be used for control connections. The valid subcommands are:

```
SITE CTRLConn=7BIT
SITE CTRLConn=iconv_ascii
SITE CTRLConn=FTP_STANDARD_TABLE
SITE CTRLConn=*
```

| See “Support for SBCS languages” on page 76 for more information.

7BIT

Indicates 7-bit ASCII is to be used.

iconv_ascii

A name recognized by iconv to indicate an ASCII code page. For a list of code pages supported by iconv, refer to code set converters in the *z/OS C/C++ Programming Guide*.

FTP_STANDARD_TABLE

Indicates that the FTP internal tables, which are the same as the tables that are shipped in TCPXLBIN(STANDARD), are to be used on the control connection.

* Indicates that the ASCII used at initialization is to be used.

Note: Setting the control connection code page with Slte CTRLCONN disables UTF-8 encoding. You must start a new session to restore UTF-8 encoding.

Cylinders

Specifies that primary and secondary space allocations are in cylinders.

If both PRImary and SECondary are unspecified, and an SMS data class has been specified, the space allocation is determined by the SMS data class and the CYlinders parameter is ignored.

DATAclass

Used to specify the SMS data class, as defined by your organization, for the target host. Specifying DATAclass with no parameter value cancels the data class specification. The equal sign (=) is optional in this case.

See “Specifying values for new data sets” on page 81 for more information about specifying attributes when allocating new data sets.

data_class

Specifies the SMS data class, as defined by your organization, for the target host. If values are specified for any of the following Slte parameters, the values specified by the Slte parameter overrides the value specified in the SMS data class:

- BLKsize
- Directory
- LRecl
- PRImary
- RECfm
- RETpd
- SECondary

If the DCbdsn Slte parameter is specified, the LRecl, RECfm, BLOCKSize, and RETpd (if specified) of the DCBDSN data set overrides the values specified in the data class.

If the MGmtclass site parameter is specified, and the requested management class specifies a retention period, the retention period value of the management class may override the retention period value of the data class.

A Slte DATACLASS command pointing to an SMS data class must be used to create a PDSE. A load module loading from a temporary data set will

always be a REPLACE operation, in that existing members will be overwritten in case of name conflicts. LMTR will not be performed in STOU mode (when SUnique is turned on).

DATASetmode

Specifies that all the data set qualifiers below the current directory are treated as entries in the directory (disables DIRECTORYMode).

DB2

Specifies the name of the DB2 subsystem.

db2_name

The name of the DB2 subsystem.

DCbdsn

Specifies the name of the MVS data set to be used as a model for allocation of new data sets. Specifying DCbdsn with no parameter value cancels the DCbdsn specification.

data_set_name

Specifies the name of the data set. The file name must be an MVS data set name. HFS file names are not allowed on the DCbdsn parameter. The setting of QUOTesoverride is ignored. If the file name is enclosed in single quotation marks, it overrides the current working directory; otherwise it is appended to the current working directory.

Notes:

1. Specify Site RECFm, LREcl, and BLKsize parameters with no values to allow characteristics from the model DCB to be used.
2. To override the model characteristics of RECFm, LREcl, BLKsize, or RETpd, specify a value on the Site command.
3. Ensure that SENDSite subcommand is toggled off. Otherwise, the Site information that is sent automatically by the client overrides the values provided by the model DCB.
4. If MGMTclass is specified, the RETpd value of the MGMTclass may override the RETpd value.

Specifying a GDG data set with a relative index produces an error message. The following examples are unsupported specifications:

```
SITE DCBDSN=MYGDG(0)
SITE DCBDSN=MYGDG(-nnn)or
SITE DCBDSN=MYGDG(+nnn)
```

See “Steps for using a DCBDSN model to create a new data set” on page 83 for more information about DCbdsn.

DEBug

Activates or disables general tracing at the FTP server. One or more traces can be activated with a single debug parameter with the following options:

? Displays the status of the traces.

ACC

The ACC trace shows the details of the login process.

ALL

This parameter is used to set all of the trace points.

Note: Both the FSC and the SOC traces will be set to level 1 when the ALL parameter is processed.

BAS

This parameter is used to set a select group of traces that offer the best overall details without the intense tracing of some of the traces. Specifying this parameter is the same as SITE DEBUG=(CMD,INT,FSC, SOC).

CMD

The CMD trace shows each command and the parsing of the parameters for the command.

FLO

The FLO trace shows the flow of control within FTP. It is useful to show which services of FTP are used for an FTP request.

FSC(*n*)

The FSC trace shows details of the processing of the file services subcommands APPE, STOR, STOU, RETR, DELE, RNFR, and RNT0.

This trace can generate very detailed information and therefore allows you to specify levels of detail for the trace points. The level (*n*) can be a number from 1 to 5.

INT

The INT trace shows the details of the initialization and termination of the FTP session with the server.

JES

The JES trace shows details of the processing for JES requests (that is, requests when SItE FILETYPE=JES is in effect).

NONE

This parameter is used to turn off all of the traces.

PAR

The PAR trace shows details of the FTP command parser. It is useful in debugging problems in the handling of the command parameters.

SEC

The SEC trace shows the processing of security functions such as TLS and GSSAPI negotiations.

SOC(*n*)

The SOC trace shows details of the processing during the setup of the interface between the FTP application and the network as well as details of the actual amounts of data that is processed. This trace can generate very detailed information and therefore allows you to specify levels of detail for the trace points.

The level 1 tracing that is specified by entering SOC or SOC(1) is the level normally used unless more data is requested by the TCP/IP service group. The level (*n*) can be a number from 1 to 8.

SQL

The SQL trace shows details of the processing for SQL requests, such as requests when SITE FILETYPE=SQL is in effect.

UTL

The UTL trace shows the processing of utility functions such as CD and SItE.

Xyyy

This syntax is used to turn off (reset) a trace that is named by *yyy*. For example, SITE DEBUG=(XPAR, XACC) will turn off the PAR and the ACC traces.

Usage notes for the DEBUg parameter:

- The client is allowed to change general tracing at the server if the FTP.DATA file for the server specified DEBUGONSITE TRUE.
- The state of the debug traces points is displayed as a response to the Site subcommand. To see the state without making a change, enter SITE DEBUG=(?).
- The setting of the traces is additive. This is demonstrated by the following example:

```
SITE DEBUG=(BAS)
200-Active traces: CMD INT FSC(1) SOC(1)
200 Site command was accepted
SITE DEBUG=(ACC)
200-Active traces: CMD INT ACC FSC(1) SOC(1)
200 Site command was accepted
```

- To ensure that only the needed traces are active, use the NONE value to clear all traces before setting the requested ones.

```
SITE DEBUG=(?)
EZA1701I >>> SITE DEBUG=(?)
200-Active traces: CMD INT FSC(1) SOC(1)
200 Site command was accepted
SITE DEBUG=(NONE,FSC(2))
EZA1701I >>> SITE DEBUG=(NONE,FSC(2))
200-Active traces: FSC(2)
200 Site command was accepted
```

- For the FSC and SOC trace options only one level of tracing can be defined at any time. However, when level 2 is defined, levels 1 and 2 are active. When level 3 is defined, levels 1, 2 and 3 are active. This progression also applies to levels 4 and 5.

```
site debug=(fsc(2),soc(1))
>>> SITE debug=(fsc(2),soc(1))
200-Active traces: FSC(2) SOC(1)
200 Site command was accepted
site debug=(fsc(1),soc(2))
>>> SITE debug=(fsc(1),soc(2))
200-Active traces: FSC(1) SOC(2)
200 Site command was accepted
```

Note: The FSC command will accept level values 6–8, but will only provide level 5 trace data. Likewise, SOC will accept level values 4–8, but will only provide level 3 trace data.

- Refer to Diagnosing FTP server problems with traces in *z/OS Communications Server: IP Diagnosis Guide* for more information about FTP server tracing.

DESt

Indicates the Network Job Entry (NJE) destination to which the files are routed when you enter a PUt command. If specified without a *destination*, the destination resets and files are stored at the host system rather than sent to a remote network.

The Site DESt subcommand enables you to send data sets (rather than storing them at the server) to other users on machines that are connected on an NJE network.

destination

Indicates the NJE destination to which the files are routed when you enter a PUt command. The value specified for destination can be:

- userID@nodeID
- nodeID.userID

Slte subcommand

- nodeID
- DestID

The file is sent over the NJE network to the specified destination.

This parameter is ignored if FILEtype=JES is set.

Directory

Specifies the number of directory blocks to be allocated for the directory of a PDS. When specified without the *size*, no directory value is used when allocating the data set. The equal sign (=) is optional in this case.

Specify Directory without a *size* when you are also specifying DATAclass=dataclass and you want the SMS data class to provide the Directory *size*. If Directory=*size* is specified with DATAclass, the value specified by the Slte Directory parameter overrides the DATAclass directory specification.

size

Specifies the number of directory blocks to be allocated for the directory of a PDS. The valid range is 1—16 777 215.

DIRECTORYMode

Specifies that only the data set qualifier immediately below the current directory is treated as an entry in the directory. In directory mode, this data set qualifier is the only one used by the MGet, LS, and Dlr subcommands.

DIRECTORYMode has no effect on files residing in an HFS.

DUMP

Activates or disables extended tracing at the FTP server.

Note: Extended tracing has the potential to generate a large amount of trace data and should not be set unless requested to debug a specific problem in the code.

One or more traces can be activated with a single dump parameter with the following options:

? Displays the status of the traces.

n Specifies the ID number of a specific extended trace point that is to be activated in the FTP code. The number has a range of 1–99.

ALL

This parameter is used to set all of the trace points.

FSC

Activates all of the extended trace points in the file services code. The ID numbers for FSC are 20 to 49.

JES

Activates all of the extended trace points in the JES services code. The ID numbers for JES are 60 to 69.

NONE

This parameter is used to turn off all of the traces.

SOC

Activates all of the extended trace points in the network services code. The ID numbers for SOC are 50 to 59.

SQL

Activates all of the extended trace points in the SQL services code. The ID numbers for SQL are 70 to 79.

Xyyy

This syntax is used to turn off (reset) a trace that is named by *yyy*. For example, SITE DUMP=(X21,X22,XSQL) will reset the extended trace points 21 and 22 and all of the SQL trace points.

Usage notes for the DUMP parameter:

- The client is allowed to change extended tracing at the server if the FTP.DATA file for the server specified DUMPON SITE TRUE.
- The setting of the traces is additive. This is demonstrated by the following example:

```

SITE DUMP=(NONE,21)
EZA1701I >>> SITE DUMP=(NONE,21)
200-Active dumpIDs: 21
200 Site command was accepted
SITE DUMP=(22)
EZA1701I >>> SITE DUMP=(22)
200-Active dumpIDs: 21 22
200 Site command was accepted

```
- The range of 99 extended trace points is defined to allow easy extension of the trace points by the TCP/IP service team. Additional trace points can be added to the code without any changes to the external mechanism to control the traces.
- Refer to Diagnosing FTP server problems with traces in *z/OS Communications Server: IP Diagnosis Guide* for more information about FTP server tracing.

ENCODING

Indicates the kind of encoding that is used for conversions between codepages for data transfers.

See “Support for SBCS languages” on page 76 and “Support for MBCS languages” on page 80 for more information.

SBCS

Single Byte encoding. Code pages are specified using the SBADATACONN statement. This is the default value.

MBCS

Multibyte encoding. Code pages are specified using the MBADATACONN statement.

FILEtype

Specifies the file type of the data set.

type

The file type of the data set can be:

Type	Description
SEQ	Sequential or partitioned data sets
SQL	SQL query function
JES	Remote job submission

ISPFSTATS

Allows FTP to create or update ISPF Member statistics when PUn, MPut or APpend subcommands are issued.

JESENTRYLimit

JESENTRYLimit specifies how many entries can be displayed at once using a LIST or NLSTcommand. JESENTRYLIMIT is only valid if JESINTERFACELVEL=2.

number

Fixed number of entries to display. The default for JESENTRYLimit is 200, if not specified in the server FTP.DATA file.

JESJOBName

Specifies that any command (Get, LIST, Dlr or MGet) should be limited to those jobs, started tasks, APPC/MVS, or TSO output that match the specified value. JESJOBName is only accepted if JESINTERFACELevel is set to 2.

jobname

Specified job name. Can be or can contain a wildcard (* or ?).

*loginuserid**

The logged in user ID appended with an asterisk (*). Default value.

Note: JESJOBName matches the first job name that a job is assigned. Jobs that change job names during execution time are matched only by their initial job name.

JESLrecl

Specifies the logical record length (LRecl) for the Job Entry System (JES) internal reader at the foreign host.

length

The logical record length for the JES internal reader at the foreign host. The valid range is 1–254.

* Indicates that the logical record length should be taken from the site LRecl parameter setting.

JESOwner

Specifies that any command (Get, LIST, Dlr or MGet) should be limited to those jobs, started tasks, APPC/MVS, or TSO output which are owned by the user ID specified. JESOWNER cannot be modified unless JESINTERFACELEVEL is set to 2.

userid

Specified user ID. The *userid* can be or contain a wild card (* or ?).

loginuserid

The logged in user ID. Default value.

JESRecfm

Specifies the record format for the JES internal reader at the foreign host.

F Fixed record format

V Variable record format

* Indicates that the record format should be taken from the Site RECfm parameter setting.

JESStatus

Specifies what type of information should be returned on LIST and NLST commands. Acceptable values are INPUT, ACTIVE, OUTPUT or ALL. The default value for JESSTATUS is ALL. JESSTATUS can only be modified if JESINTERFACELEVEL=2.

LRecl

Specifies the logical record length (LRecl) of a newly allocated data set. When specified without a *length*, no LRecl is used when allocating the data set. The equal sign (=) is optional in this case.

Specify LRecl with no value when you are also specifying `DATAclass=`*data_class* and you want the SMS data class to provide the LRecl value, or when you are specifying `DCbdsn=`*data_set_name* and you want to use the LRecl from the DCBDSN data set. If `LRecl=length` is specified with either `DATAclass` or `DCbdsn`, the length specified by the Slte LRecl parameter overrides the `DATAclass` or `DCbdsn` LRecl.

length

Specifies the logical record length of a newly allocated data set. The valid range is 0—32760. A special value of x (`LRecl=x`) is also supported to indicate that a logical record length can exceed 32760 for variable-length spanned records.

Specifying `LRecl=0` has the same effect as specifying LRecl with no parameters.

MBDATAconn=(*file_system_codepage,network_transfer_codepage***)**

Specifies the codepages for the file system and for the network transfer used when the server does data conversion during a data transfer. This parameter affects the conversion of multibyte character set (MBCS) data (including support for DBCS code pages) and is used when the `ENCODING=MBCS` is also specified.

See “Support for MBCS languages” on page 80 for more information.

file_system_codepage

Specifies the name of the file system codepage.

network_transfer_codepage

Specifies the name of the network transfer codepage.

MGmtclass

Specifies the SMS management class as defined by your organization for the target host. Specifying `MGmtclass` with no *mgmtclass* cancels the management class specification. The equal sign (=) is optional in this case.

mgmtclass

Specifies the SMS management class as defined by your organization for the target host. If the *mgmtclass* specified has a setting for RETpd, the value specified by the *mgmtclass* may override the setting of the RETpd site parameter, the RETpd value of a model data set if the `DCbdsn` parameter is specified, and the RETpd value defined in an SMS data class if `DATAclass` is specified. See “Specifying values for new data sets” on page 81 for more information about specifying attributes when allocating new data sets.

MIGratevol

Specifies the volume ID for migrated data sets if they do not use IBM Storage Management Subsystems. If you do not specify `MIGratevol`, the default *volume_serial* is MIGRAT.

volume_ID

The volume ID for migrated data.

NOASAtans

Treats ASA file transfers as regular file transfers; that is, the ASA characters are treated as part of the data and are not converted to print control characters.

NOAUTOMount

Prevents automatic mounting of volumes for data sets on volumes that are not mounted.

NOAUTORecall

Prevents automatic recall of migrated data sets.

Note: A migrated data set can be deleted even though NOAUTORecall is specified, because migrated data sets are not recalled for deletion.

NOISPFSTATS

Does not allow FTP to create or update ISPF Member statistics when PUt, MPut or APpend subcommands are issued.

NOQUotesoverride

Treats a single quotation mark appearing at the beginning of the file name, as well as all other single quotation marks contained in the file name, as part of the actual file name. The entire file name, including the leading single quotation mark, is appended to the current working directory.

NORDW

Specifies that Record Descriptor Words (RDWs) are not treated as if they were part of the record and are discarded during FTP transmission of variable format data sets.

NOSBSUB

Specifies that substitution is not allowed for data bytes that cannot be translated in a single-byte character translation. This causes a data transfer failure if a character cannot be translated during the transfer.

NOSPRRead

Specifies that the output is in report format rather than spreadsheet format when the file type is SQL.

NOTRAILIngbLanks

Specifies that the FTP server does not preserve the trailing blanks that are in a fixed format data set when the data is sent to the foreign host.

NOTRUNcate

Specifies that truncation is not permitted. The FTP server will set an error and fail file transfer if a record that is longer than the LRECL of the new file is detected.

Note: If WRAPRECORD is set then the data is wrapped, not truncated, no error will be set and the file transfer will continue.

NOUCSSUB

In Unicode-to-EBCDIC conversion, the data transfer is terminated if any Unicode character cannot be converted into the EBCDIC code set.

NOUCSTRUNC

In Unicode-to-EBCDIC conversion, truncation of EBCDIC data is not allowed. The data transfer is aborted if the logical record length of the receiving data set is too small to contain the data after conversion to EBCDIC.

Note: The setting of the CONDDisp parameter determines what happens to the target data set if the transfer is aborted.

NOWRAPRecord

Indicates that data is truncated if no new line character is encountered before the logical record length of the receiving file is reached.

Note: If NOWRAPRecord and NOTRUNcate are set, then an error will be set and the file transfer will fail.

NOWRTAPEFastio

Indicates that ASCII Stream data that is being written to tape must be written using the LE Run-Time Library.

PDSTYPE

Specifies whether the FTP server creates MVS directories as partitioned data sets or as partitioned data sets extended.

When specified without a value, FTP will not specify to z/OS whether to allocate a new MVS directory as a PDS or a PDSE. When specified without a value, the equal sign (=) is optional.

PDS

Allocate directories as partitioned data sets.

PDSE

Allocate directories as partitioned data sets extended.

PRImary

Specifies the amount of tracks, blocks, or cylinders for primary allocation. When specified without an *amount*, no primary value is used when allocating the data set. The equal sign (=) is optional in this case.

Specify PRImary with no value when you are also specifying `DATAclass=data_class` and you want the SMS data class to provide the PRImary *amount*.

To allow the SMS data class to determine the space allocation, both PRImary and SECondary must be specified with no value. The tracks, blocks, and cylinders setting is ignored in this case. If `PRImary=amount` is specified with `DATAclass`, the value specified by the Site PRImary parameter overrides the `DATAclass` space allocation.

amount

Specifies the amount of tracks, blocks, or cylinders for primary allocation. For allocating partitioned data sets, this is the amount that is allocated for the primary extent.

For allocating sequential data sets this is the maximum amount that is allocated for the primary extent. If a lesser amount is needed to hold the data being transferred, only the amount actually needed to hold the data is allocated. The valid range is 1—16 777 215.

Qdisk

Used to display statistics about available space on a volume. If Qdisk is entered without a specific *volume_serial*, statistics about available space are displayed for each volume that is defined with "Use Attribute=storage."

volume_serial

Displays statistics about available space on a specific volume.

QUOtesoverride

Specifies single quotation mark at the beginning and end of a file name should override the current working directory instead of being appended to the current working directory. This is the way single quotation marks are used in all previous MVS FTP servers, and is the default. Any single quotation mark inside the beginning and ending quotation mark are treated as part of the file name.

Slte subcommand

QUOTEoverride indicates the usage of single quotation mark appearing at the beginning of, or surrounding, a file name. The setting of this keyword affects all FTP subcommands that have a path name as a parameter except keywords on the Slte subcommand.

RDW

Specifies that Record Descriptor Words (RDWs) are treated as if they were part of the record and not discarded during FTP transmission of variable format data sets in stream mode.

Note: RDW information is stored in binary. Transfer files in binary mode to avoid translation problems that can occur if you transfer this binary field in EBCDIC or ASCII.

READTAPEFormat

Used to provide information about an input data set on tape. If specified without the *tape_format* (which is the default), processing of input tapes will not take advantage of the record format information prior to open. The equal sign (=) is optional in this case.

READTAPEFormat has no effect on, and is not affected by DATAclass, DCbdsn, JESLrecl, JESRecfm, LRecl, RECFM, or any other parameters associated with creating a data set.

tape_format

Specifies the format of the records on the input tape data set. Valid formats are:

- F** Fixed record length
- V** Variable record length
- S** Spanned records
- X** Logical record length is undefined (Lrecl X)
- blank** Unspecified

The formats are mutually exclusive. Spanned implies variable, and Lrecl X implies spanned. If specified, the *tape_format* must be the most inclusive identifier in the list that matches the tape. If it is not the most inclusive identifier, an error message will be issued. For example, if *tape_format* is **S** (spanned), and the tape contains records with undefined length (Lrecl X), the request will fail. An unspecified format will avoid this type of error. However, the following should be considered:

- Specify a value for READTAPEFormat in all the following cases. Failure to specify a format will likely cause errors in processing the tape.
 - The record length is undefined (Lrecl X).
 - The records are spanned (Recfm is VBS, VS).
 - The records are variable (Recfm is V, VB, VBA) and RDW is specified.
- Specify a value for READTAPEFormat for all input tapes with one of the listed formats to ensure best results.

RECFM

Specifies the record format of a data set. When specified without the *format*, no record format is used when allocating the data set. The equal sign (=) is optional in this case.

Specify RECFM with no value when you are also specifying DATAclass=*data_class* and you want the SMS data class to provide the RECFM

format, or when you are specifying `DCbdsn=data_set_name` and you want to use the record format from the DCBDSN data set.

If `RECfm=format` is specified with either `DATAclass` or `DCbdsn`, the value specified by the Site `RECfm` parameter overrides the `DATAclass` or `DCbdsn` record format.

format

Specifies the record format of a data set. Valid record formats are: F, FA, FB, FBA, FBM, FBS, FBSA, FBSM, FM, FS, FSA, FSM, U, UA, UM, V, VA, VB, VBA, VBM, VBSA, VBSM, VBS, VM, VS, VSA, and VSM. The characters used to specify these record formats have the following meanings:

Code	Description
F	Fixed record length
V	Variable record length
U	Undefined record length
B	Blocked records
S	Spanned records (if variable) / standard records (if fixed)
A	Records contain ISO/ANSI control characters
M	Records contain machine code control characters

RETpd

Specifies the number of days that a newly allocated data set should be retained. When specified without the number of *days*, a retention period will not be specified when allocating new data sets. The equal sign (=) is optional in this case.

Specify `RETpd` with no value when you are also specifying `DATAclass=data_class` or `MGmtclass=mgmtclass` and you want SMS to provide the `RETpd` value, or when you are specifying `DCbdsn=data_set_name` and you want to use the `RETpd` from the DCBDSN data set. If more than one of the Site parameters (`RETpd`, `MGmtclass`, `DATAclass`, or `DCbdsn`) are specified, the order of precedence (highest to lowest) is:

1. `MGmtclass`
2. `RETpd`
3. `DCbdsn`
4. `DATAclass`

If a retention period is associated with an SMS management or data class, or with a model DCBDSN data set, the value of the retention period may be overridden to another retention period, but it cannot be overridden to have no retention period specified for the newly created data sets.

days

Specifies the number of days that a newly allocated data set should be retained. The valid range is 0—9999. A value of 0 indicates a retention period of 0 days so that the data set expires the same day it was created.

Note: An attempt to either append or replace an existing data set with a retention period requires operator interaction to take place for permission to alter the data set. This is normal MVS behavior.

SBDDataconn

Specifies the conversions between file system and network code pages to be used for data transfers. Valid subcommands are:

SItE subcommand

```
SItE SBDataconn=dsname  
SItE SBDataconn=(file_system_cp,network_transfer_cp)  
SItE SBDataconn=FTP_STANDARD_TABLE  
SItE SBDataconn=*
```

See “Support for SBCS languages” on page 76 for more information.

dsname

Specifies the fully qualified name of an MVS data set or HFS file that contains the EBCDIC-to-ASCII and ASCII-to-EBCDIC translate tables generated by the CONVXLAT utility.

Notes:

1. The name must *not* be enclosed in quotation marks. If quotation marks appear, they are treated as part of the name. (QUOTESoverride is ignored.)
2. The HFS name is case sensitive. The MVS name is not.
3. The name cannot begin with a left parenthesis [(.]
4. The SBDataconn keyword must be the only keyword or the last keyword on a SItE subcommand.
5. The translate tables being used for the data connection can also be changed by a SItE XLate subcommand.
6. SItE XLate and SItE SBDataconn are mutually exclusive.

file_system_cp

Specifies the name of a code page recognized by iconv. For a list of code pages supported by iconv, refer to code set converters in the z/OS C/C++ Programming Guide.

network_transfer_cp

Specifies the name of a code page recognized by iconv. For a list of code pages supported by iconv, refer to code set converters in the z/OS C/C++ Programming Guide.

FTP_STANDARD_TABLE

Indicates that the FTP internal tables, which are the same as the tables that are shipped in TCPXLBIN(STANDARD), are to be used on the data connection.

- * Indicates the translate tables set up at initialization for the data connection must be used.

SBSUB

Specifies that substitution is allowed for data bytes that cannot be translated in a single byte character translation. The substitution character is specified by the SBSUBCHAR parameter.

SBSUBCHAR *nn*

Specifies the value that is used for substitution when SBSUB is also specified. The value is one of the following:

SPACE

When the target codeset is ASCII, replace untranslatable characters with X'20' during SBCS data transfers. When the target codeset is EBCDIC, replace untranslatable characters with X'40' during SBCS data transfers.

- nn* Replace untranslatable characters with *nn* during SBCS data transfers where *nn* is a hexadecimal value from 00 to FF.

SECondary

Specifies the amount of tracks, blocks, or cylinders for secondary allocation. When specified without the *amount* for the C server, no secondary value is used when allocating the data set. The equal sign (=) is optional in this case.

Specify SECondary with no value when you are also specifying DATAClass=*dataclass* and you want the SMS data class to provide the SECondary value. To allow the SMS data class to determine the space allocation, both PRImary and SECondary must be specified with no value. The tracks, blocks, or cylinders setting is ignored in this case. If SECondary=*amount* is specified with DATAClass, the value specified by the Site SECondary parameter overrides the DATAClass space allocation.

amount

Specifies the amount of tracks, blocks, or cylinders for secondary allocation. The valid range is 0—16 777 215.

SPRead

Specifies that the output is in spreadsheet format when the file type is SQL.

SQLCol

Specifies the column headings of the SQL output file.

any

The label of the DB2 SQL table column heading is the first choice for column heading, but if there is no label, the name becomes the column heading.

labels

Labels are the DB2 SQL table column headings. If any of the columns do not have labels, FTP supplies a column heading in the form of COLnnn.

names

Uses the names of the DB2 SQL table column headings. The labels are ignored.

STOrclass

Specifies the SMS storage class as defined by your organization for the target host. Cancels the storage class specification when specified without a *storage_class* parameter value. The equal sign (=) is optional in this case.

See “Specifying values for new data sets” on page 81 for more information about specifying attributes when allocating new data sets.

storage_class

Specifies the SMS storage class as defined by your organization for the target host.

When an SMS storage class is in use, any of the attributes specified there can be overridden by a different specification by the user. To avoid overriding the setting in the SMS storage class, specify BLKSize, LRecl, PDSTYPE, PRImary, RECfm, SECondary, UCOUNT, Unit, VCOUNT, or VOLume with no associated value. This removes any value specified on a prior SITE command or in FTP.DATA, and the affected attributes are not included on the allocation. To override a setting in the SMS storage class, specify the desired value with the appropriate keyword.

TRacks

Specifies that primary and secondary space allocations are in tracks. If both PRImary and SECondary are unspecified, and an SMS data class has been specified, the space allocation is determined by the SMS data class and the TRacks parameter is ignored.

TRAILingblanks

Specifies that the FTP server preserves the trailing blanks that are in a fixed format data set when the data is retrieved from a foreign host.

TRUNcate

Specifies that truncation is permitted. The FTP server does not set an error when a truncated record is detected and file transfer continues.

UCOUNT

Specifies how many devices to allocate concurrently to support the allocation request.

unit_count

Specifies number of devices to allocate. Valid value is 1–59. When specified without a value, the FTP server does not specify a unit count when allocating data sets.

P Parallel mount request.

The setting for UCOUNT may be overridden by the SMS storage class, if one is specified. Therefore, it is recommended that UCOUNT not be coded if an SMS storage class is in use.

UCSHOSTCS

Specifies the EBCDIC code set to be used when converting to and from Unicode. If you do not specify a *code_set*, the current code set is used.

code_set

Name of the EBCDIC code set to be used when converting to and from Unicode.

UCSSUB

In Unicode-to-EBCDIC conversion, the EBCDIC substitution character is used to replace any Unicode character that cannot successfully be converted. Data transfer continues.

UCSTRUNC

In Unicode-to-EBCDIC conversion, truncation of EBCDIC data is allowed. The data transfer continues even if EBCDIC data is truncated.

Note: If the EBCDIC data contains any double-byte data, truncation may not honor character boundaries and EBCDIC records may not end in Shift-in state.

UMask

Defines the file mode creation mask. The file mode creation mask defines which permission bits are *not* to be set on when a file is created. When a file is created, the permission bits requested by the file creation are compared to the file mode creation mask, and any bits requested by the file creation which are disallowed by the file mode creation mask are turned off.

The format of the UMask keyword is **UMASK** *ooo*.

When a file is created, the specified permission bits for the file are 666 (-rw-rw-rw-). If the file mode creation mask is 027, the requested permissions and the file mode creation mask are compared:

110110110	- 666
000010111	- 027

11010000	- 640

The actual permission bits set for the file when it is created is 640 (-rw-r-----).

Notes:

1. The default value for UMask is 027.
2. You cannot use FTP to create HFS files with execute permissions. If you require execute permissions, use the SITE CHMod command to change permissions after the file has been created.

Unit

Specifies the unit type for allocation of new data sets.

unit_type

The unit type (for example, 3380) for the allocation of new data sets on direct access devices. If *unit_type* is not specified, the unit type used for allocation is set back to the system default.

VCOUNT

Specifies the number of volumes an allocated data set may span. When specified without a *volume_count* value, the FTP server uses a volume count of 50 when allocating data sets.

volume_count

Valid values are from 1–255.

VOLume

Specifies the volume serial number for allocation of new data sets.

volume_serial

The serial number of the volume to use for allocation.

volume_serial_list

A list of one or more volume serial numbers for allocation. Delimit each *volume_serial* from the prior one with a comma.

If VOLume is specified without a *volume_serial_list* or *volume_serial* parameter, no volumes are specified by the FTP server during the allocation of a new data set, and the installation default is used.

The MVS FTP server identifies multiple commands issued with a single-site command by the white space. For example (note the white space in the two commands): `site vol=fffff` is a single-site command; however, `site vol = fffff` is treated by the server as three different commands.

WRAPrecord

Indicates that data is wrapped to the next record if no new line character is encountered before the logical record length of the receiving file is reached.

WRTAPEfastio

Indicates that ASCII Stream data that is being written to tape is allowed to be written using BSAM I/O.

XLate

Indicates the desired translate table to be used for the data connection. Valid subcommands are:

SITE XLate=name

SITE XLate=*

name

Specifies the name that corresponds to the desired translate table data set. The corresponding data set name is *hlq.name.TCPXLBIN* unless environment variable `_FTPXLATE_name = dsn` was defined for the FTP server to override the data set name. In that case, *dsn* is the data set used.

SItE subcommand

- * Indicates the translate tables set up at initialization for the data connection are to be used.

Notes:

1. The translate tables being used for the data connection can also be changed by an SBDatConn subcommand.
2. SItE XLate and SItE SBDatConn are mutually exclusive.

Usage

- Because more than one parameter can be specified with the SItE subcommand, *parameter* can be repeated many times, with each *parameter* separated by a blank space.
- If the remote host is using TCP/IP, use the SItE subcommand to set data set routing and send data set allocation attributes to the host. The site-dependent information sent with the SItE subcommand remains active until you issue a new SItE subcommand. The new SItE subcommand adds to, or changes, the attributes established by previous SItE subcommands.
- If you specify one or more incorrect parameters with the SItE subcommand, an error message specifying the incorrect parameter is displayed. All correct parameters are set, regardless of any incorrect parameters, and do not need to be reissued.
- If the data sets are sent from an MVS host, use the SENDSite subcommand to automatically invoke the SItE subcommand.
If the local host does not support the SItE subcommand, site information can be sent to the MVS FTP server from the client using the QUOTE subcommand.
- Use the HELP SERVER SItE command to get information about the SItE parameters supported by a server.

Context

- To check the effect of the SItE subcommand on the attributes at the foreign host, see “STatus subcommand—Retrieve status information from a remote host” on page 271.
- See “SENDSite subcommand—Toggle the sending of site information” on page 242 for more information about the SENDSite subcommand.
- See “QUOTE subcommand—Send an uninterpreted string of data” on page 232 for more information about the QUOTE subcommand.
- Refer to the *z/OS MVS JCL Reference* for more information about some of the SItE and LOCStE parameters.

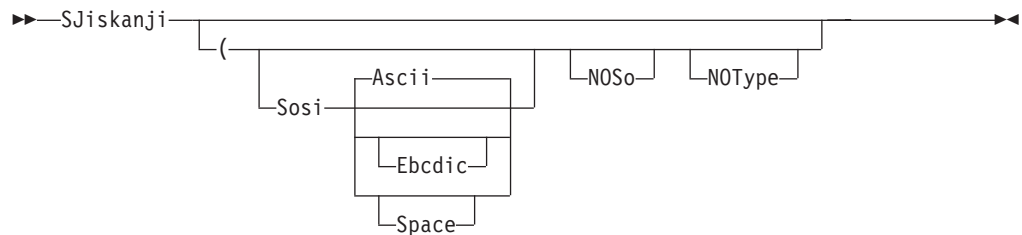
SJiskanji subcommand—Change the data transfer type to SJISKANJI

Purpose

Use the SJiskanji subcommand to change the data transfer type to SJISKANJI.

MVS FTP uses the same SBCS translate table for single-byte or double-byte data transfers. If you require an alternate SBCS table for a double-byte transfer, use the SIt e/LOC SIt e SBDat aconn or SIt e XLat e subcommand to have the server (or client) change the SBCS translation for the data connection.

Format



Parameters

Sosi

Transferred data contains the shift-out and shift-in characters specified by one of the following parameters — Ascii, Ebcdic or Space. If no parameter is specified, ASCII is used as the default.

If Sosi is not specified at all, shift-out or shift-in characters are not used in the transferred data.

Ascii

When combined with the Sosi parameter, causes shift-out and shift-in characters X'1E' and X'1F' to be used to delimit DBCS strings in ASCII data.

Ebcdic

When combined with the Sosi parameter, causes shift-out and shift-in characters X'0E' and X'0F' to be used to delimit DBCS strings in ASCII data.

Space

When combined with the Sosi parameter, causes shift-out and shift-in characters X'20' and X'20' (ASCII spaces) to be used to delimit DBCS strings in ASCII data.

NOSo

Specifies that the data transferred is pure DBCS (data with no SBCS characters) and is to be transferred to or from EBCDIC DBCS data that contains no shift-out or shift-in delimiters.

NOType

Suppresses the sending of the corresponding TType command to the server. Use this parameter when translation is to be done by the FTP client only.

Examples

To cause the FTP client to change its transfer type to Shift JIS kanji, without sending a TYPE command to the FTP server, use:

```
SJISKANJI (NOTYPE
```

The server in this example should be set to the ASCII transfer type before the (NOTYPE subcommand is issued.

Usage

- The SJiskANJI client subcommand is equivalent to the TYPE B 1 server command.
- The SJiskANJI (Sosi or SJiskANJI (Sosi ASCII client subcommands are equivalent to the TYPE B 1 S A server command.
- The SJiskANJI (Sosi EBcdic client subcommand is equivalent to the TYPE B 1 S E server command.
- The SJiskANJI (Sosi SPACE client subcommand is equivalent to the TYPE B 1 S S server command.
- The SJiskANJI (NOSO client subcommand is equivalent to the TYPE B 1 N server command.

Context

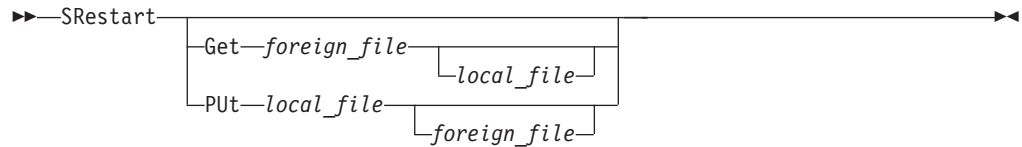
See “FTP with traditional DBCS support” on page 77 and “Support for MBCS languages” on page 80 for more information.

SRESTART subcommand—Restart a stream data transfer

Purpose

Use the SRESTART subcommand to restart an interrupted stream mode data transfer.

Format



Parameters

Get

Resume a get subcommand.

foreign_file

Specifies the name of the file to be retrieved from the remote host.

local_file

Specifies the name of the local file created as a result of the Get subcommand.

Enter the same names for *foreign_file* and *local_file* as you used in the interrupted get subcommand.

You can override the usage of the current local working directory in the local file name by specifying *local_file* as a complete data set name enclosed in single quotation marks (''). If *local_file* is not specified, the *local_file* name is the same as the *foreign_file* name.

PUt

Resume a put subcommand.

local_file

Specifies the name of the file on your local host being sent to the remote host.

foreign_file

Specifies the name that the delivered file is given on the remote host. If the *foreign_file* name is not specified, the *foreign_file* name is the same as the *local_file* name.

Enter the same names for *foreign_file* and *local_file* as you used in the interrupted put subcommand.

You can override the usage of the current local working directory in the local file name by specifying *local_file* as a complete data set name enclosed in single quotation marks (''). If *local_file* is not specified, the *local_file* name is the same as the *foreign_file* name.

Usage

- Do not use SRestart to resume an interrupted file transfer unless you can recreate the start options, FTP.DATA statements, SItE, and LOCSItE options in effect at the time of the failed file transfer. Unpredictable results may occur if the

SRESTART subcommand

file transfer environment cannot be recreated. If you cannot recreate the file transfer environment, issue Get or PUt to transfer the file again.

- Not all file transfers can be resumed in STREAm mode. Observe these restrictions during the original file transfer as well as the srestart transfer.
 - Mode must be STREAm.
 - Filetype must be SEQ.
 - Structure must be FILE.
 - SUnique option must be disabled.
 - Data type must be ASCII, EBCDIC, or Image.
 - The local file must reside in the HFS.
 - For SRestart PUt, a z/OS CS V1R6 or later server will reject the restart if the *foreign_file* is not an HFS file.
- For SRestart PUt, if the server cannot calculate an appropriate point to restart the file transfer, SRestart will fail.
- For SRestart Get, if the client cannot calculate an appropriate point to restart the file transfer, SRestart will fail.
- If SRestart fails, use Get or PUt and start the file transfer again.

Context

- See “SUnique subcommand—Changes the storage method” on page 275 for information about changing the storage method on the remote host.
- See “STRucture subcommand—Set the file structure” on page 274 for more information.

STAtus subcommand—Retrieve status information from a remote host

Purpose

Use the STAtus subcommand to retrieve current configuration information from the FTP server. This information includes the current settings of the configuration variables, which can be initialized in the FTP.DATA data set or changed using various FTP subcommands. For information about the parameters of the FTP.DATA data set, refer to the *z/OS Communications Server: IP Configuration Reference*.

Format

►►—STAtus—name—►►

Parameters

name

Specifies the file or directory for which status information is requested. The *name* parameter is not supported by the z/OS FTP server.

Examples

The following is an example of retrieving the status information from an FTP server:

STatus subcommand

```
status
>>>STAT
211-Server FTP talking to host 9.117.222.59, port 23467
211-User: USER33 Working directory: /u/user33
211-The control connection has transferred 395 bytes
211-There is no current data connection.
211-The next data connection will be actively opened
211-to host 9.117.222.59, port 23467,
211-using Mode Stream, Structure File, type EBCDIC, byte-size 8
211-Automatic recall of migrated data sets.
211-Automatic mount of direct access volumes.
211-Auto tape mount is allowed.
211-Inactivity timer is disabled
211-VCOUNT is 59
211-ASA control characters in ASA files opened for text processing
211-will be transferred as ASA control characters.
211-Trailing blanks are removed from a fixed format
211-data set when it is retrieved.
211-Data set mode. (Do not treat each qualifier as a directory.)
211-ISPFSTATS is set to FALSE
211-Primary allocation 2 tracks. Secondary allocation 1 track.
211-Partitioned data sets will be created with 27 directory blocks.
211-FileType SEQ (Sequential - default).
211-Number of access method buffers is 5
211-RDWs from variable format data sets are discarded.
211-Records on input tape are unspecified format
211-SITE DB2 subsystem name is D7A
211-Data not wrapped into next record.
211-Tape write is not allowed to use BSAM I/O
211-Truncated records will not be treated as an error
211-JESLRECL is 80
211-JESRECFM is Fixed
211-JESINTERFACELEVEL is 1
211-ENcoding is set to SBCS
211-SBSUB is set to FALSE
211-SBSUBCHAR is set to SPACE
211-SMS is active.
211-New data sets will be catalogued if a store operation ends abnormally
211-Single quotes will override the current working directory.
211-UMASK value is 027
211-Process id is 50331660
211-Checkpoint interval is 0
211-Authentication type: None
211-Record format FB, Lrecl: 80, Blocksize: 3120
211 *** end of status *** Command:
```

Usage

The retrieved status information can be a directory, a file, or general status information, such as a summary of activity. If *name* is omitted, general status information is retrieved.

For further information about setting values for server initialization in the FTP.DATA data set, refer to the *z/OS Communications Server: IP Configuration Reference*.

STREAm subcommand—Set the stream data transfer mode

Purpose

Use the STREAm subcommand to set the data transfer mode to stream mode. This is equivalent to specifying the MDe S subcommand. See “MDe subcommand—Set the data transfer mode” on page 216 for more information.

Format

►►—STREAm—◄◄

Parameters

There are no parameters for this subcommand.

STRucture subcommand—Set the file structure

Purpose

Use the STRucture subcommand to set the file structure.

Format



Parameters

File

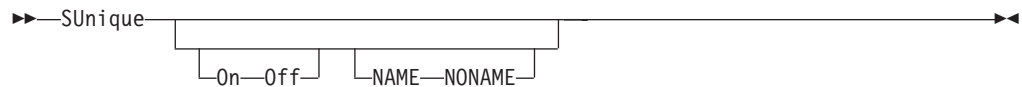
Sets the file structure to file. The file structure affects both the transfer mode and the interpretation and storage of the data set or file. With a file structure of F, the data being transferred is considered to be a continuous sequence of data bytes.

Record

Sets the file structure to record.

The SUnique subcommand changes the method of storing files on the foreign host.

Format



Parameters

On

Turns on store unique.

Off

Turns off store unique.

NAME _____

When specified with ON or OFF, instructs the client to include a name when sending a store-unique command to the server.

NONAME

When specified with ON or OFF, instructs the client to omit a name when sending the store-unique command to the server.

Usage

- By default, the SUnique setting is OFF NAME and FTP uses a store command (STOR) with the PUt and MPut subcommands. If the foreign host already has a data set or file with the name specified by *foreign_file*, the foreign host overwrites the existing data set or file.
- If SUnique is set to ON, FTP uses a store-unique command (STOU) with the PUt and MPut subcommands and prevents you from overwriting or erasing the existing data set or file on the foreign host. If the default setting of NAME is in effect, a name string will be sent to the server with the store-unique command. The created foreign data set or file is stored with a unique name. FTP sends the unique name of the created foreign data set or file to the local host, where the data set or file name is displayed on your terminal.
- SUnique with no parameters toggles the ON/OFF setting. If ON or OFF is specified, SUnique will be set to that value regardless of its current setting. The NAME/NONAME setting can be changed as SUnique is turned ON or OFF. It is in effect when SUnique is ON and does not change for the session until another NAME or NONAME setting is specified.

SYstem subcommand—Display the operating system name

Purpose

Use the SYstem subcommand to display the name of the remote host operating system. The remote host must have also implemented the SYST subcommand.

Format

►►—SYstem—◄◄

Parameters

There are no parameters for this subcommand.

Usage

Use this subcommand to determine the operating system at the server. The reply from the server has as its first word one of the system names from the Protocol Numbers and Assignment Services list for Operating System Names. The names are maintained by the Internet Assigned Numbers Authority (<http://www.iana.org>). For the z/OS server, the reply is determined by the current working directory at the server.

- If the current working directory is an hfs directory, the reply is:
215 UNIX is the operating system of this server. FTP Server is running on z/OS.
- Otherwise, the reply is:
215 MVS is the operating system of this server. FTP Server is running on z/OS.

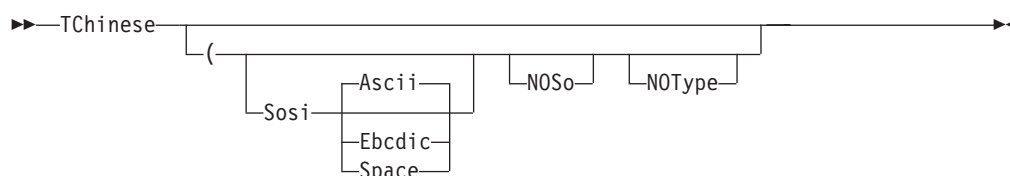
TChinese subcommand—Change the data transfer type to TCHINESE

Purpose

Use the TChinese subcommand to change the data transfer type to Traditional Chinese (5550).

MVS FTP uses the same SBCS translate table for single-byte or double-byte data transfers. If you require an alternate SBCS table for a double-byte transfer, use the Site/LOCSite SBDataconn or Site XLate subcommand to have the server (or client) change the SBCS translation for the data connection.

Format



Parameters

Sosi

Transferred data contains the shift-out and shift-in characters specified by one of the following parameters — Ascii, Ebcdic or Space. If no parameter is specified, ASCII is used as the default.

If the S parameter is not specified at all, shift-out or shift-in characters are not used in the transferred data.

Ascii

When combined with the Sosi parameter, causes shift-out and shift-in characters X'1E' and X'1F' to be used to delimit DBCS strings in ASCII data.

Ebcdic

When combined with the Sosi parameter, causes shift-out and shift-in characters X'0E' and X'0F' to be used to delimit DBCS strings in ASCII data.

Space

When combined with the Sosi parameter, causes shift-out and shift-in characters X'20' and X'20' (ASCII spaces) to be used to delimit DBCS strings in ASCII data.

NOSo

Specifies that the data transferred is pure DBCS (data with no SBCS characters) and is to be transferred to or from EBCDIC DBCS data that contains no shift-out or shift-in delimiters.

NOType

Suppresses the sending of the corresponding TYPE command to the server. Use this parameter when translation is to be done by the FTP client only.

Usage

The TChinese client subcommand is equivalent to the TYPE B 7 server command.

Context

| See “FTP with traditional DBCS support” on page 77 and “Support for MBCS
| languages” on page 80 for more information.

TSO subcommand—Use TSO commands

Purpose

Use the TSO subcommand to pass a Time Sharing Option (TSO) command to a local host TSO environment.

Format

►►—TSO—*command_line*—◄◄

Parameters

command_line

Specifies a TSO command. Do not use synonyms.

Usage

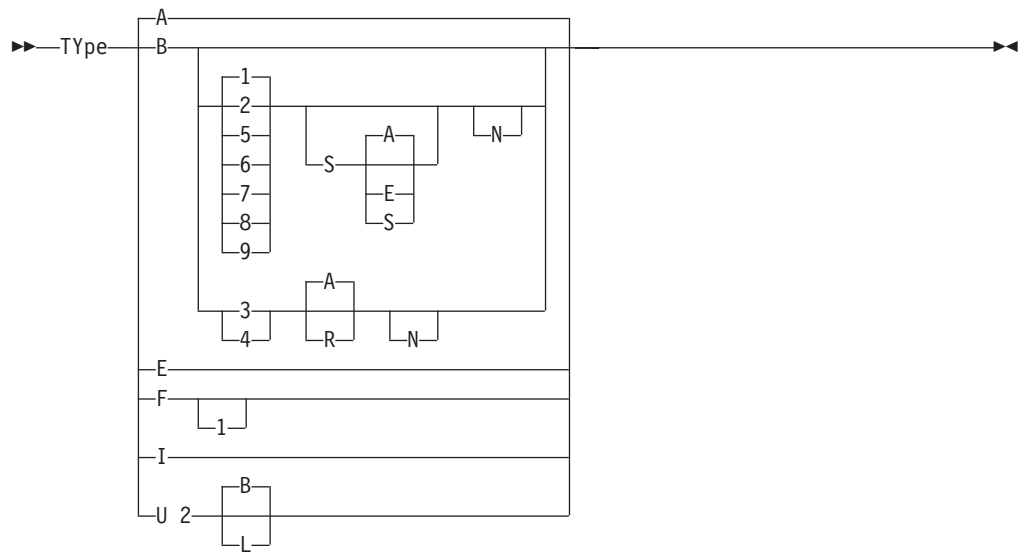
The TSO subcommand is not available from batch.

TType subcommand—Set the data transfer type

Purpose

Use the TType subcommand to set the data transfer type for the client and server at the same time with one command. FTP supports the ASCII, EBCDIC, image (binary), Unicode, and two DBCS data transfer types.

Format



Parameters

- A** Sets the transfer type as ASCII. Specifying the ASCII transfer type has the same effect as using the AScii subcommand. When the data transfer type is ASCII, FTP will translate outgoing files to ASCII before sending them, and translate incoming files from ASCII to the file system code page before storing them. ASCII is the default transfer type.
- B** Sets the transfer type as DBCS. Specifying the B transfer type with the appropriate options has the same effect as using the BIG5, EUckanji, HAngeul, JIS78kj, JIS83kj, Ksc5601, SJiskanji, SCHinese, or TChinese subcommands. If B is specified alone, the second type parameter defaults to 1 and current transfer type is changed to Shift JIS kanji.

When you transfer double-byte data, the currently active SBCS translation table is used for SBCS characters in the data set. If necessary, use the SItE/LOCSItE SBDataconn or SItE XLate FTP subcommand to select an alternate SBCS translation table that is appropriate for your data before transferring your double-byte data.

B 1

Changes current transfer type to Shift JIS kanji.

B 2

Changes current transfer type to Extended UNIX Code kanji.

B 3

Changes current transfer type to JIS 1983 kanji.

B 4
Changes current transfer type to JIS 1978 kanji.

B 5
Changes current transfer type to Hangeul.

B 6
Changes current transfer type to Korean Standard Code KSC-5601, 1989 version.

B 7
Changes current transfer type to Traditional Chinese (5550).

B 8
Changes current transfer type to Big-5.

B 9
Changes current transfer type to Simplified Chinese.

S Transferred data contains shift-out and shift-in delimiters.

If S is specified alone, the second parameter defaults to A. Shift-out and shift-in characters X'1E' and X'1F' are used.

The S parameter can be used to control the use of shift-out (SO) and shift-in (SI) characters during DBCS data transfer for Big5, SChinese, Shift-JIS kanji, EUC kanji, Hangeul, KSC-5601, and TChinese.

If Sosi is not specified at all, shift-out or shift-in characters are not used in the transferred data.

S A
Use shift-out and shift-in characters X'1E' and X'1F' to delimit DBCS strings in the transferred data.

S E
Use shift-out and shift-in characters X'0E' and X'0F' to delimit DBCS strings in the transferred data.

S S
Use ASCII spaces (X'20') as shift-out and shift-in characters to delimit DBCS strings in the transferred data.

A Use ASCII shift-in escape sequence ESC (B. This is the default. (Used for DBCS data types JIS 1983 kanji and JIS 1978 kanji only.)

R Use JISROMAN shift-in escape sequence ESC (J. (Used for DBCS data types JIS 1983 kanji and JIS 1978 kanji only.)

N Indicates the transfer is to be pure DBCS data (data with no SBCS characters) and that the data is to be transferred to or from EBCDIC DBCS data that contains no shift-out or shift-in delimiters.

When data is transferred from the EBCDIC host, the entire data set is assumed to be EBCDIC DBCS with no SO/SI characters in the data. The data is then converted to the required ASCII type and if any SO/SI option has been specified for the transferred data then the corresponding SO/SI characters are used to delimit the ASCII DBCS strings.

When transferring data to the EBCDIC host, no SO/SI characters are inserted, and if any SO/SI option is specified for the transferred data, the corresponding SO/SI characters are removed from the ASCII data and not replaced at the host. The length of data may change during transfer to and from the EBCDIC host when pure DBCS is specified with any SO/SI option. When pure DBCS is

TType subcommand

specified by itself, the length of data does not change. If N is not specified, the shift-out or/shift-in characters X'0E' and X'0F' are used at the host.

- E Sets the transfer type as EBCDIC. Specifying the EBCDIC transfer type has the same effect as using the EBcdic subcommand. The EBCDIC transfer type is intended for efficient transfer between hosts that use EBCDIC for their internal character representation.
- F Sets the transfer type as EBCDIC IBM kanji. Specifying the IBM kanji transfer type has the same effect as using the IbmkANJI subcommand.
 - F 1
Change current transfer type to IBM (EBCDIC) kanji.
- I Sets the transfer type as image (binary). Specifying the image transfer type has the same effect as using the BINary subcommand. With the image transfer type, data is sent as contiguous bits, packed into 8-bit bytes. The image transfer type is used for the efficient storage and retrieval of data sets or files, and for the transfer of binary data.
- U 2
Sets the transfer type to Unicode UCS-2. TType U 2 has optional parameters:
 - B Specifies big-endian byte order for Unicode encoding. This is the default.
 - L Specifies little-endian byte order for Unicode encoding.

Examples

- Transfer text data to another host:

```
User:      ascii
System:    >>>TYPE A
           200 Representation type is ASCII.
Command:
```

- Transfer binary data to another host:

```
User:      type i
System:    >>>TYPE I
           200 Representation type is IMAGE.
Command:
```

- Transfer text data from an EBCDIC host to an EBCDIC host:

```
User:      type e
System:    >>>TYPE E
           200 Representation type is Ebcdic NonPrint
Command:
```

- Transfer binary data from an EBCDIC host to an EBCDIC host:

```
User:      type i
System:    >>>TYPE I
           200 Representation type is Image.
Command:
```

- Set the transfer type to JIS 1983 kanji using the JISROMAN shift-in escape sequence ESC (J:
TYPE B 3 R
- Set the transfer type to Shift-JIS kanji using the EBCDIC SO/SI characters X'0E'/X'0F' in the transferred date:

TYPE B 1 S E

Usage

- If no `Sosi` option is specified by the `TType` command for `BIG5`, `SChinese`, `EUckanji`, `HAngeul`, `Ksc5601`, `SJiskanji`, or `TChinese`, standard DBCS control is used for the data transfer. This means that no `SO/SI` characters are placed in the ASCII data when transferring from the (EBCDIC) host to ASCII and the value of each ASCII character is used to determine if it is a single-byte character or part of a double-byte character when transferring to the host. For JIS 1983 kanji and JIS 1978 kanji, three-character escape sequences are always used to delimit DBCS strings in mixed SBCS/DBCS ASCII data. These escape sequences cannot be altered by using the `S`, `S A`, `S E`, or `S S` parameters.
- If no `Sosi` option is specified, the length of data may change as it is transferred to or from the EBCDIC host since EBCDIC DBCS types on the host contain `SO/SI` characters in mixed SBCS/DBCS data to determine which characters are part of a DBCS string. Any of the above `SO/SI` options (`S`, `S A`, `S E` or `S S`) may be used for mixed SBCS/DBCS data so that the length of data does not change when transferred to or from the EBCDIC host. Use of three-character escape sequences for JIS 1983 kanji and JIS 1978 kanji means that the length of data for these types always change when transferring mixed SBCS/DBCS data to or from the EBCDIC host.
- Use ASCII spaces as `SO/SI` characters in the transferred data only for transfer from the EBCDIC host. Data can be transferred to the host when using this option but care must be taken as each ASCII space is interpreted as a shift-out or shift-in character and is replaced with the corresponding `SO/SI` character on the host.

Context

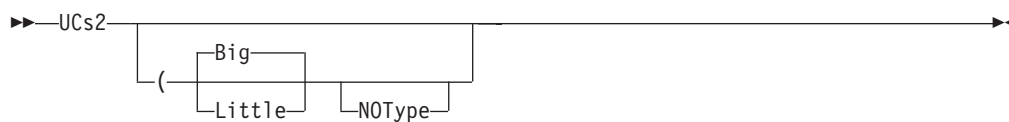
For more information about transfer methods, see Table 12 on page 51.

UCs2 subcommand—Change data transfer type to Unicode UCS-2

Purpose

Use the UCs2 subcommand to change the data transfer type to Unicode UCS-2.

Format



Parameters

BIG

Specifies big-endian byte order for the Unicode encoding. This is the default.

LITTLE

Specifies little-endian byte order for the Unicode encoding.

NOTYPE

Suppresses the sending of the corresponding TYPe command to the server. Use this parameter when you want translation to be done by the FTP client only.

Usage

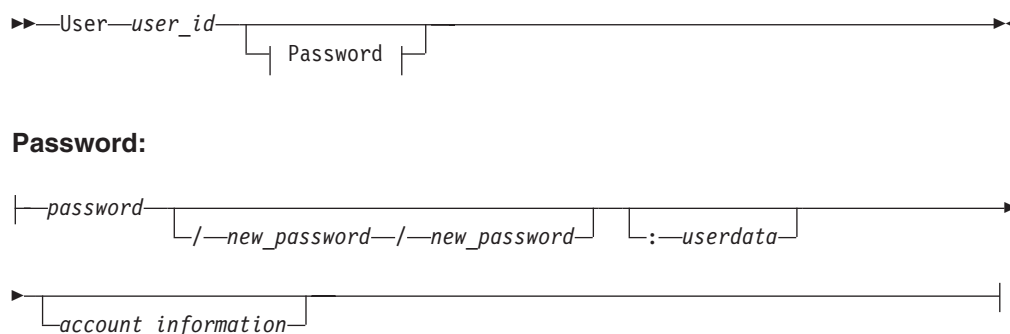
The UCs2 client subcommand is equivalent to the TYPe U 2 subcommand.

User subcommand—Identify yourself to a host or change your TSO user ID password

Purpose

Use the User subcommand to identify yourself to the host after opening a connection or, if the foreign host is a z/OS FTP server, you can change your TSO user ID password.

Format



Parameters

user_id

Specifies your logon name on the host.

password

Specifies your current password on the host. If you do not supply a password when invoking the User subcommand, you are prompted to enter a password if the host requires a logon password.

new_password / new_password

Specifies your new password on the host. You must enter the password twice.

:userdata

The optional user data must be separated from the password information by a colon (:) and can be any combination of up to 200 nonblank characters and numbers—except the colon. Care should be taken when using the backslash character (\) in combination with other characters, which might be interpreted as an escape sequence by the C compiler.

account_information

An optional parameter that will be supplied to the remote FTP server if the server requests account information after receiving the password.

Usage

- Not all FTP servers support the userdata parameter. The z/OS FTP server interprets userdata as a character string and passes it to the server FTCHKPWD user exit routine.
- If you enter your password incorrectly, you are not prompted to enter the password again. You must reissue the User subcommand to enter the correct password.
- If you do not specify *password/new_password/new_password* on the User subcommand, you can specify it when you are prompted for the password after

User subcommand

entering the User subcommand. You can specify the User subcommand to change your TSO *user_id* password at any time during the FTP session.

- To avoid having your password print when issuing your user ID and password as part of a CLIST or batch job, enter your user ID and password on separate lines.
- Do not place any spaces between the passwords and the slashes (/), and the user data.
- You can use the NETRC data set to automatically log on to a remote host.
- You can pass multiple strings as one parameter by enclosing them in single quotation marks. For example, if USER MYNAME1 MYNAME2 were passed, MYNAME1 would be parsed and sent to the server as the user ID, and MYNAME2 would be parsed as the password and sent when prompted by the server. However, sending the command USER 'MYNAME1 MYNAME2' would cause MYNAME1 MYNAME2 to be sent as the user ID. Typically, this is used when using FTP through a proxy that requires two user IDs (one for the firewall and one for the remote system). It is also used with servers that allow blank characters to be imbedded within a user ID.

This same technique also works with the password. If the following statement is issued: USER 'MYNAME1 MYNAME2' 'PASSWD1 PASSWD2', FTP replies to the USERID prompt with 'MYNAME1 MYNAME2' and to the PASSWORD prompt with 'PASSWD1 PASSWD2'.

Context

For information about using NETRC, see “NETRC data set” on page 37.

Verbose subcommand—Toggle verbose mode

Purpose

Use the Verbose subcommand to toggle verbose mode. When in verbose mode the client displays message IDs. This subcommand is effective only when the client is running in a z/OS UNIX environment.

Format

►►—Verbose—◄◄

Parameters

There are no parameters for this subcommand.

Examples

```
verbose
Message IDs are not displayed when running in OS/390 UNIX
Command:
lpw
Local directory name set to hierarchical file /u/user33
Command:
verbose
EZA2859I Message IDs are displayed when running in OS/390 UNIX
EZA1460I Command:
lpw
EZA2578I Local directory name set to hierarchical file /u/user33
EZA1460I Command:
```

Usage

Verbose is normally toggled off when the client starts. If you want it toggled on when the client starts, use the -v parameter on the FTP command. If the FTP client is running in a TSO environment, the display of message IDs is controlled by the profile options MSGID and NOMSGID.

Verbose subcommand

Chapter 6. Sending electronic mail using SMTP commands

This chapter describes how to use the SMTPNOTE command, provided with z/OS CS, to prepare and send electronic mail. Recipients of the mail can be users on your local host, users on network job entry (NJE), or users on TCP hosts. The SMTPNOTE command uses the Simple Mail Transfer Protocol (SMTP) to send the mail.

This chapter describes information about:

- “Interfaces to the SMTP address space”
- “Using the SMTPNOTE command from your terminal” on page 290
- “Monitoring the status of SMTP using the SMSG command” on page 296
- “SMTP commands” on page 302
- “SMTP responses” on page 318
- “Using batch SMTP command in TSO utilities” on page 319
- “SMTP with DBCS support” on page 321

Interfaces to the SMTP address space

Interfaces to the SMTP address space are:

- SMTP mail can be sent and received interactively over a TCP/IP network. Mail from TCP/IP network sites destined for local MVS users (or users on a NJE network attached to the local MVS system) arrives over this interface. All commands and data received and transmitted through this interface use ASCII characters.
- Interface from the Job Entry Subsystem (JES) spool, including any connected NJE nodes. SMTP commands can be written into a SYSOUT data set, with an external writer name of the SMTP address space. SMTP processes each of the commands in the data set in sequence, exactly as if it had been transmitted over a TCP/IP connection. This is how mail is sent from local MVS users to recipients on the TCP network. Batch SMTP data sets must contain commands and data in EBCDIC characters.

For a description of batch SMTP in TSO utilities, see “Using batch SMTP command in TSO utilities” on page 319. For examples of batch SMTP, see “Batch SMTP examples” on page 319.

Notes:

1. This interface can be used to send mail only. Using the VERB command with this interface causes spool problems. For a description of the VERB command, refer to “VERB command—Enable or disable verbose mode” on page 316.
2. With this interface, you might not be able to use certain SMTP options that require the NETDATA format. For details, refer to the *z/OS Communications Server: IP Configuration Reference*.

IBM z/OS CS TCP/IP provides an SMTP gateway function, which can be used to transfer electronic mail between an NJE network and a TCP/IP network, as shown in Figure 11 on page 290.

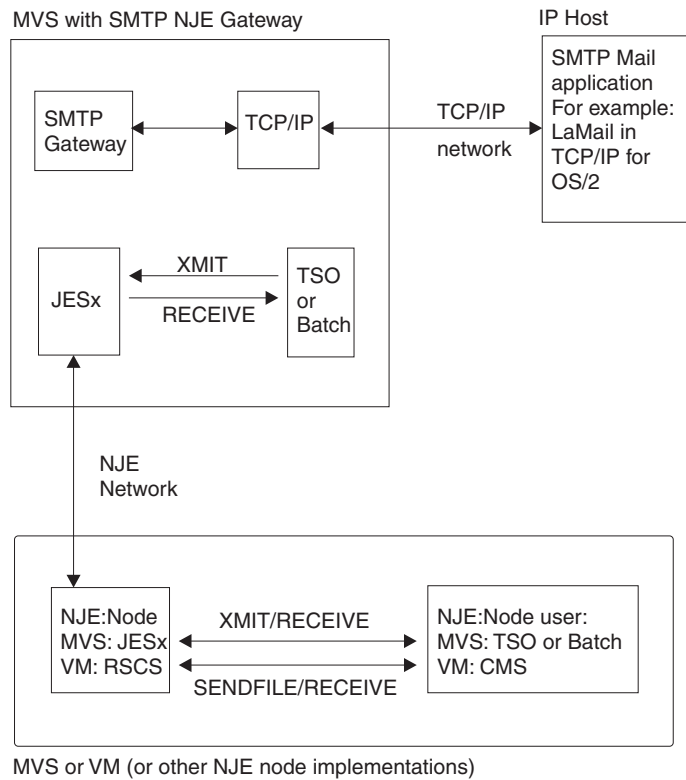


Figure 11. SMTP gateway overview

Using the SMTPNOTE command from your terminal

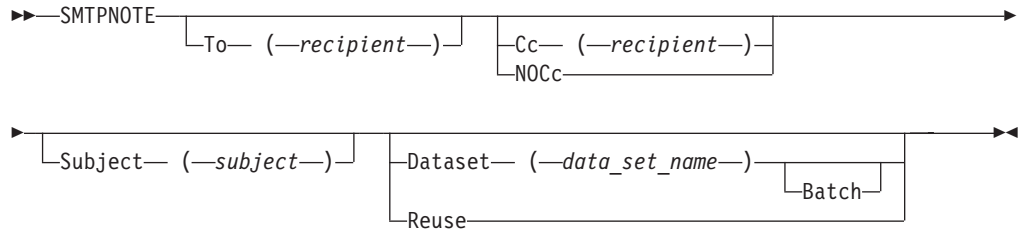
The SMTPNOTE command enables you to prepare the mail using the facilities of the Time Sharing Option (TSO) EDIT command, or to send mail prepared with a system editor of your choice.

SMTPNOTE command—Send electronic mail to one or more recipients on NJE or TCP networks

Purpose

Use the SMTPNOTE command to send electronic mail to one or more recipients on NJE or TCP networks.

Format



Note: The minimum abbreviation for each parameter is shown in uppercase letters.

Parameters

To (*recipient*)

Specifies a single recipient for the mail. If you do not specify the To parameter, you are prompted to enter a list of recipients. Enter the name of each recipient on a separate line and end the list with a blank line. You must specify at least one mail recipient.

Cc (*recipient*)

Specifies a single copy recipient for the mail. If you do not specify the Cc parameter and you do not specify the NOCc or Batch parameters, you are prompted to enter a list of copy recipients.

If there are no recipients, press Enter. Otherwise, enter the name of each recipient on a separate line and end the list with a blank line.

NOCc

Specifies that no prompting for Cc takes place.

recipient

Specifies the path address of the mail recipient. The format of *recipient* is equivalent to the path syntax, as described in RFC 821, without the (<) and (>) delimiters. See Appendix E, "Related protocol specifications (RFCs)," on page 415 for information about obtaining RFCs. This *recipient* parameter has one of the following formats:

user_id@host_name

User on a host in your domain, possibly on your local node.

user_id@host_name .domain

User on a host in a specified domain.

user_id%nje_host_name@ gateway_name.domain

User on an NJE or RSCS node connected to a TCP network at *gateway_name*. See "Electronic mail gateway" on page 301 for more information.

@host1,@host2,...,@hostn :user_id @host_name

User on a host that is not known by the local Domain Name Server, but that can be reached by following the path from *host1* to *hostn*.

Subject (*subject*)

Specifies the subject of the note. If you do not specify the Subject parameter, you are prompted for the subject.

If there is no subject for the note, press Enter. If Subject is specified as a keyword, you cannot have embedded blanks. Otherwise, the *subject* can be any arbitrary string of characters, but is limited to a total length of 233 characters.

Batch

Specifies that no prompting take place. You must also specify the To and Dataset parameters.

Dataset (*data_set_name*)

Indicates that the text of the mail is contained in a sequential data set. The data set can have any record format, be blocked or unblocked, and have records of up to 243 characters in length. The *data_set_name* is the name of the sequential data set containing the text of the note. It must be a valid data set name, and is fully qualified if it is contained within single quotation marks (').

Reuse

Causes SMTP to reuse the contents of a note that was previously canceled. If a note was not canceled, the Reuse parameter is ignored.

Usage

- When the To(), Cc(), Subject(), or Dataset() parameters are specified more than once, the last value specified is the one used by SMTPNOTE. No error messages are generated for duplicate parameters on the command line.
- SMTPNOTE no longer requires quotation marks around blanks, single quotation marks, semicolons, or commas, or triple quotation marks around data set names.

Preparing and sending mail

After you enter the SMTPNOTE command, you are prompted for the mail recipients (To:), the copy recipients (Cc:), and the subject of the note (Subject:), if they were not specified with the SMTPNOTE command. If you enter a list of recipients, enter the name of each recipient on a separate line and indicate the end of the list by entering a blank line.

After you answer the prompts, SMTPNOTE invokes the TSO EDIT command to enable you to prepare your note. Typically, the editor starts in INPUT mode. Enter the text of your note line by line. When your note is complete, enter a null line (that is, do not type anything when prompted), and press Enter. The editor switches to EDIT mode.

In EDIT mode, you can use all the functions of the editor. You can also return to INPUT mode, send the note, or cancel the note. For a complete description of the EDIT command, refer to the *IBM TSO Extensions Command Language Reference*.

If you invoke the SMTPNOTE command with the REUSE or DATASET parameter, you are immediately placed in EDIT mode. The contents of the previously canceled note, or the data set that you specify, are already part of the note. You can add to or change the data that is already present.

To send the note, enter **END SAVE** in EDIT mode, and then enter **SEND**. To cancel the note, enter **END SAVE** or **END NOSAVE** in EDIT mode, and then enter **CANCEL**. If you cancel a note, you can recover what you entered by invoking the SMTPNOTE command with the REUSE parameter. The recipients and subject of the note are not saved, and must be reentered.

Figure 12 is an example of preparing and sending mail.

```
READY
smtpnote
TO:
irvine@mvs2.accounting
bekker@mvs2.accounting
mcgregr@mvs1.accounting

CC:

SUBJECT:
Travel Expenses

ENTER "END SAVE" TO SAVE THE NOTE.
FOR A COMPLETE LIST OF EDIT SUBCOMMANDS ENTER "HELP".
INPUT
Could we please postpone the expense review because I
will be out of town the week of the 19th.

How about the 23rd? Thank you, John.

EDIT
end save
ENTER "SEND" TO SEND THE NOTE.
ENTER "CANCEL" TO TERMINATE WITHOUT SENDING THE NOTE.
send
READY
```

Figure 12. Example of preparing and sending mail

Receiving mail

Use the TSO RECEIVE command to receive SMTP mail, as you would other mail and messages. Figure 13 shows an example of using the RECEIVE command.

```
System:    READY

User:  receive
System:  Dataset ** MESSAGE ** from SMTP on MVSXA2
        Received: from MVSXA2 by TREEFROG.ABC.OZ (IBM MVS SMTP V3R2)
        with BSMTP id 3088
        ;
        ***

        Wed, 28 Jul 93 16:41:31 EST
        Date:    28 Jul 93 16:37:56 LCL
        From:    MMC@TREEFROG.ABC.OZ
        To:      mvsuser%mvsvxa3@TREEFROG.ABC.OZ
        Cc:      mmc%mvsvxa3@TREEFROG.ABC.OZ
        Subject: TSO RECEIVE Example

        This is an example of the TSO RECEIVE command.

        *****
        INMR000I No more files remain for the receive command to process.
```

Figure 13. TSO RECEIVE command

If there is no message to be received, the following message is displayed:

```
INMR003I You have no messages or data sets to receive.
***
```

For more information, refer to the *IBM TSO Extensions Interactive Data Transmission Facility: User's Guide*.

Undelivered notes

When SMTP cannot deliver a piece of mail, a nondelivery note explaining the reason for nondelivery is sent to the sender. Nondelivery can occur for several reasons, such as the destination host is unreachable, or the recipient does not have a user ID on the destination host. If a note cannot be delivered, the body of the original piece of mail is returned as part of the nondelivery notification. For an example of a nondelivery note, see Figure 14 on page 295. The nondelivery note is shown in bold.

```

Date: Mon, 9 Mar 92 08:23:54 EST
From: SMTP@MVS1.ACME.COM
To: DANIEL@MVS1
Subject: Undeliverable Mail
MVS1.ACME.COM unable to deliver following mail to recipient(s):
<MATT@SMTP-GATEWAY.IBM.COM>
MVS1.ACME.COM unable to connect for 3 days to host:
SMTP-GATEWAY.IBM.COM
** Text of Mail follows **
Date: Mon, 9 Mar 92 08:22:36 EST
From: <DANIEL@MVS1.ACME.COM>
To: <MATT@SMTP-GATEWAY.IBM.COM>
Subject: ACME iron birdseed

Matt,

The shipment of ACME iron birdseed was shipped last Thursday. Please
advise me if you have not received it, and I'll try to track it down.
Also, your ACME giant rock catapult is on back order; another customer
bought the last one yesterday.

Daniel

```

Figure 14. Example of a nondelivery note

If a recipient is unknown at the destination host, the destination host does not accept the mail for delivery, and a nondelivery note is forwarded to the sender. For an example of an unknown recipient note, see Figure 15. The unknown recipient note is shown in bold.

```

Date: Mon, 9 Mar 92 13:32:12 EST
From: SMTP@MVS1.ACME.COM
To: DANIEL@MVS1
Subject: Undeliverable Mail
MVS1.ACME.COM unable to deliver following mail to recipient(s):
<GEORGE@SMTP-GATEWAY.IBM.COM>
MVS1.ACME.COM received negative reply from host:
SMTP-GATEWAY.IBM.COM
** Text of Mail follows **
Date: Mon, 9 Mar 92 08:22:36 EST
From: <DANIEL@MVS1.ACME.COM>
To: <GEORGE@SMTP-GATEWAY.IBM.COM>
Subject: Your retirement

George,

I recently learned that you will soon be retiring. I just wanted to
wish you best of luck and thanks for all the great work you've done.
You were a great asset to your company, and I'm sure they will miss you.

Daniel

```

Figure 15. Example of an unknown recipient note

SMTP exit for unwanted mail

You can use an SMTP exit to inspect and filter unwanted mail (spam) sent through SMTPPROC.

The SMTP component contains the SMTPPROC application which is the mail to mail interface used on the Internet. This component is responsible for routing mail between the sender and receiver. A user exit may be used to reject mail (spam) based on criteria determined by the user. This exit examines the data sent by the remote SMTP client application and determines what action to take based on the contents of that mail item or mail command.

This exit can be replaced dynamically without stopping the SMTPPROC program. The procedure for doing this follows:

1. Issue a "MSG smtpprocname STPEXIT" TSO command. The TSO userid must be in the authorized list for SMTPPROC to issue this command. This will cause SMTP to issue the termination call to the exit and then set a flag so that the exit will not be called anymore. Processing of mail will continue as if there is no exit.
2. Remove the old exit using the SETPROG EXIT operator command or by updating SYS1.PARMLIB(PROGxx) and issuing the refresh console command. An example of updating SYS1.PARMLIB follows:
 - a. In SYS1.PARMLIB(PROGxx) have this line:
EXIT DELETE EXITNAME(EZBTCPIPSMTPEXIT) MODNAME(OLDEXIT) FORCE(YES)
 - b. At the MVS console issue SET PROG=xx.
3. Add the new exit using the SETPROG EXIT operator command or by updating SYS1.PARMLIB(PROGxx). An example of updating SYS1.PARMLIB follows:
 - a. In SYS1.PARMLIB(PROGxx) have this line:
EXIT ADD EXITNAME(EZBTCPIPSMTPEXIT) MODNAME(NEWEXIT)
 - b. At the MVS console issue SET PROG=xx.
4. Issue a "MSG smtpprocname STAREXIT" TSO command. This will cause SMTP to issue the initialization call to the exit. A flag is then set so the exit will be called from then on for new mail connections. Processing of new mail will continue with the exit being called. The first smtp command to be seen by a reinstated exit will be HELO. The exit will not be called in the middle of a currently processing exchange.

Monitoring the status of SMTP using the MSG command

The MSG command provides an interactive interface to the SMTP server to:

- Query the operating statistics of the SMTP server
- Query the SMTP mail delivery queues
- Perform privileged system administration tasks, such as shutting down the SMTP server and enabling or disabling various tracing and debugging options

Responses to commands are sent back to the originator of the command using MSG commands (or MSGNOH commands if SMTP is running with privilege class B).

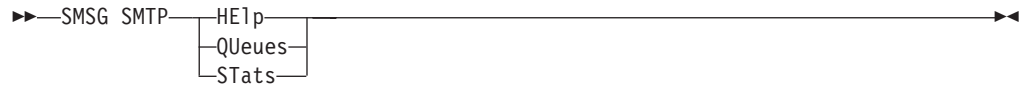
SMTP MSG is not supported in batch. It uses VMCF and the PASCAL interface to queue up information and will not print it to a DD card.

MSG SMTP command for the general user

Purpose

As a general user, use the MSG SMTP command to monitor the status of SMTP.

Format



Note: The minimum abbreviation for each parameter is shown in uppercase letters.

Parameters

HELP

Provides a list of valid SMTP MSG commands.

QUEUES

Provides a list of mail queued on the various SMTP mail delivery queues.

STATS

Provides operating statistics about the SMTP server since the SMTP server was started.

Examples

The following example shows the output from the SMTP QUEUES command.

R Retry

A Active

Q Pending - waiting for TCP/IP connection

- xxx.xxx.xxx.xxx is the IP address
- 1 is the number of pieces of mail
- HostName.DomainName is the symbolic name

```
Msg from SMTP: * ----- Mail Queues -----
Msg from SMTP: * Spool Queue: 0
Msg from SMTP: * R: xxx.xxx.xxx.xxx : 1 HostName.DomainName
Msg from SMTP: * Undeliverable Queue: 0
Msg from SMTP: * --- Resolver Queues ---
Msg from SMTP: * Process Queue: 0
Msg from SMTP: * Send Queue: 0
Msg from SMTP: * Wait Queue: 0
Msg from SMTP: * Retry Queue: 0
Msg from SMTP: * Completed Queue: 0
Msg from SMTP: * Error Queue: 0
```

The following example shows the output from the SMTP STATS command.

```

System:    READY
User:     user.smsg smtp stats
System:    +Msg from SMTP: * Last Up Time: Wed, 28 Jul 93 16:33:32 EST
           +Msg from SMTP: * Statistics   : 07/28
           +Msg from SMTP: * From TCP    :    0
           +Msg from SMTP: * From Spool  :    0
           +Msg from SMTP: * BSMTP Logs :    0
           +Msg from SMTP: * Error Mail  :    0
           +Msg from SMTP: * To Local   :    0
           +Msg from SMTP: * To NJE     :    0
           +Msg from SMTP: * To TCP     :    0
           +Msg from SMTP: * Passive Opns:    0
           +Msg from SMTP: * Active Opens:    0
READY

```

Usage

The statistics about SMTP include:

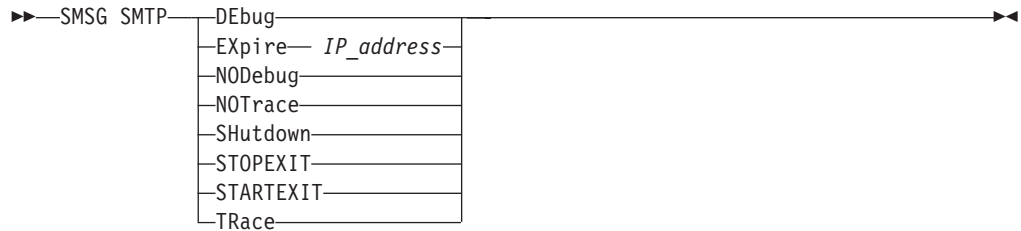
- The date that SMTP was last started.
- Statistics about mail handled by SMTP over the past two days, including:
 - The number of pieces of mail that arrived over TCP connections
 - The number of pieces of mail that arrived from spool (local or NJE senders)
 - The number of pieces of mail generated in response to requests to VERbose batch SMTP connections
 - The number of pieces of mail generated to return error mail to the sender
 - The number of pieces of mail delivered to local recipients
 - The number of pieces of mail delivered to recipients on the RSCS network
 - The number of pieces of mail delivered to recipients on the TCP/IP network
 - The number of TCP connections through which mail was received
 - The number of TCP connections through which mail was delivered

SMSG SMTP command for the privileged user

Purpose

As a privileged user, use the SMSG SMTP command to monitor the status of SMTP.

Format



Note: The minimum abbreviation for each parameter is shown in uppercase letters.

Parameters

DEbug

Enables connection debugging and tracing information to the SMTP.DEBUG data set. This is the same as adding DEBUG to the SMTP.CONFIG data set.

EXpire *IP_address*

Causes the domain name resolution for mail queued for delivery to this IP address to expire. SMTP will again try to resolve the IP addresses for this mail if it is still within the retry time window.

NODebug

Disables connection debugging and tracing.

NOTrace

Disables resolver tracing.

SHUTDOWN

Causes the SMTP server to shut down.

STARTEXIT

Causes SMTP to enable a user exit program by issuing the initialization call to the user exit program if one exists. For more information regarding user exit programs refer to the *z/OS Communications Server: IP Configuration Guide*.

STOPEXIT

Causes SMTP to disable a currently running user exit program by issuing the termination call to the user exit program if one exists. For more information regarding user exit programs refer to the *z/OS Communications Server: IP Configuration Guide*.

TRace

Enables resolver tracing. The output of the resolver trace is sent to the SMTP console. This is the same as adding TRACE RESOLVER to the TCPIP.DATA data set.

Examples

Note: If the screen remains inactive even after you issue the SMSG SMTP command, press Enter a few times until any one of the following messages is displayed.

- In this example, MVSUSER starts the debugging and tracing:

```
System:    READY

User:      smsg smtp debug
System:    +Msg from SMTP:  * Session Debugging Enabled
```

- Stop debugging and tracing:

```
System:    READY

User:      smsg smtp nodebug
System:    +Msg from SMTP:  * Session Debugging Disabled
READY
```

- Begin resolver tracing:

```
System:    READY

User:      msg smtp trace
System:    +Msg from SMTP:  * Resolver Tracing Enabled
READY
```

- Stop resolver tracing:

```
System:    READY

User:      smsg smtp notrace
System:    Msg from SMTP:  * Resolver Tracing Disabled
READY
```

- Shut down the SMTP server:

```
System:    READY

User:      smsg smtp shutdown
System:    +Msg from SMTP:  * ok, About to End SMTP
READY
```

- Cause all mail queued for name resolution to expire:

```
System:    READY

User:      smsg smtp3 expire 9.67.112.25
System:    +Msg from SMTP3:  * No Mail Found for IP address: 9.67.112.25
READY
```

Usage

Privileged user SMSG commands are accepted only from users specified in the SMSGAUTHLIST statement.

Context

Refer to *z/OS Communications Server: IP Configuration Reference* for information about the TCPIP.DATA data set and for a description of the SMSGAUTHLIST configuration statement.

Electronic mail gateway

A system administrator can configure the SMTP server to run as a mail gateway between TCP network users and users located on an NJE or Remote Spooling Communications Subsystem (RSCS) network that is attached to the local host. Figure 16 is an example of a mail gateway.

In Figure 16, the following abbreviations are used:

A	The local MVS host running both the TCP/IP program and NJE.
B and C	Hosts attached to host A through an NJE network.
D and E	Hosts attached to host A through a TCP network.

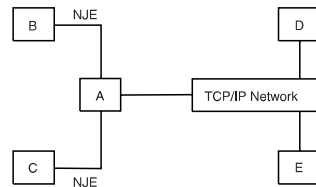


Figure 16. SMTP as a mail gateway

Users on hosts A, B, and C can send mail to users on TCP hosts D and E using the SMTPNOTE command. This method is described in “Using the SMTPNOTE command from your terminal” on page 290.

Users on TCP hosts D and E can send mail to the users on host A using addresses in the following format:

user_id@A.domain

Where:

<i>user_id</i>	Is the user ID of the TSO user on host A.
<i>A.domain</i>	Is the TCP host name of host A.

The users on TCP hosts D and E can send mail to users on NJE hosts B and C using addresses in the following format:

user_id%NJEHost@A.domain

Where:

<i>user_id</i>	Is the user ID of the user on the host.
<i>NJEHost</i>	Is the name of the NJE host (B or C).
<i>A.domain</i>	Is the TCP host name of host A.

Path address

Path addresses are rewritten according to the following rules:

- If the local part of a mailbox name includes a percent sign (%) and the domain of the mailbox is the host system, SMTP rewrites the address, treating the portion of the local part to the right of the percent sign (%) as the real destination host. For example, the path address:

John%yourhost@ourhost.our.edu

is rewritten by SMTP running at ourhost.our.edu as:

John@yourhost

- Path addresses with source routes are accepted and rewritten to remove the domain name of the host system. For example, the path address:

@ourhost.our.edu,@next.host.edu
:John@yourhost

is rewritten by SMTP running at ourhost.our.edu as:

@next.host.edu:John@yourhost

SMTP also optimizes a path address. For example,

@some.host.edu,@ourhost.our.edu,
@next.host.edu:John@yourhost

is rewritten by SMTP running at ourhost.our.edu as:

@next.host.edu:John@yourhost

SMTP commands

This section describes the SMTP commands as listed in Table 20.

Table 20. SMTP commands

Subcommand	Description	Page
DATA	Define the following information as data.	303
EXPN	Verify if a mailbox exists on the local host.	305
HELO	Identify the domain name of the sending host to SMTP.	306
HELP	Get help with SMTP commands.	307
MAIL FROM	Specify the sender of the mail.	308
NOOP	Return a 250 OK return code when SMTP is responding.	309
QUEU	Get information about mail queued at SMTP for delivery.	310
QUIT	End an SMTP connection.	312
RCPT TO	Specify the recipients of the mail.	313
RSET	Reset the SMTP connection to the initial state.	314
TICK	Insert an identifier into the batch SMTP response data set.	315
VERB	Enable or disable verbose mode. Note: VERB ON may cause spool problems for SMTP if the REPLY TO: user is not a valid NJE node.user.	316
VERFY	Verify if a mailbox exists on the local host.	317

Note: If the DISALLOWCMD statement was used, the server will not support the EXPN, HELP, QUEU, VERB and VERFY commands.

Data sets containing SMTP commands can be written to the JES spool as SYSOUT data sets. These SYSOUT data sets contain either punch or NETDATA records. Data sets originate from users on the same system as the SMTP address space or from users on any system connected to the host system through an NJE network.

DATA command—Define the following information as data

Purpose

Use the DATA command to define the following information as the data text of the mail body.

Format

►—DATA—◄

Parameters

There are no parameters for this command.

Examples

After entering the DATA command, you receive the following message (response code 354) when you can transmit the body of your mail:

354 Enter mail body. End new line with just a '.'

You end transmitting the body of your mail by entering a single ASCII period (.) on a line by itself.

The following message indicates success:

250 Mail Delivered

Usage

- Use the DATA command after a HELO command, a MAIL FROM command, and at least one RCPT TO command have been accepted.
- When receiving mail over a TCP connection, the ASCII period should be followed by the ASCII <carriage return> <line feed> character sequence. If any record in the body of the mail begins with a period, the sending SMTP program must convert the period into a pair of periods (..). When the receiving SMTP encounters a record that begins with two periods in the body of the mail, it discards the leading period. This convention permits the body of mail to contain records that would otherwise be interpreted as signaling the end of the body of mail. These rules must be followed over both TCP and batch SMTP connections.

The SMTPNOTE command performs this period doubling on all mail spooled to SMTP. If the body of the mail in a batch SMTP command is not explicitly ended by a record with a single period, SMTP adds one.

After a period has been received, the SMTP connection is reset to the initial state (the state before any sender or recipients have been specified). Additional MAIL FROM, RCPT TO, DATA, and other commands can now be sent.

If no more mail is to be delivered, end the connection with the QUIT command. If a QUIT command is not found at the end of a batch SMTP command data set, it is implied.

- If SMTP runs out of local mail storage space, it sends a reply with a 451 code. If the length of the body of the mail exceeds MAXMAILBYTES (defined in SMTP configuration data sets to be 512KB), SMTP sends a reply with a 552 code. For more information about MAXMAILBYTES, refer to the *z/OS Communications Server: IP Configuration Reference*.
- When mail arrives over a batch SMTP connection from a Remote Spooling Communications Subsystem (RSCS) network host, and 822 header rewriting is enabled (with the REWRITE822HEADER configuration option), then header

fields are modified to ensure that all addresses are fully qualified domain names. Refer to the *z/OS Communications Server: IP Configuration Reference* for more information about header rewriting.

- When mail arrives over the JES spool interface using SMTP batch or TSO transmit command, an NL (newline) or < character occurring in column 80 of the data is interpreted as a continuation character by the SMTP transport layer. The last byte of data should not be a continuation character. If the last byte is a continuation character, then the last record will not be processed correctly and you will be missing data. Check your note file, correct the data and resend the mail.

EXPN command—Verify whether a mailbox exists on the local host

Purpose

Use the EXPN command to verify whether a given mailbox exists on the local host.

Format

►►—EXPN—*mailbox*—◀◀

Parameters

mailbox

Specifies a user-defined identifier for a mailbox. This name can specify a single mailbox or a mailing list.

Examples

Verify whether mike is a mailbox on host abc.com:

```
System:    READY
User:      EXPN mike
System:    250 mike@abc.com
```

Verify whether users-hackers is a mailing list on host abc.com:

```
System:    READY
User:      EXPN users-hackers
System:    250-carol@abc.com
           250-greg@abc.com
           250-marsha@abc.com
           250 peter@abc.com
```

The hyphen (-) as the fourth character of a response indicates that the response is continued on the next line.

Usage

- The EXPN command operates exactly the same as the VRFY command.
- The EXPN command can verify the existence of one or more mailboxes on the system. The mailboxes are defined by configuration statements in the SMTP.SMTP.CONFIG data set.
- The MVS SMTP server verifies only TSO user IDs if RACF is installed on the local system. TSO user IDs that are verified as valid are accepted with a reply code of 250. If RACF is not installed, any character string up to eight characters is accepted with a reply code of 250.

HELO command—Identify the domain name of the sending host to SMTP

Purpose

Use the HELO command to identify the domain name of the sending host to SMTP before a MAIL FROM command.

Format

►—HELO—*domain_name*—————►

Parameters

domain_name

Specifies the domain name of the sending host.

Usage

- The HELO command is sent once before a MAIL FROM command.
- If *domain_name* is not known, you can send messages, but the message never heard of you is returned. This message indicates that the HELO command is accepted, but that the host name could not be resolved either through the name server or through the host tables.
- HELO commands received over a TCP connection that has a *domain_name* IP address that does not match the IP address of the *ForeignSocket* field of the connection information record are accepted. However, the reply text indicates the mismatch. HELO commands received over a batch SMTP connection with a *domain_name* that does not match the host name of the origination point of the spool data set are accepted, but the reply text indicates the mismatch.

HELP command—Get help with SMTP commands

Purpose

The HELP command returns a multiline reply with some general information about the SMTP commands.

Format

▶▶—HELP—

Parameters

command_name

Indicates any of the SMTP commands.

MAIL FROM command—Specify the sender of the mail

Purpose

Use the MAIL FROM command to specify the sender of the mail.

Format

►►MAIL FROM: —<—*sender_path_address*—>—►►

Parameters

sender_path_address

Specifies the full path address of the sender of the mail.

Note: The angle brackets (< >) surrounding the *sender_path_address* in the syntax diagram are required.

Usage

- The MAIL FROM command is used once after a HELO command.
- If the host system has never heard of the sender host, a positive reply is sent, but a message is logged in the SMTP console.

NOOP command—Return a 250 OK return code when SMTP is responding

Purpose

Use the NOOP command to return a 250 OK return code when SMTP is responding.

Format

»»—NOOP—◀◀

Parameters

There are no parameters for this command.

QUEU command—Get information about mail queued at SMTP for delivery

Purpose

Use the QUEU command to get information about mail queued at SMTP for delivery.

Format



Parameters

DATE

Causes information about the age of the mail to be returned. The default is to not return age information.

Usage

QUEU returns a multiline reply with information about mail queued at SMTP for delivery. The following information is returned about mail:

- | | |
|----------------------------|---|
| Spool Queue | Contains mail that is destined for recipients on the local MVS system, or for recipients on an NJE system attached to the local MVS system. This queue is generally empty, because SMTP can deliver this mail quickly by spooling it to the local recipient or to the NJE address space for delivery to an NJE network recipient. |
| Active | Indicates that if SMTP is currently transmitting to a TCP network destination, all the mail queued for that destination is shown to be active. |
| Queued | All mail that arrives over a batch SMTP connection, and mail from TCP connections that is to be forwarded to another TCP network destination through source routing, is placed on the queued list. As soon as SMTP receives resources from the TCPIP address space, mail that is queued is promoted to active. |
| Retry Queue | Mail is placed here after SMTP tries to transmit mail to each of the TCP network hosts, but was unable to either open a connection or complete delivery over the connection. After the number of minutes specified by RETRYINT, mail is promoted from the retry queue to the QUEUED state. For more information about the RETRYINT variable, refer to the <i>z/OS Communications Server: IP Configuration Reference</i> . |
| Undeliverable Queue | Mail is placed here if SMTP cannot deliver mail to a local MVS recipient, or to a recipient on the NJE network attached to the local MVS system, because spool space on the local MVS system is full. After spool space has been increased and SMTP has been restarted, delivery is attempted again. |

Resolution Queues

SMTP uses the following queues for processing queries to the name server. If the SMTP server is configured to use the site tables rather than the name server, these queues are not used.

If the queue is empty, the word Empty appears to the right of the queue. If the queue contains queries, the queries appear on separate lines below the queue. However, due to the speed of the SMTP server, the output may show that the queue is active without containing any entries. In this case, the word Empty does not appear.

Resolver Process Queue

Is generally empty; it contains queries waiting to be sent to the SMTP resolver. After the query has been processed, it is put in the resolver send queue.

Resolver Send Queue

Contains queries waiting to be processed by the SMTP resolver. SMTP staggers the number of queries sent by the resolver to prevent the overloading of the network and the name server.

Resolver Wait Queue

Contains queries for which the SMTP resolver is waiting for responses. Queries remain in this queue for the period of time it takes to receive a reply from the name server. If a reply is not received, the queries are removed from this queue after the resolver timeout has occurred, and are placed in the resolver retry queue. If the query is successful, the query is placed in the resolver completed queue.

Note: The SMTP resolver timeout is specified by the RESOLVERTIMEOUT statement in the TCPIP.DATA data set.

Resolver Retry Queue

Contains queries that have previously failed, either because the name server did not reply, or the name server returned a temporary error that forced the SMTP resolver to retry the query. A temporary error occurs if, for example, the name server truncates a packet, or if the name server detects a processing error.

The RESOLVERRETRYINT statement specifies the number of minutes SMTP waits before retrying the query. The RETRYAGE statement specifies the number of days SMTP should continue to resolve the query before returning the mail to the sender.

Resolver Completed Queue

Contains queries that have been resolved and are waiting to be recorded into the mail. After the Internet addresses are recorded, SMTP attempts to deliver the mail.

Resolver Error Pending Queue

Contains queries that the name server has returned without answers. The corresponding mail message is returned to the sender with an unknown recipient error.

QUIT command—End an SMTP connection

Purpose

Use the QUIT command to end an SMTP connection.

Format

►►—QUIT—◄◄

Parameters

There are no parameters for this command.

RCPT TO command—Specify the recipients of the mail

Purpose

Use the RCPT TO command to specify mail recipients.

Format

►►—RCPT TO—: —<—*recipient_path_address*—>—►►

Parameters

recipient_path_address

Specifies the full path address of the mail recipient.

Note: The angle brackets (< >) surrounding *recipient_path_address* in the syntax diagram are required.

Usage

- There is a limit on the number of RCPT TO commands that can be processed successfully on a single note. If you have more than 3,000 RCPT commands you will receive a failure reply code **552 Too many recipients**. In this situation an abend B37 still might occur if no more space is available on the volume or if the volume table of contents (VTOC) is full.
- You can use the RCPT TO command only after a MAIL FROM command has been issued.
- If the host system has never heard of the recipient host, the RCPT TO command receives a negative reply.
- If a name server is used for domain name resolution, MX records are used to resolve the recipient IP address before trying A records.

Context

For more information about MX and A records, refer to the *z/OS Communications Server: IP Configuration Guide*.

RSET command—Reset the SMTP connection to the initial state

Purpose

Use the RSET command to reset the SMTP connection to the initial state in which the sender and recipient buffers are erased and the connection is ready to begin a new mail transaction.

Format

►►—RSET—◄◄

Parameters

There are no parameters for this command.

TICK command—Insert an identifier into the batch SMTP response data set

Purpose

Use the TICK command, in combination with the VERB ON command, to insert an identifier into the batch SMTP response data set. This command is useful with mail systems that keep track of batch SMTP response data sets.

Format

►►—TICK—*identifier*—————►◄

Parameters

identifier

Specifies a string used to identify the origin of batch SMTP responses.

Usage

The TICK command has no effect when it is issued over a TCP connection to SMTP.

VERB command—Enable or disable verbose mode

Purpose

Use the VERB command to enable or disable verbose mode.

Format



Parameters

ON

Enables verbose mode. When enabled, the batch SMTP commands and associated replies are recorded in the batch SMTP response data set. Also, the batch SMTP response data set is sent back to the origination point of the batch SMTP command data set.

To avoid receiving spool errors, ensure that the origination point is a valid JES user and node on the SMTP sending system. The origination point information is taken from the TSO transmit (XMIT) command headers.

OFF

Disables verbose mode. When disabled, only the replies (not the commands) are recorded in the batch SMTP response data set. This is the default.

Usage

The VERB command has no effect when issued over a TCP connection to SMTP.

VRFY command—Verify whether a mailbox exists on the local host

Purpose

Use the VRFY command to verify whether a given mailbox exists on the local host.

Format

►►—VRFY—*mailbox*—◄◄

Parameters

mailbox

Specifies a user-defined identifier for a mailbox. This name can specify a single mailbox or a mailing list.

Examples

Verify whether mike is a mailbox on host abc.com:

```
System:    READY
User:      VRFY mike
          250 mike@abc.com
```

Verify whether users-hackers is a mailing list on host abc.com:

```
System:    READY
User:      VRFY users-hackers
System:    250-carol@abc.com
          250-greg@abc.com
          250-marsha@abc.com
          250 peter@abc.com
```

The hyphen (-) as the fourth character of a response indicates that the response is continued on the next line.

Usage

- The VRFY command operates exactly the same as the EXPN command.
- The VRFY command can verify the existence of one or more mailboxes on the system. The mailboxes are defined by configuration statements in the SMTP.SMTP.CONFIG data set.
- The MVS SMTP server verifies only TSO user IDs if RACF is installed on the local system. TSO user IDs that are verified as valid are accepted with a reply code of 250. If RACF is not installed, any character string up to eight characters is accepted with a reply code of 250.

SMTP responses

SMTP commands arrive over a TCP connection (to your terminal) or over a batch SMTP connection. With either connection, a response to each command is generated. All responses are prefixed with a 3-digit number. You can determine the response by inspecting the first digit of the response code:

First digit	Description
2	Indicates a positive response. Command accepted.
3	Indicates a positive response. Send the data associated with the command.
4	Indicates a temporary negative response. Try again later.
5	Indicates a permanent negative response. The command has been rejected.

If SMTP commands arrive over a TCP connection, all responses (positive or negative) are returned over that TCP connection. If SMTP commands arrive over a batch SMTP connection, all responses are written to the batch SMTP response data set.

If verbose mode is enabled for a batch SMTP connection, SMTP returns the batch SMTP response data set to the origination point of the spool data set. The origination point is determined from the NETDATA header if the data set arrives in NETDATA format, or the MAIL FROM command if the data set arrives in punch format. If the batch SMTP connection is not in verbose mode, the batch SMTP response data set is not returned to the point of origin, and is discarded.

If an error occurs during the processing of commands over a batch SMTP connection, such as reception of a negative response (with a first digit of 4 or 5), an error report is mailed back to the sender. The sender is determined from the last MAIL FROM command received that was valid. If the sender cannot be determined from a MAIL FROM command, the sender is assumed to be the origination point of the batch SMTP command data set. The error report mailed to the sender includes the batch SMTP response data set and the text of the undeliverable mail.

All SMTP commands and data that arrive over TCP or batch SMTP connections are subject to the restrictions imposed by constants defined in the SMTPGLOB object. A reference copy of this object is included in the SEZACMAC library and lists constant value declarations used by SMTP. The default values of some of these constants are:

- Command lines must not exceed MaxCommandLine (512 characters).
- Data lines longer than MaxDataLine (1024 characters) are wrapped.

Note: If an incoming note has data lines between 251 and 1024 characters long, these notes are not processed by the TSO RECEIVE command like conventional notes. The recipient user will be prompted to enter a new data set name for the RECEIVE command to temporarily store the note text. When the prompt has been responded to, the text will be presented to the user along with any other notes to be processed.

- Path addresses must not exceed MaxPathLength (256 characters).
- Domain names must not exceed MaxDomainName (256 characters).
- User names, the local part of a mailbox specification, must not exceed MaxUserName (256 characters).

A limit on the number of RCPTs in a single SMTP job is 3 000. If you have more than 3 000 the excessive RCPT commands will receive an failure reply code 552 Too many recipients. Abend B37 can still occur for either of the following reasons:

- No more space is available on volume.
- Volume table of contents (VTOC) is full.

Batch SMTP examples

The following sections contain examples that demonstrate batch SMTP capabilities.

Sending mail to a TCP network recipient

The following is an example of sending mail from an NJE network host to two TCP network recipients. The NJE network is BITNET, and the NJE host is named YOURMVS. This batch SMTP data set is spooled to SMTP at OURMVS, which is running with the run-time arguments GATEWAY and NJEDOMAIN BITNET. OURMVS is a BITNET host and is also connected through a TCP network to the hosts *rsch.our.edu* and *ai.our.edu*.

```
HELO YOURMVS
MAIL FROM:<CAROL@YOURMVS>
RCPT TO:<msgs@rsch.our.edu>
RCPT TO:<alice@ai.our.edu>
DATA
Date: Thur, 26 Mar 92 21:48:57 EST
From: Carol <CAROL@YOURMVS>
To: <msgs@rsch.your.edu>
Cc: <alice@ai.your.edu>
Subject: update
```

```
Mike: Cindy stubbed her toe. Bobby went to
      baseball camp. Marsha made the cheerleading team.
      Jan got glasses. Peter has an identity crisis.
      Greg made dates with 3 girls and couldn't
      remember their names.
```

```
.
QUIT
```

SMTP rewrites the From: line to reflect that the mail has been transferred from an NJE network (in this case, BITNET) to a TCP network. The TCP network recipients receive:

```
From: carol <CAROL%YOURMVS.
BITNET@ourhost.our.edu>
```

Querying the SMTP delivery queues

The SMTP delivery queues can be queried by sending a data set with the SMTP commands VERB ON and QUEU to the SMTP address space. A batch SMTP response data set is returned with the result of the VERB ON command.

Using batch SMTP command in TSO utilities

The batch SMTP commands are also used with the TSO transmit (XMIT) command and the IEBGENER utility in TSO/ISPF.

Note: Jes spool files created by TSO transmit will retain trailing blanks. Jes spool files created by IEBGENER and other utilities will have the trailing blanks truncated.

Use the TSO transmit (XMIT) command to spool a batch SMTP command sequential data set to SMTP. After you create the batch SMTP command sequential data set, use the following command to spool the data set to SMTP:

```
XMIT jesnode-name.smtp DA(batsmtp.text)
```

Where:

jesnode

Is the JES nodename or hostname.

smtp Is the SMTP address space name. This is the default.

batsmtp.text

Is the batch SMTP commands data set.

Note: If sending a member of a partitioned data set (pds) using the TSO transmit command, the member must be converted to a SEQuential file. Use the SEQ option on the TSO transmit (XMIT) command to accomplish this as shown in the following example.

```
XMIT jesnod-name.smtp DA(pds(member)) SEQ
```

Where *pds* is the name of the partitioned data set and *member* is the name of the member to be sent to SMTP.

To code the batch SMTP commands as inline input for SYSUT1 and SYSUT2, create the following JCL using the IEBGENER utility on the TSO/ISPF application.

```
//BATSMTP JOB (userid,nn),MSGCLASS=B,PRTY=12,MSGLEVEL=(2,1)
//IEBGENER EXEC PGM=IEBGENER
//SYSIN DD DUMMY
//SYSUT1 DD *
HELO YOURMVS
MAIL FROM:<CAROL@YOURMVS>
RCPT TO:<msgs@rsch.our.edu>
RCPT TO:<alice@ai.our.edu>
DATA
Date: Thur, 26 Mar 92 21:48:57 EST
From: Carol <CAROL@YOURMVS>
To: <msgs@rsch.your.edu>
Cc: <alice@ai.your.edu> Subject: update

Mike: Cindy stubbed her toe. Bobby went to
      baseball camp. Marsha made the cheerleading team.
      Jan got glasses. Peter has an identity crisis.
      Greg made dates with 3 girls and couldn't
      remember their names.

.
QUIT
/*
//SYSUT2 DD SYSOUT=(B,smtp)
/*          | v
/*          v SMTP address space name for external writer
/*          SYSOUT class
//SYSOUT DD SYSOUT=A
//SYSPRINT DD SYSOUT=A
//
```

The blocksize limit for files placed on the jes spool is 32760. If necessary, code the DCB attributes on the SYSUT2 DD statement. Do not place spanning record files on the jes spool for SMTP to pick up, because SMTP does not support these files. The following shows how to code the DCB attributes:

```
//SYSUT2 DD SYSOUT=(B,SMTP),DCB=(LRECL=133,BLKSIZE=27930),FREE=CLOSE
```

SMTP with DBCS support

Mail in EBCDIC DBCS Big-5, Kanji, Hangeul, Simplified Chinese, or Traditional Chinese can be sent to a remote host using SMTPNOTE, if the SMTP server is configured with the corresponding DBCS support. Refer to the *z/OS Communications Server: IP Configuration Reference* for more information about configuring DBCS support for the SMTP server.

Conversion of DBCS mail

The transmission of DBCS mail by SMTP actually uses two different translation tables, one SBCS and one DBCS. SBCS characters in the mail headers and in the mail body are converted using *hlq*.STANDARD.TCPKJBIN, TCPHGBIN, TCPSCBIN, or TCPCHBIN.

Both SBCS and DBCS translation tables are required for the transmission of DBCS mail, as the mail can contain mixed-mode strings. A mixed-mode string contains both SBCS and DBCS data, delimited by shift-out and shift-in characters.

DBCS conversion is performed only on outgoing and incoming mail to and from other hosts. Mail spooled to SMTP by SMTPNOTE for the local host is delivered directly, without any DBCS code conversion.

Chapter 7. Sending electronic mail using z/OS UNIX sendmail

This chapter briefly describes how to use z/OS UNIX sendmail, provided with z/OS CS, to prepare and send electronic mail using the facilities of the z/OS shell.

For a comprehensive discussion of sendmail, refer to the industry-accepted document *sendmail* by O'Reilly & Associates, Inc.

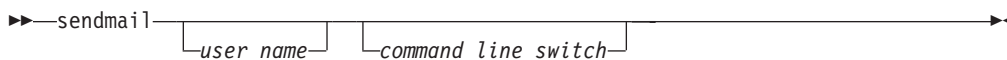
You can also find more information about sendmail on Web site <http://www.sendmail.org>. For the features added after version 8.8.7, refer to *SENDMAIL INSTALLATION AND OPERATION GUIDE*, that can be found on Web site <http://www.sendmail.org/~ca/email/doc8.12/op.html>.

sendmail command—Send file contents

Purpose

Use the `sendmail` command to send the contents of a file.

Format



Parameters

user name

The *user_name* of the person you want to receive the mail.

command line switch

Refer to the *z/OS Communications Server: IP System Administrator's Commands* for information about sendmail command line arguments or switches.

Examples

To test run sendmail by hand, complete the following steps:

1. Create a file named *sendstuff* with the following contents:

This is a one line message.

2. Mail this file to yourself with the following command line, where *you* is your login name:

```
sendmail you <sendstuff
```

When you run `sendmail`, any command-line arguments that do not begin with a hyphen (-) are considered to be the names of the people to whom you are sending the mail message.

Note: The full path name may differ on your system. If so, simply specify the full sendmail path name as it is configured on your system.

The `<sendstuff` sequence causes the contents of the file that you have created (*sendstuff*) to be redirected into the `sendmail` program. The `sendmail` program treats everything it reads from its standard input (up to the end of the file) as the mail message to transmit.

Results

There are several ways to view the message that you just sent, depending on how your system is configured. You can type MAIL to view your mail, or use the *mh* package and type INC to receive and SHOW to view your mail. After viewing your mail, save the mail message to a file. The file will look something like this:

```
From you@Here.US.EDU Wed Dec 26 18:45:36 2001
Return-Path: <you>
Received: (from you@localhost)
    by Here.US.EDU (8.12.1/8.12.1) id fBQAJaoi001037
    for you; Wed, 26 Dec 2001 18:45:36 -0700
Date: Wed, 26 Dec 2001 18:45:36 -0700
From: you <you>
Message-Id: <200112261045.fBQAJaoi001037@Here.US.EDU>
Status: RO
```

This is a one line message.

This file begins with nine lines of text that were not in your original message. Those lines were added by sendmail and your local delivery program and are called the *header*.

The last line of the file is the original line from your *sendstuff* file. It is separated from the header by one blank line. The body of a mail message comes after the header and consists of everything that follows the first blank line.

Ordinarily, when you send mail with your MAILUSERAGENT (MUA), the MUA adds a header and feeds both the header and the body to sendmail. This time, however, you ran sendmail directly and supplied only a body; the header was added by sendmail.

Chapter 8. Using remote printing

z/OS CS provides client and server support for remote printing. The remote printing application enables you to spool data sets remotely to a Line Printer Daemon (LPD). The Line Printer Requester (LPR) sends the spooled data set to a specified print server host and to a specified printer.

This chapter describes the remote printing commands listed in Table 21.

Note: Although this chapter describes the commands and parameters that are valid for the MVS LPR client, you may not get the same results from non-MVS servers, because those servers may not support the same commands and parameters.

Table 21. Remote printing commands

Command	Description	Page
LPQ	Request a list of the printer queue on a remote printer.	328
LPR	Print to a remote printer.	330
LPRM	Remove a job from the printer queue on a remote host.	343
LPRSET	Set the default printer and host name.	345

LPQ command—Request a list of the printer queue on a remote printer

Purpose

Use the LPQ command to request a list of the printer queue on a remote printer from the LPD server controlling that printer.

Notes:

1. Do not use the forward slash character (/) in any parameter value for this command.
2. The TSO LPQ command uses the Pascal socket API, so VMCF must be started for the command to be successful. If VMCF is not started, an ABEND0D6 can occur.

Format

```
LPQ job_id ( Opt Params 1: Opt Params 2:
```

Opt Params 1:

```
ALL Printer name Host host  
AT host
```

Opt Params 2:

```
TRace TYpe VerSion
```

Parameters

job_id

Specifies either a user ID (this cannot start with a digit), or a job number in the remote printer queue. If you do not specify *job_id* with the LPQ command, all the jobs in the remote printer queue are listed.

Note: *job_id* is case-sensitive on some systems.

ALL

Prints a long report, which shows the source host and other print job information.

Printer *name*

Specifies the name of the printer for which you want the printer queue listed.

The printer name cannot contain an @ symbol.

Host *host*

Specifies the name or IPv4 IP address of the printer host. The name must resolve to an IPv4 address. AT is a synonym for this option.

AT *host*

Specifies the name or IPv4 IP address of the printer host. The name must resolve to an IPv4 address. Host is a synonym for this parameter.

TRace

Turns on the trace details for interaction with the remote printer. TRace always overrides TYPe because TYPe is a subset of TRace. Use this option whenever you need to document a problem.

TYPe

Displays the progress of the command.

Version

Displays the version of the program.

Examples

- Query the printer lp0 on the system os2sys1 and print a short listing of the jobs that are queued for the lp0 printer:
LPQ (PRINTER lp0 HOST os2sys1
- If the LPRSET command was previously issued (LPRSET lp0@os2sys1), using the following LPQ command has the same effect as issuing the command in the previous example.
LPQ
- Get a long listing of the jobs queued, including the name of the host that created the jobs:
LPQ (PRINTER lp0 HOST os2sys1 ALL
- List the jobs for a user named smith:
LPQ smith (PRINTER lp0 HOST os2sys1
- Get information only about job 123:
LPQ 123 (PRINTER lp0 HOST os2sys1

Usage

- If the printer or host name are not specified in the LPQ command, the last LASTING.GLOBALV variables for PRINTER and PRTHOST in the *user_id*.LASTING.GLOBALV data set are used as the defaults. You can specify these variables with the LPRSET command. You can use these variables to set up a default printer and host to be used if you do not specify a printer or host.
- User names in a query are case-sensitive. For example, smith and SMITH are not the same names. Also for example, on UNIX systems, lp0 and LP0 can refer to different printers.
- Some systems do not answer with the job information when you use a job number for a job that was not produced by the querying system.
- You would not normally use the LPQ command to query an MVS system, because the LPD queue on MVS processes so quickly.

LPR command—Print to a remote printer

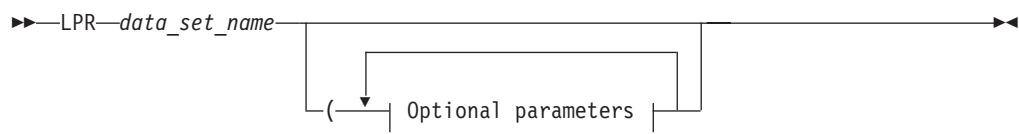
Purpose

Use the LPR command to print to a remote printer.

Notes:

1. Do not use the forward slash character (/) in any parameter value for this command.
2. The TSO LPR command uses the Pascal socket API, so VMCF must be started for the command to be successful. If VMCF is not started, an ABEND0D6 can occur.

Format



Optional parameters:

AT	<i>host</i>
BIG5	
NOBinary	
BINary	
BUrst	
NOBUrst	
CC	
NOCc	
CFfirst	
Class	<i>class</i>
1	
COpies	<i>copies</i>
EOFIf	
NOEOFIf	
Euckanji	
Filter	filter
HAngeul	
HEader	
NOHeader	
IBmkanji	
Indent	<i>number</i>
JIS78kj	ASCII
	JISROMAN
JIS83kj	ASCII
	JISROMAN
JNum	<i>number</i>
Job	jobname
Ksc5601	
LAandscape	
LANDNOcz	
LATEconn	
LNcz	
55	
LInecount	<i>count</i>
NOLincount	
Mail	
NAme	<i>name</i>
POstscript	
NOPostscript	
Printer	<i>name</i>

More optional parameters:

Host	<i>—host</i>
SChinese	
SJiskanji	
SLOWshutdown	
S0si	
S0si ASCII	
S0si EBCDIC	
S0si NONE	
S0si SPACE	
TChinese	
TIMEout	
Title	<i>—title</i>
T0pmargin	<i>—number</i>
NOT0pmargin	
TRACe	
TRANslatetable	<i>—name</i>
TYpe—USCFxlate	
User	<i>—name</i>
Version	
Width	<i>—width</i>
Xlatetable	<i>—name</i>
—o	<i>—option</i>

filter:

f
l
p
r

jobname:

DEST
FOR
FORM
IDENTIFIER
LINECOUNT
OTHERS
PASS
PRIORITY

Parameters

data_set_name

Specifies the name of the data set to be printed. This cannot be the name of an HFS file.

AT *host*

Specifies the name or IPv4 IP address of the printer host machine. If *host* is a name, it must resolve to an IPv4 address. Host is a synonym for this option.

BIG5

Converts data from Traditional Chinese host DBCS to Big-5 DBCS when transferring data to a remote system. LPR loads the BIG5 DBCS translation table from TCPCHBIN binary table data set.

NOBinary

Causes LPR to convert the data from EBCDIC to ASCII when it is sent to the remote system. This is the default.

BINary

Causes LPR to send the data without translation and without any indication of record boundaries. Use this option if the data set is already in ASCII.

Note: The MVS LPD server always converts data sets in ASCII to EBCDIC, and there is no option to disable this conversion.

BURst

Causes a burst page to be printed on the remote printer. This is the default.

NOBURst

Prevents a burst page from being printed on the remote printer.

CC

Causes the remote system to interpret the first character of each line as carriage control.

Records containing control characters that are not valid are deleted. If all records in the file are deleted, LPR processes the empty file.

CC is the default if the record format is FA, FBA, FBM, FM, VA, VBA, VBM, or VM. The characters used to specify these record formats have the following meanings:

- F** Fixed record length
- V** Variable record length
- B** Blocked records
- A** Records containing ISO/ANSI control characters
- M** Records containing machine code control characters

NOCc

Prevents the remote system from interpreting the first character of each line as an ASA carriage control.

CFfirst

Specifies that LPR will send the ControlFile describing the data before it sends the DataFile that contains the data. This option enables some LPD servers to print larger jobs since the data can be printed as it is received.

Specify this option when small jobs print, but large jobs do not.

Note: Even when this option is specified, the print job may still be too complex to print.

CLass *class*

Specifies the class name to the remote system. The class name is printed on the banner pages. The default is the sending host name.

To override the SYSOUT CLASS of a job, the CLASS value must be only one alphanumeric character. For example, CLASS c.

COpies *copies*

Specifies the number of copies to be printed. The default is one copy.

EOFI

Causes an ASCII line feed after the last line of data of a file formatted by ANSI carriage control. Since ANSI carriage control positions the paper before the line is printed, you cannot specify how the paper should be positioned after the

last line prints. The normal network standard is to terminate every file with a line feed. Some LPDs do not print the last line if the line feed is not added. For example, in ANSI carriage control, a 'F1'X means eject to a new page before printing the lines. ANSI or ASA CC is used in files with RECFM=FBA.

EOFlf is the default for ANSI CC files. Specify NOEOFlf if your paper is positioned incorrectly and an extra line is printed because LPR adds a line feed.

This parameter does not impact files that are not ANSI CC. For example, BINary, POstscript, LAndscape and Machine CC files are not affected by EOFlf.

NOEOFlf

Inhibits adding the ASCII line feed after the last line of a file that is formatted by ANSI carriage control. Since ANSI carriage control positions the paper before the line is printed, how the paper should be positioned after the last line cannot be specified by the carriage control characters. The normal network standard is to terminate every file with a line feed. Specifying this parameter causes the last byte of data to be the last byte sent; a line feed is not added.

For example, an ANSI carriage control 'F1'X means eject to a new page before printing the line. ANSI or ASA CC is used, for example, in files with RECFM=FBA.

Specify NOEOFlf if your paper is positioned wrong because an extra line is being printed at the end of the file. Some applications specify the positioning and do not have the extra line feed sent by LPR.

For example, BINary, POstscript, and Machine CC files are not affected by this parameter. This option does not apply when you specify LAndscape.

Euckanji

Causes the data to be converted from EBCDIC DBCS to Extended UNIX Code kanji ASCII DBCS when it is sent to the remote system. LPR loads the EUCKANJI DBCS translation table from the TCPKJBIN binary translate table data set.

Filter *filter*

Specifies the type of processing to be done on the data by the remote system. The *filter* is written as a single letter. Both uppercase and lowercase letters are accepted, but uppercase letters are converted to lowercase.

Note: The filter values must also be defined in the SERVICE statement of the configuration data set for the MVS LPD server. Refer to the *z/OS Communications Server: IP Configuration Reference* for more information on the LPD server configuration data set.

In addition to the following list of filter codes, there are filters supported by other servers described in RFC 1179. [For a list of Requests for Comments (RFCs), see Appendix E, "Related protocol specifications (RFCs)," on page 415.]

Filter code	Description
f	Print as a sequence of lines
l	Print, passing through all control characters
p	Print with pagination

Filter code	Description
r	<p>Print, interpreting the first column as FORTRAN carriage control characters. The supported IBM FORTRAN carriage control characters are 1, 0, +, and -.</p> <p>When using the MVS LPD server to print files with filter code <i>r</i>, the PAGESIZE parameter on the SERVICE statement for the printer you are printing to also affects pagination.</p> <p>See “Usage” on page 341 for further information.</p>

HAngeul

Causes the data to be converted from EBCDIC DBCS to Hangeul ASCII DBCS when it is sent to the remote system. LPR loads the HANGEUL DBCS translation table from the TCPHGBIN binary translate table data set.

HHeader

Causes a page header to be inserted by the client at the top of every printed page if the NOCc and NOBinary options are in effect. To cause the server to insert page headers, use *p* as the value of *filter* and specify the NOHeader option.

NOHeader

Prevents the client from inserting page headers.

IBmkanji

Causes the data to be sent without translation as IBM (EBCDIC) kanji. This parameter performs the same function as the BINary parameter.

Indent *number*

Specifies the number of columns the remote system indents the output when *f* or *p* is specified as the value of *filter*.

JIS78kj ASCII

Causes the data to be converted from EBCDIC DBCS to JIS 1978 kanji ASCII DBCS, using the ASCII shift-in escape sequence ESC (B, when it is sent to the remote system. LPR loads the JIS78KJ DBCS translation table from the TCPKJBIN binary translate table data set.

JIS78kj JISROMAN

Causes the data to be converted from EBCDIC DBCS to JIS 1978 kanji ASCII DBCS, using the JISROMAN shift-in escape sequence ESC (J, when it is sent to the remote system. LPR loads the JIS78KJ DBCS translation table from the TCPKJBIN binary translate table data set.

JIS83kj ASCII

Causes the data to be converted from EBCDIC DBCS to JIS 1983 kanji ASCII DBCS, using the ASCII shift-in escape sequence ESC (B, when it is sent to the remote system. LPR loads the JIS83KJ DBCS translation table from the TCPKJBIN binary translate table data set.

JIS83kj JISROMAN

Causes the data to be converted from EBCDIC DBCS to JIS 1983 kanji ASCII DBCS, using the JISROMAN shift-in escape sequence ESC (J, when it is sent to the remote system. LPR loads the JIS83KJ DBCS translation table from the TCPKJBIN binary translate table data set.

JNum *number*

Specifies a specific job number for the print request, where *number* is a unique, 3-digit number in the range 000–999. This job number is used by LPR to name the temporary data and control files, such as:

dFA123hostname cFA123hostname

The JNum parameter is not valid from NPF; do not specify JNum in the NPF OPTIONS file.

If JNum is not specified for LPR, the three-digit number is randomly generated by LPR.

Job *jobname*

Specifies the job name to the remote system. The default name is the full data set name. The job name is printed on the banner pages.

The following parameters are available with the Job parameter and are entered as PARAMETER=value. When you use these parameters, you must separate them from Job or *jobname* by a blank and from other options by a comma and no blank. For example,

Job PASS=password,FOR=userid

DEST Sets the destination node. The default is the node on which the LPR client is running.

FOR Specifies a user ID other than the sending user ID for which the output is to be spooled. The default is the sender's ID.

FORM Identifies the form on which the data is printed. This is the equivalent of the form-name subparameter in the MVS SYSOUT parameter on the DD card. Therefore, the form name specified can be 1 through 4 alphanumeric or national (\$, #, @) characters.

IDENTIFIER Sets the destination ID. The default is SYSTEM.

LINECOUNT Specifies a numeric field indicating the number of lines on a page. This option overrides the PAGESIZE parameter of LPD.

OTHERS Causes all subsequent options to be ignored. This option is ignored by the MVS LPD server.

PASS Specifies the password. The default is no password, which causes the job to fail if the RACF option is specified for the service.

PRIORITY Specifies the transmission priority. The default is 50.

Ksc5601

Causes the data to be converted from EBCDIC DBCS to Korean Standard Code KSC-5601 ASCII DBCS when it is sent to the remote system. LPR loads the KSC5601 DBCS translation table from the TCPHGBIN binary translate table data set.

Landscape

Converts a non-PostScript data set to a PostScript data set for printing with print lines parallel to the long edge of the paper. If the remote printer can process PostScript output, the data set is printed in landscape format (rotated 90 degrees). Some nonprinting EBCDIC characters below X'3F' are changed to blanks.

Note: An ASCII cntl-Z X'1A' is sent after the data. If this dos-EOF character causes problems, use the LANDNOcz option instead.

LANDNOcz/LNcz

Converts a non-PostScript data set to a PostScript data set for printing with

print lines parallel to the long edge of the paper. If the remote printer can process PostScript output, the data set is printed in landscape format (rotated 90 degrees). Some nonprinting EBCDIC characters below X'3F' are changed to blanks.

Note: Normally, you should use the LAndscape option, unless the dos-EOF character (X'1A') sent after the file causes problems. LN and LNCz are abbreviations for LANDNOcz.

LATEconn

Causes LPR to process the input data file before making any TCPIP connection with the printer. When this option is not specified, the TCPIP connection is made before the data file processing begins. This option can be specified when the initial processing of very large files causes the connection with a printer to be dropped because of a timeout.

LInecount *count*

Determines the number of lines to be printed before a new heading is printed. This option is meaningful only for a data set that does not have the CC option specified either explicitly or by default.

The valid range for LInecount is 0 to the Pascal integer MAX number 2 147 483 647. The default value is 55. To suppress printing a header before each new page, specify LInecount 0. Specifying LInecount 0 has the same effect as specifying the NOLinecount option.

NOLinecount

Prevents a header being printed before each new page. Specifying NOLinecount has the same effect as specifying LInecount 0.

Mail

Causes mail to be sent to the user when the printing operation ends (for those servers that support this).

NAme *name*

Specifies the job information to be provided by the remote system in response to a query. Only the *name* or *files* portion of the query is displayed. This option is not honored by all remote printing servers.

POstscript

Inserts the header required by some systems to recognize a PostScript data set.

NOPostscript

Prevents a PostScript data set from being recognized as a PostScript data set.

Printer *name*

Specifies the name of the printer on which you want the data set printed. The printer name is case sensitive.

Host *host*

Specifies the name or IPv4 IP address of the printer host machine. If *host* is a name, it must resolve to an IPv4 address. AT is a synonym for this option.

SChinese

Converts data from Simplified Chinese host DBCS to Simplified Chinese PC DBCS when transferring data to a remote system. LPR loads the SCHINESE DBCS translation table from TCPSCBIN binary table data set.

SJiskanji

Causes the data to be converted from EBCDIC DBCS to Shift JIS kanji ASCII DBCS when it is sent to the remote system. LPR loads the SJISKANJI DBCS translation table from the TCPKJBIN binary translate table data set.

Slowshutdown

Causes slower TCP/IP connection termination after the job is sent to the printer. This option is rarely needed. This option is provided for print servers which discard the print job just successfully received when LPR uses the fast shutdown. Before using this option, check the print server for errors (such as spool file full) that may be causing the job to be discarded instead of printed.

SOsi

Determines how any EBCDIC DBCS shift-out ('0E'X) and shift-in ('0F'X) characters in the input file are handled. The ASCII, EBCDIC, or SPACE parameters specifies what is used as shift characters in the ASCII output from LPR. If SOsi is specified without a following parameter, ASCII is used as the default.

If you do not specify SOsi, shift-out/shift-in characters are not used in the ASCII data stream. Therefore, the EBCDIC DBCS shift characters are just removed during the translation to ASCII. This is the same as specifying SOsi NONE.

SOsi has no effect on DBCS translations JIS78KJ, JIS83KJ, and IBMKANJI. It is used with other DBCS translation such as BIG5, EUCKANJI, HANGEUL, KSC5601, SCHINESE, SJISKANJI, and TCHINESE.

SOsi ASCII

Specifies that DBCS data strings in the ASCII output are delimited by special shift-out/shift-in characters. As the data is translated from EBCDIC to ASCII, input EBCDIC shift-out ('0E'X) becomes ('1E'X), and '0F'X becomes '1F'X.

SOsi EBCDIC

Specifies that DBCS data strings in the ASCII output are delimited by EBCDIC shift-out/shift-in characters. As the data is translated from EBCDIC to ASCII, input EBCDIC shift-out ('0E'X) remains EBCDIC shift-out ('0E'X), and '0F'X remains '0F'X.

SOsi NONE

Specifies that DBCS data strings in the ASCII output are not delimited by any shift-out/shift-in characters. As the data is translated from EBCDIC to ASCII, any EBCDIC DBCS shift characters are removed.

SOsi SPACE

Specifies that DBCS data strings in the ASCII output are delimited by ASCII space ('20'X) characters. As the data is translated from EBCDIC to ASCII, input EBCDIC shift-out ('0E'X) becomes ASCII space ('20'X) and EBCDIC shift-in ('0F'X) also becomes '20'X.

TChinese

Causes the data to be converted from EBCDIC DBCS to Traditional Chinese (5550) ASCII DBCS when it is sent to the remote system. LPR loads the TCHINESE DBCS translation table from the TCPCHBIN binary translate table data set.

TIMEout

Specifies that LPR wait 5 minutes for an ACK or NACK from the LPD printer. If ACK or NACK does not arrive, LPR terminates the connection with Error Number=73. Since LPR waits for ACK in several places, this error can occur in different LPR messages, such as EZB1048E.

For some printers, the ACK is not returned until the job has printed. For these printers, specifying the TIMEout option can cause long jobs to stop printing.

When the `TIMEout` option is not specified, LPR waits as long as the TCP/IP connection exists. For some printers, this could tie up the PORT (and any NPF thread using LPR on that PORT) until an operator intervenes to fix the printer. For NPF users, `TIMEout` should be added as an LPR option for these printers. Refer to the *z/OS Communications Server: IP Network Print Facility* for information about configuring LPR options in NPF.

Title *title*

Specifies the title assigned to a data set printed with the `FILTER p` option.

TOpmargin *number*

Specifies the number of lines designated for the top margin.

NOTOpmargin

Indicates that blank lines are not inserted at the top of each page.

TRACe

Turns on the trace details for interaction with the remote printer. `TRACe` always overrides `TYpe` because `TYpe` is a subset of `TRACe`.

TRANslatetable *name*

Specifies the SBCS translate table to be used by the client. The *name* parameter is preceded by either the *userid* or the *hlq* and followed by `TCPXLBIN` to form the data set name of the translate table (*userid.name.TCPXLBIN* or *hlq.name.TCPXLBIN*). If both data sets exist, a search order hierarchy determines which one is to be used.

Refer to the *z/OS Communications Server: IP Configuration Reference* for more information about search order hierarchy, loading, and customizing SBCS translation tables. `XLatetable` is a synonym for this option.

TYpe

Displays the progress of the command as the data set is being processed.

USCFxlate

Specifies that a single byte translation table such as `JPNKANA` be used for the print data. The control file generated by LPR and sent to LPD contains upper- and lowercase alphanumeric characters. Specify this option if any of them are being translated incorrectly, causing the LPD to reject the print jobs.

User *name*

Specifies a name that overrides the user identification of the program that is requesting the print job, prints on the banner page, and becomes the user identification of the mail option. The *name* field cannot be longer than eight characters. If you do not enter the user name parameter, it defaults to the system user identification or to the job name.

Version

Displays the version of the program.

Width *width*

Specifies the line width of a data set printed with the `FILTER` options `f`, `l`, `p`, or `r`.

Xlatetable *name*

Specifies the SBCS translate table to be used by the client. The *name* parameter is preceded by either the *userid* or the *hlq* and followed by `TCPXLBIN` to form the data set name of the translate table (*userid.name.TCPXLBIN* or *hlq.name.TCPXLBIN*). If both data sets exist, a search order hierarchy determines which one is to be used.

Refer to the *z/OS Communications Server: IP Configuration Reference* for more information about search order hierarchy, loading, and customizing of SBCS translation tables. TRANslatetable is a synonym for this option.

-o option

Specifies an option that the control file in PSF for AIX (PSF/6000) or InfoPrint uses to format the print job. Any -o option honored by PSF/6000 can be passed to the control file using this parameter of the LPR command. This parameter must be issued without a blank between the -o and the option.

Below are some sample options. None of these options are standard LDP options. They are not honored by most LPD print servers.

-ochars=GT15 Sets the value of the CHARS parameter to GT15.

-obin=2 Sets the input bin to 2 (use alternate input bin).

-opagedef=P13700
Sets the value of PAGEDEF parameter to P13700.

-oformdef=F1SEPA
Sets the value of the FORMDEF parameter to F1SEPA.

-ocopies=002 Sets the JCL COPIES count to 2. This parameter is not honored by most LPD servers. Other LPD servers ignore all control file information and print one copy. For these printers, issue the LPR command multiple times to get multiple copies.

IBM Print Services for AIX (S544-3878-03) contains detailed descriptions of the -o options for PSF/6000.

Examples

- Print the data set TEST.LISTING on a printer named lp0 on the system mvs1:
LPR TEST.LISTING (PRINTER lp0 HOST mvs1
- If TEST.LISTING has a record format that contains carriage control such as VBA, the first character of each line is interpreted as carriage control. To prevent the first character of each line from being interpreted as carriage control, use the following command:
LPR TEST.LISTING (PRINTER lp0 HOST mvs1 NOCC
- If this LPRSET command was issued:
LPRSET lp0@mvs1

the following LPR command would also print the data set on printer LP0 on the host MVS1 and prevent the first character of each line from being interpreted as carriage control:

LPR TEST.LISTING (NOCC

- Print the data set TEST.LISTING in landscape mode:
LPR TEST.LISTING (LANDSCAPE

The following example shows the PostScript attributes used in the Landscape option:

```
614 25 translate 90 rotate .88 .76 scale
/n 1 def
/fs 10 def
/lr 11.2 def
/lr 1s 2 mul def
/lr 1s 3 mul def
/t 740 fs sub def
/y t def /ff t def /os 20 def
```

```

/s 512 string def
/Courier-Bold findfont
fs scalefont setfont
/p {n {copypage} repeat erasepage} def
/i (%stdin) (r) file def
/{/c i read not {p stop} if def
c 26 eq {p stop} if
/x 20 def
/y c 43 eq {y /x os def}
{c 32 eq {y ls sub}
{c 48 eq {y ld sub}
{c 45 eq {y lt sub}
{c 49 eq {ff} {y} ifelse}
ifelse} ifelse} ifelse} ifelse def
/ff 0 def
y 65 le {p /y t def} if x y moveto
/os i s readline not {p stop} if dup show
length 0 eq {20} {20.72} ifelse def } loop

```

To understand these attributes you may need to reference a PostScript manual.

- If a data set TEST has a low-level qualifier of LISTPS (PostScript), use the following command to send TEST to a PostScript-capable printer without specifying the PostScript option:

```
LPR TEST.LISTPS (PRINTER lp0 HOST mvs1
```

- Print a FORTRAN source program with 57 lines on each page:

```
LPR TEST.FORTRAN (LINECOUNT 57
```

Usage

- When sending a print job to a printer that has RACF in its definition in the LPD.CONFIG data set, you must specify the password. If it is for a different user ID, you must specify that password and user ID as follows:
Job PASS=password,F0R=userid
- If the printer or host name are not specified in the LPR command, the last LASTING.GLOBALV variables for PRINTER and PRTHOST in the *user_id*.LASTING.GLOBALV data set are used as the defaults. You can specify these variables with the LPRSET command.
- LPR normally issues messages only if there is an error. If you want to track the progress of the command, use the TYpe or TRACe parameter.
- You can use the LPR command to send PostScript data sets to a printer that can print documents in that language. LPR checks that no incompatible options were given, if it is a PostScript data set. You can override this check, if you want to print a PostScript program with the NOPostscript option. UNIX systems examine the first few characters of a data set (looking for %!) to determine if a data set is a PostScript data set. If you have PostScript data sets that do not contain the characters %!, use the PPostscript parameter to add them.
- Carriage control is interpreted line by line. A data set can mix ASA and machine carriage control. Interpretation is done by converting the controls to the appropriate ASCII sequences, before the data set is sent to the remote system. Lines that have incorrect carriage control are not printed.
- When a data set is printed without carriage control, LPR adds a heading line that shows the name of the data set, the title of the system on which the LPR command is running, and a page number. You can specify the number of lines to be printed (excluding the 3 heading lines) with the LInecount parameter.
- When you specify a filter code, LPR ignores CC, HHeader, NOCc, NOHeader, and TOPmargin. When a filter code of f, l, p, or r is specified, LPR stops paginating the data set it is printing. Instead, it sends the data in the data set as plain lines. The following list provides a description of these filter codes:

Filter code	Description
f	Print as a sequence of lines.
l	Print, passing through all control characters.
p	Print with pagination.
r	Print, interpreting the first column as FORTRAN carriage control characters. The supported IBM FORTRAN carriage control characters are 1, 0, +, and -.

When using the MVS LPD server to print files with filter code **r**, the PAGESIZE parameter on the SERVICE statement for that printer is ignored in the LPD CONFIG file. The PAGESIZE parameter defaults to 60 if it is not specified. To prevent unwanted page ejects, change the value specified on the PAGESIZE parameter to a number greater than the actual number of lines on the pages being printed. For example, you can specify 100 000 for the PAGESIZE parameter.

When you specify a filter code of **c**, **d**, **g**, **n**, **t**, or **v**, LPR transmits the data as a byte stream (as though you specified the BINary option).

LPRM command—Remove a job from the printer queue on a remote host

Purpose

Use the LPRM command to remove a job from the printer queue on a remote host.

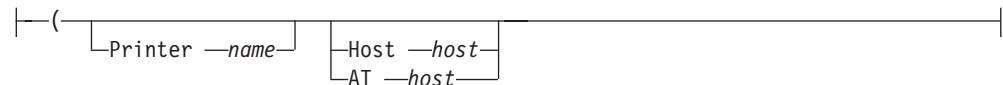
Notes:

1. Do not use the forward slash character (/) in any parameter value for this command.
2. The TSO LPRM command uses the Pascal socket API, so VMCF must be started for the command to be successful. If VMCF is not started, an ABEND0D6 can occur.

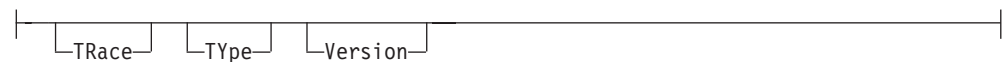
Format



Opt Parms 1:



Opt Parms 2:



Parameters

job_id

Specifies either a user ID (this must not start with a digit), or a job number in the remote printer queue. If you do not specify *job_id* with the LPRM command, your currently active job is removed.

Printer *name*

Specifies the name of the printer associated with the job.

Host *host*

Specifies the name or IPv4 IP address of the printer host. If *host* is a name, it must resolve to an IPv4 address. AT is accepted as a synonym for HOST.

AT *host*

Specifies the name or IPv4 IP address of the printer host. If *host* is a name, it must resolve to an IPv4 address. Host is a synonym for this option.

TRace

Turns on the trace details for interaction with the remote printer. TRace always overrides TYpe because TYpe is a subset of TRace.

TYpe

Displays the progress of the command.

Version

Displays the version of the program.

Examples

- Cancel job number 123 on the printer lp0 on the local system os2sys1:

```
LPRM 123 (PRINTER lp0 HOST os2sys1  
LPRM 123 (PRINTER lp0 AT os2sys1
```

If the job is in the queue, it is removed. If the job is currently active, it is stopped.

- If the LPRSET command was previously issued (LPRSET lp0@os2sys1), using the following LPRM command has the same effect as issuing the command in the previous example:

```
LPRM 123
```

- Cancel the currently active job:

```
LPRM (PRINTER lp0 HOST os2sys1
```

Usage

- If the printer and host name are not specified in the LPRM command, the last LASTING.GLOBALV variables for PRINTER and PRTHOST in the *user_id*.LASTING.GLOBALV data set are used as the defaults. You can set these variables with the LPRSET command. You can use these variables to set up a default printer, which is used if you do not specify a printer.
- Removing the currently active job can depend on the number of jobs currently printing. If you have two jobs printing, and you use the LPRM command without the *job_id* parameter, the first job may finish, but you could inadvertently remove the second job instead.

LPRSET command—Set the default printer and host name

Purpose

Use the LPRSET command to set the default printer and host name. The printer and host name can also be included in the line printer commands (LPR, LPQ, and LPRM).

Notes:

1. Do not use the forward slash character (/) in any parameter value for this command.
2. The TSO LPRSET command uses the Pascal socket API, so VMCF must be started for the command to be successful. If VMCF is not started, an ABEND0D6 can occur.

Format

►► LPRSET—*printer@host* —————►►
Optional Parameters: |

Optional Parameters:

| (| Query | TRace | Version |
| | Type | | |

Parameters

printer@host

Specifies the name of the printer and host to be used. If *host* is a name, it must resolve to an IPv4 address.

Query

Displays the current settings for the default printer and host.

TRace

Turns on the trace details for the recording of the printer and remote host name. TRace always overrides TYPe because TYPe is a subset of TRace.

TYPe

Displays the progress of the command.

Version

Displays the version of the program.

Examples

- Set the default printer and host as the printer `lp0` on the local system `mvs1`:
LPRSET lp0@mvs1
- Display the current version of LPRSET:
LPRSET (VERSION
- Display the current settings:
LPRSET (QUERY

Usage

- When you use LPRSET to set the printer and host, a data set by the name *userid.LASTING.GLOBALV* (where *userid* is the TSO user ID) is created or updated. If this data set does not exist, you must be able to create this data set. *userid.LASTING.GLOBALV* is the name required by LPRSET.
- Printer names can be case sensitive. The printer name must be spelled the way the host uses it. For example, on UNIX systems, lp0 and LP0 can refer to different printers.

Also be aware that ISPF panels default to uppercase unless otherwise specified.

- When you query the current settings on the same command that you set the default printer and host, the query of the current settings is done before the specified default printer and host are set. For example, if the printer was set to PRINT1@RALVM13, and you perform the query, LPRSET PRINT2@RALVM13(Q, the message returned says, PRINTER is PRINT1@RALVM13. However, it also changes the default printer to PRINT2. So if you query again, it would respond, PRINTER is PRINT2@RALVM13.

If you want to set the default printer and host and see that the defaults were set in the same LPRSET command, use the TYPE parameter. For example, if you want to set the default printer and host to PRINT2 on RALVM13 and then see the results afterward, you would enter the following command.

```
LPRSET PRINT2@RALVM13 (TYPE
```

SMSG command—Monitoring the Status of LPD

Purpose

The SMSG command provides an interactive interface to the LPD server to:

- Turn on and off diagnostics tracing
- Query the work queue currently being used by LPD server

These commands are privileged so the commands are only accepted from users specified in the OBEY statement in the LPD server configuration data set. For more information regarding this statement see the IP Configuration Reference. Responses to the SMSG commands are sent to the SYSPRINT file associated with the LPD started procedure job.

SMSG LPD Command for the Privileged User As a privilege user, use the SMSG LPD command to monitor the status of LPD.

Format

►►—SMSG LPD—TRACE ON—TRACE OFF—PRINT WORK—◄◄

Parameters

TRACE ON

Enables tracing in the LPD server.

TRACE OFF

Disables tracing in the LPD server.

PRINT WORK

Prints the jobs in the work queue for LPD.

Examples

The following example shows the output from the SMSG LPD PRINT WORK command which is sent to the SYSPRINT file. Note: Response to the SMSG LPD does not go to the screen for the user. The user must look in the SYSPRINT file associated with LPD job to see the response.

```
16:59:29 EZB0786I Command received "PRINT WORK".
16:59:29 EZB0731I      Work Queue start
16:59:29 EZB0732I      <job number>      <job state>
16:59:29 EZB0733I      Work Queue end
```

Chapter 9. Using GDDMXD/MVS with the X Window system

This chapter describes GDDMXD/MVS and the GDDMXD CLIST. This chapter also describes how to use GDDMXD/MVS user-specified options and keyboard functions. Problem determination information associated with GDDMXD/MVS is also described in *z/OS Communications Server: IP Diagnosis Guide*.

Note: The feature HIP612X is required for GDDMXD.

The following subjects are covered in this chapter:

- “Overview of GDDMXD/MVS”
- “Using GDDMXD/MVS” on page 351
- “User-specified options” on page 354
- “Keyboard functions” on page 367

Overview of GDDMXD/MVS

GDDMXD/MVS is an interface that allows graphics from the IBM Graphical Data Display Manager/MVS to be displayed on workstations that support the X Window System. When GDDMXD/MVS is installed and activated, the data stream created by the GDDM[®] application is translated to the X Window System protocol and transmitted by TCP/IP to the X Window System server for the display. If GDDMXD/MVS is installed and not activated, or has been made inactive, the GDDM application transmits data to its supported display device as if GDDMXD/MVS were not present.

Keyboard and character set mappings

The following member names contain the described character sets:

Member name	Description
GDXALTCS	A member of <i>hlq</i> .SEZAINST that contains a second character set (the 3270 alternate character sets).
GDXAPLCS	A member in the <i>hlq</i> .SEZAINST data set that contains sample keyboard mapping for APL2.
KEYCODE	A member of <i>hlq</i> .SEZALOAD that displays key codes. You can edit this data set to change keyboard mappings.

Executable code

The following member names contain the described executable code or sample:

Member name	Description
GDXLIOX0	A member of <i>hlq</i> .SEZALOAD that contains executable code
XDEFAULT	A member of <i>hlq</i> .SEZAINST that contains the sample XDEFAULT member for GDDMXD/MVS

GDDM application limitations

When GDDMXD/MVS is inactive, there are no GDDM application restrictions. The following types of functions are not supported by GDDMXD/MVS:

- Multiple instances of the GDDM application

- Opening multiple display devices at one time
- Operator windows

GDDM display limitations

GDDMXD/MVS appears as an IBM 3179G device model to the GDDM application. When the HostRast option is active, the device model is an IBM 3279. The IBM 3179 Model G Color Graphics Display Station is used regardless of the display device nickname presented by the application.

The following are characteristics of the GDDMXD/MVS IBM 3179G display station:

Alphanumeric Cursor

When the graphics cursor is not enabled, the alphanumeric cursor can be repositioned by pointing the X Window System pointer device cursor for the GDDMXD window at the desired character location and pressing the pointing device button.

Attached Graphics Cursor

When the graphics cursor is attached, the X Window System pointer device cursor for the GDDMXD window changes to a crosshair pattern and moves as the pointer device is moved.

Blinking Character Attribute

Ignores the blinking character attribute.

Character Display

Characters with an EBCDIC value of less than hex 40 are displayed as blanks.

Color Mixing

GDDMXD/MVS supports only the overpaint foreground color mix mode. The initial color of the image area is black, and mixing with the actual background colors is not performed.

An exception is made for data passed by an image data order. In this exception, a combined foreground color mix mode is supported, if the series of begin image orders have exactly the same parameter values.

When the HostRast option is active, color mixing is performed by GDDM, and the preceding exception does not apply.

Default Vector Symbol Set

The Default Vector Symbol Set is not supported.

Detached Graphics Cursor

When the graphics cursor is detached by the data stream or is not attached, the X Window System pointer device cursor for the GDDMXD window changes to an open arrow when the keyboard is unlocked, or changes to an X shape when the keyboard is locked.

Detectable Fields

Ignores the detectable fields.

Pixel Spacing

When the HostRast option is not active, the vertical and horizontal pixel spacing of the actual display device that is obtained from the X Window System is supplied to the GDDM application. When the HostRast option is active, the pixel spacing of an IBM 3279 Color Display Station is supplied to the GDDM application.

Visual Appearance

For all programmed symbol and image data that is received from the GDDM application, each GDDM pixel is mapped to one X Window System display pixel, which causes a different appearance from the same data stream displayed on an IBM 3179G Color Graphics Display Station. This map process can also cause display differences in the placement of alphanumeric field data over the graphics display and in the appearance of the filled areas of the graphic display. When the HostRast option is active, aspect ratio distortion of the displayed graphics appears, unless the aspect ratio of the X Window System display is the same as the IBM 3279.

Using GDDMXD/MVS

Before GDDM data can be sent to an X Window System display, activate GDDMXD/MVS by invoking the GDDMXD CLIST. Make sure that you have already copied the GDDMXD CLIST to your system CLIST data set. If you have not, refer to the *z/OS Communications Server: IP Configuration Reference* for instructions.

Note: If you do not want to run GDDM applications through the X Window System, do not enable GDDMXD/MVS.

To invoke the GDDMXD CLIST, use the GDDMXD command in the format described in “GDDMXD command—Invoke the GDDMXD CLIST” on page 352.

GDDMXD command—Invoke the GDDMXD CLIST

Purpose

Use the GDDMXD command to invoke the GDDMXD CLIST.

Format

►► GDDMXD ON
OFF _____ ►◄

Parameters

ON

Enables GDDMXD/MVS. GDDM output is sent to the X Window System display. The system responds with GDDMXD/MVS active.

OFF

Disables GDDMXD/MVS. The system erases the data set that was created when GDDMXD/MVS was activated and responds with GDDMXD/MVS inactive.

Identifying the target display

Purpose

A TSO global variable is used by the X Window System to identify the IP address of the target display based on the contents of the data set *user_id.XWINDOWS.DISPLAY*.

Format

►—*internet_address*—:*target_server*—┐
└*.target_screen*┘◄

Parameters

internet_address

Specifies the IPv4 IP address of the host machine on which the X Window System server is running.

:*target_server*

Specifies the number of the display server on the host machine.

.target_screen

Specifies the screen to be used on the *target_server*.

Examples

Examples of the contents of the *user_id.XWINDOWS.DISPLAY* data set.

- charm.cambridg.ibm.com:0.0
- 129.42.3.109:0.0

GDDMXD usage notes

- When you use the TSO Session Manager with GDDMXD, enter a null line in the host session window after the GDDMXD graphics window disappears. This updates and activates the host session window.
- When you run PL/I GDDM applications, do not let the ISASIZE run-time option default to 0. This causes excessive allocation of storage below the 16 megabyte line, and causes a variety of storage allocation abends. Enter a run-time option for ISASIZE, such as ISASIZE(20K), to prevent storage allocation abends.
- Although GDDMXD provides its own device information to the GDDM application, normal GDDM device initialization occurs. A full-screen 3270 TSO session from a real or emulated 3270 terminal with 80 columns and 32 rows is required to invoke the GDDM application.

Resizing the GDDMXD graphics window

GDDMXD supports four graphics presentation space sizes. The size of the graphics presentation space used by GDDMXD is determined by the window width specified by the Geometry option in the *user_id.X.DEFAULTS* data set (see “User-specified options” on page 354 for more information). The size is also determined dynamically when you resize the GDDMXD graphics window. The relationship between the size of the graphics presentation space and the window width is shown in Table 22.

Table 22. Supported graphics presentation space sizes

Window width (pixels)	GDDMXD graphics presentation space (pixels)
< 650	480 horizontal by 352 vertical
>=650 to < 850	720 horizontal by 512 vertical
>= 850 to <= 1024	960 horizontal by 682 vertical
> 1024	1200 horizontal by 864 vertical

For graphics presentation space sizes other than the default size (720 pixels by 512 pixels), bit-mapped data, such as symbol sets and images, is expanded or compressed to meet the scaling requirements of the specified graphics presentation space.

You can expand bit-mapped data by duplicating rows and columns of the data. The resulting view can differ slightly from the default-size view. You can compress single-plane bit-mapped data by combining rows and columns of the data with a logical OR function. Because this might not yield acceptable results when a black on white image is viewed, the Compr option is provided to specify that a logical AND function be used to compress the data. See “Compr option—Control the technique used to compress bit-mapped data” on page 358 for more information about using this option. You can compress multiplane bit-mapped data by eliminating certain rows and columns. Data compression produces a view that is different from the default-size view.

User-specified options

The user-specified options for GDDMXD/MVS are entries in a data set called *user_id.X.DEFAULTS*. The *user_id.X.DEFAULTS* data set is searched during initialization of GDDMXD/MVS.

Note: The values in the *user_id.X.DEFAULTS* data set are case sensitive and must be entered as shown.

The options listed in Table 23 are supported by GDDMXD/MVS.

Table 23. GDDMXD/MVS options

Option	Description	Page
ANFontn	Specifies the X Window System font used for characters in the alphanumeric presentation space.	356
CMap	Specifies whether the default color map is loaded or bypassed.	357
Compr	Controls the technique used to compress bit-mapped data when a graphics window size of 480 by 352 pixels is specified.	358
Enter	Overrides the default key mapping for Enter.	359
GColornn	Specifies a color name.	360
Geometry	Specifies the size and location of the initial GDDMXD graphics presentation space.	361
GMCPnn	Overrides GDDM multicolor patterns with workstation color names.	362
HostRast	Performs raster image processing at the host.	363
NewLine	Overrides the default key mapping for NewLine.	364
XSync	Requests that the X Window System process one request at a time.	365
ZWL	Tells GDDMXD/MVS to draw all lines using 0-width lines.	366

ANFontn option—Specify the X Window system font used for characters in the alphanumeric presentation space

Purpose

Use the ANFontn option to specify the X Window System font that GDDMXD should use to display characters in the alphanumeric presentation space of the GDDMXD window.

Format

►►—gddmx*ANFontn:—*fontname*————►►

Parameters

n Specifies presentation space size.

fontname

Specifies the name of the X Window System font.

Examples

The following are examples of ANFontn options.

```
gddmx*ANFont1: Rom8
gddmx*ANFont3: Rom14
```

Usage

Graphics mode 1 and 2 characters in the graphics presentation space are not affected by this option. The value of *n* is in the range 1–4 and defines the X Window System font for each of the four sizes of presentation space supported by GDDMXD. You can specify the ANFontn option for any, all, or none of the four values for *n*. The X Window System fonts specified should be fixed-space fonts that have characters that fit into the character box size required by each of the four presentation space sizes.

<i>n</i>	Presentation space	Character box	Example font
1	480 x 352	6 x 11	Rom8
2	720 x 512	9 x 16	Rom11
3	960 x 682	12 x 21	Rom14
4	1200 x 864	15 x 27	Rom17

If you select a font that has characters that are larger than the character box size, the characters might overlap when displayed.

CMap option—Specify whether the default color map is loaded or bypassed

Purpose

Use the CMap option to specify whether the default color map is loaded or bypassed.

Format



Parameters

Y Directs GDDMXD/MVS to load the default color map. This is the default.

N Directs GDDMXD/MVS to bypass loading the default color map.

Usage

During initialization, GDDMXD/MVS issues the X Window System call, `XInstallColormap`, to load the default color map. If the CMap option is specified as N, the `XInstallColormap` call is not made. This option is for X Window System servers that load their own color map and do not want the clients to load any other color map.

Compr option—Control the technique used to compress bit-mapped data

Purpose

Use the Compr option to control the technique used to compress bit-mapped data when a graphics window size of 480 by 352 pixels is specified.

Format



Parameters

O or o

Specifies that a logical OR function must be used when compressing bit-mapped data. This is the default.

A or a

Specifies that a logical AND function must be used when compressing bit-mapped data.

Enter option—Override the default key mapping for Enter

Purpose

The Enter option can be specified in the *user_id.X.DEFAULTS* data set to identify which X Window System Keysym is to be mapped to the Enter function. This option overrides the default mapping of the Keysym `XK_Execute` to the Enter function.

Format

►►—`gddmx*Enter:—keysym_name—`◄◄

Parameters

keysym_name

Specifies the X Window System Keysym representing the physical key. For standard Keysyms, the `XK_` prefix is not included in specifying the option.

Examples

In the following example of the Enter option, the X Window System Keysym, `XK_Return`, is mapped to the Enter function.

`gddmx*Enter: Return`

GColornn option—Specify a color name

Purpose

GDDMXD/MVS provides a default mapping of GDDM colors to X Window System colors. Use the GColornn option to override a default color name or to specify a color if a default color name is not available by your X Window System server.

Format

►►gddmx*GColornn:—c◄◄

Parameters

nn:

Specifies the GDDM color entry that is mapped.

c Specifies the X Window System color that is used as the GDDM color.

Usage

Table 24 lists the GDDM colors that GDDMXD/MVS maps to the X Window System.

Table 24. GColors

GColornn	GDDM color	X Window System color
GColor1	Blue	Blue
GColor2	Red	Red
GColor3	Magenta	Magenta
GColor4	Green	Green
GColor5	Turquoise	Turquoise
GColor6	Yellow	Yellow
GColor7	White	White
GColor8	Black	Black
GColor9	Dark Blue	Dark Slate Blue
GColor10	Orange	Orange
GColor11	Purple	Plum
GColor12	Dark Green	Dark Green
GColor13	Dark Turquoise	Dark Turquoise
GColor14	Mustard	Wheat
GColor15	Gray	Gray
GColor16	Brown	Brown

Examples

The following is an example of using a GColornn option to override a default color:

```
gddmx*GColor3: Pink
```

In this example, specifying the GColor3 entry in the *user_id*.X.DEFAULTS data set maps the GDDM color, magenta, to the X Window System new color of pink.

Geometry option—Specify the size and location of the initial GDDMXD graphics presentation space

Purpose

Use the Geometry option to specify the size and location of the initial GDDMXD graphics presentation space.

Format

►►—gddmx*Geometry:—*width x height*— + —*x_offset*— + —*y_offset*—►◄

Parameters

width

Specifies the initial width of the GDDMXD graphics window. The *width* determines the initial size of the graphics presentation space.

height

Specifies the initial height of the GDDMXD graphics window.

x_offset

Specifies the location of the upper left corner of the window where *x_offset* is the horizontal offset from the upper left corner of the display.

y_offset

Specifies the location of the upper left corner of the window where *y_offset* is the vertical offset from the upper left corner of the display.

Examples

The following is an example of a Geometry option:

```
gddmx*Geometry: 750x600+20+20
```

GMCPnn option—Override GDDM multicolor patterns with workstation color names

Purpose

Use the GMCPnn option to override GDDM multicolor patterns with workstation color names.

Format

►►—gddmx*GMCPnn:—c—————◄◄

Parameters

nn:

Specifies the GDDM multicolor pattern.

c Specifies the color that is used with the defined GDDM multicolor pattern.

Examples

The following is an example of a GMCPnn option:

```
gddmx*GMCP126: MediumBlue
```

In this example, the color medium blue is used when multicolor pattern 126 is specified by the GDDM application.

HostRast option—Perform raster image processing at the System/370 Host

Purpose

Use the HostRast option to perform raster image processing at the System/370™ host.

Use the HostRast option when:

- Multiplane character symbol sets are required by the application.
- GDDM color mixing is important to the application.

The default device model for GDDMXD/MVS is an IBM 3179G with a mouse and the raster image processing is performed at the workstation.

Format



Parameters

- N** Directs GDDMXD/MVS to use the IBM 3179G as a device model. This is the default.
- Y** Directs GDDMXD/MVS to use the IBM 3279 as a device model.
- X** Directs GDDMXD/MVS to use the IBM 3279 as a device model and expand the pixel mapping to reduce aspect ratio distortion.

Usage

- The APL2 character set is not supported when the HostRast option is active.
- When the HostRast option is specified as Y, the GDDM application performs the raster image processing and transmits the picture as a series of characters whose pixel definitions have been transmitted to Programmed Symbol Sets. The picture is mapped exactly as an IBM 3279.
- If the ratio of horizontal to vertical pixel spacing is not the same as that of an IBM 3279, the aspect ratio can be distorted.

NewLine option—Override the default key mapping for NewLine

Purpose

The NewLine option can be specified in the *user_id.X.DEFAULTS* data set to identify which X Window System Keysym is to be mapped to the NewLine function. This option overrides the default mapping of the Keysym XK_Return to the NewLine function.

Format

►►—gddmx*NewLine:—*keysym_name*—————►◄

Parameters

keysym_name

Specifies the X Window System Keysym representing the physical key. For standard Keysyms, the XK_ prefix is not included in specifying the option.

Examples

In the following example of the NewLine option, the X Window System Keysym, KP_Enter, is mapped to the NewLine function:

```
gddmx*NewLine:  KP_Enter
```

XSync option—Request that the X Window system process one request at a time

Purpose

The X Window System operates asynchronously. By the time an error has been detected, more requests could have been issued by the application.

Use the XSync option to request that the X Window System process one request at a time.

Format



Parameters

N Allows the X Window System to operate asynchronously. This is the default.

Y Directs GDDMXD/MVS to cause the X Window System to operate synchronously.

Usage

Be aware that system performance goes down when you use XSync=Y.

ZWL option—Tell GDDMXD/MVS to draw all lines using 0-width lines

Purpose

The X Window System supports a range of line widths. Because some X Window System servers draw wide lines at a slow rate, you can use the Zero Width Lines (ZWL) to tell GDDMXD/MVS to draw all lines using 0-width lines. The X Window System server uses the fastest process to draw the lines. The resulting line might not be exactly the same as if it had been drawn as a wide line.

Format

►►gddmx*ZWL:

N
Y

◄◄

Parameters

- N Directs GDDMXD/MVS not to use 0-width lines for all drawing. This is the default.
- Y Directs GDDMXD/MVS to use 0-width lines for all drawing.

Keyboard functions

The following sections detail different keyboard functions supported by GDDMXD/MVS.

GDDMXD/MVS keyboard functions

When you enter input to the GDDM application by GDDMXD/MVS, use the following 3270 keyboard functions.

- All alphanumeric keys
- **F1** – **F24**
If **F13** – **F24** are not available, use **Shift** + **F1** to **Shift** + **F12**
- **Tab** or **Shift** + **Tab**
- Directional arrows
- **End** key to erase to the end of the field
- **Insert** key and **Delete** key
- **PA1**, **PA2**, and **PA3**
- **Enter** key
- **Newline** key

Note: The **Backspace** key is treated as a cursor left key.

If you cannot locate these keys on your workstation, refer to your workstation X Window System documentation to determine the mapping of X Window System key symbol definitions to the physical keys.

GDDMXD/MVS to X Window system keyboard functions

The following are the GDDMXD/MVS keyboard functions that translate to X Window System key symbol definitions. Key functions not listed are not supported.

GDDMXD/MVS keyboard function	X Window System key symbol
APL2 character set toggle	XK_Backspace with state Mod1Mask
Clear	XK_Pause
Delete	XK_Delete
Down	XK_Down
End	XK_End
Enter	XK_Execute
Insert	XK_Insert
F1 – F12	XK_F1 – XK_F12
Left	XK_Left
Newline	XK_Return
PA1	XK_Prior
PA2	XK_Next
PA3	XK_Home
Right	XK_Right
Tab	XK_Tab
Up	XK_Up

APL2 character set keyboard

The APL2 character set is activated by simultaneously pressing the X Window System XK_Backspace key (usually the **Backspace** key) and the State Mod1Mask key (usually the **Alt** key). For example, if you use the IBM 101 Enhanced Keyboard, the APL2 character set is toggled on and off by pressing and holding the **Alt** key, and then pressing the **Backspace** key.

When the APL2 character set is active, the characters *APL* are displayed in the title bar of the GDDMXD/MVS window.

In the X Window System, a key code is assigned to each key on the keyboard. GDDMXD/MVS uses key codes in combination with modifier keys. For example, the **Shift** and **Alt** keys determine the data that should be passed back from GDDMXD/MVS to the X Window System application to identify the user's keystroke data.

GDDMXD looks for the data set *hlq*.SEZAINST(GDXALTCS) when it is initialized. Before using GDDMXD, copy the installed TCP/IP copy of *hlq*.SEZAINST(GDXALTCS) to *user_id*.GDXALTCS.PSS, or allocate the common installed copy of *hlq*.GDXALTCS.PSS to ddname GDXDACSP.

A default map for the APL2 character set is provided in GDDMXD/MVS, which corresponds to the IBM 101 Key Enhanced Keyboard. You can override this default map by creating a data set called GDXAPLCS.MAP to define the map for your workstation. When GDDMXD/MVS is initialized, the system searches for a data set called GDXAPLCS.MAP. If the GDXAPLCS.MAP data set exists, the data in the GDXAPLCS.MAP data set replaces the default mapping for all keys.

Setting up *hlq*.GDXAPLCS.MAP

The following steps describe how to set up the GDXAPLCS.MAP data set.

1. Invoke the program KEYCODE from the TCP/IP load module library in *hlq*.SEZALOAD to determine the key codes for the keyboard keys.
When KEYCODE is executed from your workstation session to the host system, the key code is displayed for each key pressed at the workstation. Therefore, you can establish the association between a key and the character you want to generate.
See Appendix B, "Mapping values for the APL2 character set," on page 399 for more information about the mapping values that are defined in the GDXAPLCS.MAP data set.
2. Copy the *hlq*.GDXAPLCS.SAMPMAP installed with TCP/IP to *hlq*.GDXAPLCS.MAP.
3. Edit GDXAPLCS.MAP to establish the association between the key codes in the program KEYCODE and the character set and code values in Appendix B, "Mapping values for the APL2 character set," on page 399.
4. GDDMXD looks for the data set *user_id*.GDXDAPLCS.MAP when it is initialized. If you want to use a different data set name, allocate the data set to ddname GDXDACSM.

Chapter 10. Executing commands on a remote host

The Remote Execution Protocol (REXEC) and the Remote Shell Protocol (RSH) are remote execution clients that enable you to execute a command on a remote host and receive the results on the local host. You can execute either REXEC or RSH from the TSO command line, the z/OS UNIX command line, or as a batch program. When executed as a batch program, the results are stored in a data set for later use.

To use REXEC, you must have a REXEC daemon running on the remote host. The REXEC client passes the user name, password, and command to the REXEC daemon. The daemon provides automatic logon and user authentication, depending on the parameters that you set.

To use RSH, you must have a RSH daemon running on the remote host. The RSH client passes the local user name, remote user name, and command to the RSH daemon. The remote user name may be in the form user/password when the RSH daemon is on an MVS host. The daemon provides automatic logon and user authentication, depending on the parameters that you set.

This chapter describes how to use the REXEC and RSH clients.

The following subjects are covered in this chapter:

- “REXEC command—Execute a command on the remote host and receive the results on your local host” on page 370
- “Using the NETRC data set” on page 372
- “Submitting REXEC and RSH requests in batch” on page 372
- “Using remote execution clients in a z/OS UNIX environment” on page 378
- “The z/OS UNIX orexec/rexec command—Execute a command on the remote host” on page 380

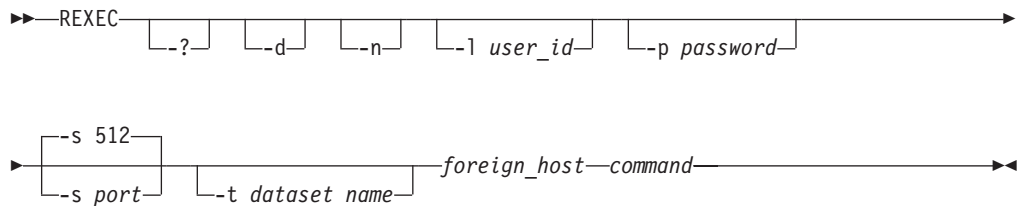
REXEC command—Execute a command on the remote host and receive the results on your local host

Purpose

Use the REXEC command to execute a command on the remote host and receive the results on the local host.

Note: The TSO REXEC command uses the z/OS LE C API, so VMCF must be started for the command to be successful. If VMCF is not started, an ABEND0D6 can occur.

Format



Notes:

1. The REXEC parameters -d, -l, -n, -p, -s, and -t are case sensitive and must be entered in lowercase letters. The *user_id* and *password* parameters may be case sensitive, depending on the operating system of the remote host.

Parameters

- ? Displays the help message.
- d Activates debug tracing.
- n Prevents automatic logon, if the same foreign host name is defined in the NETRC data set.
- l *user_id*
Specifies the user ID on the foreign host.
- p *password*
Specifies the password for the user ID on the foreign host.
- s *port*
Specifies the TCP port number of the REXEC server on the foreign host. The default, 512, is the port number defined in */etc/services*.
- t *dataset_name*
Specifies the data set name of a translation table other than STANDARD. The data set name is *userid.tran_table.TCPXLBIN*. The default data set name is *userid.STANDARD.TCPXLBIN*. If this data set is not found, REXEC uses a compiled translation table.
- foreign_host*
Specifies the name or IP address of the foreign host to which you are sending the REXEC command. Specify the foreign host by its host name or IP address.
- command*
Specifies the command to be executed on the remote host.

Examples

Use the REXEC command without using NETRC.DATA:

```
READY  rexec -l user28 -p user28 -s 512 mvs1 lista  
  
MVS TCP/IP REXEC CS V1R2  
SYS1.HELP  
GIM.SGIMCLS0  
DSN230.DSNCLIST  
USER.CLIST  
BUILD.CLIST  
SYS1.HRFCLST  
USER28.RSHD5.JOB00160.D0000103.?
```

Usage

- If you omit the *user_id*, the *password*, or both when entering the REXEC command, the system prompts you to supply the parameters, if the foreign host is not specified with a user ID password in NETRC data set.
- When issuing a command to be executed on the remote host, do not place the command in quotation marks. Doing so may result in unexpected results.

Note: There is no such restriction when using the z/OS UNIX orexec command.

- A condition code of 12 will be set when an REXEC batch request encounters one of the following error conditions:
 - The client cannot connect to TCP/IP.
 - The host name cannot be resolved.
 - The translation table cannot be loaded.
- When REXEC issues a command to a remote system and retrieves the output for presentation to the user, it expects a line of output to be no more than 32767 bytes. A warning message is issued when the size of the output line approaches this threshold. This condition has no effect on the job running on the remote host.

Using the NETRC data set

The NETRC data set provides you with an alternative to specifying the `user_id` and password as REXEC parameters. REXEC uses the following search order to find the NETRC data set to use:

1. NETRC DD statement
2. `userid.NETRC.DATA`
3. `tso_prefix.NETRC`
4. `userid.NETRC`

For information about using the NETRC data set in a batch file, see “Submitting REXEC and RSH requests in batch.”

If the user ID is specified on the `-l` parameter on the REXEC command, no NETRC data sets are used. The user ID and password are case sensitive. If the user ID and password are not in the correct case, failures might occur when connecting to a nonmainframe REXEC server. The following is the format of the NETRC data set:

```
machine hostname login user_id password password
```

Note: You can omit your password in the NETRC data set. If you do, REXEC prompts you for your current password.

The following is an example of an NETRC data set:

```
machine mvs1 login user28 password abcdef
```

The following is a sample of the response that is displayed as a result of using the REXEC command and the NETRC data set.

```
READY  rexec mvs1 lista
MVS TCP/IP REXEC CS V1R2
SYS1.HELP
GIM.SGIMCLS0
DSN230.DSNCLIST
USER.CLIST
BUILD.CLIST
SYS1.HRFCLST
USER28.RSHD5.JOB00161.D0000103.?
```

Submitting REXEC and RSH requests in batch

You usually run REXEC and RSH interactively by entering the command and then receiving the results at your terminal. However, you can also run REXEC and RSH as a batch job. To accomplish this, you must supply the necessary job control language (JCL) and submit it to the job entry subsystem (JES) using the TSO SUBMIT command.

The command format when submitted as a batch job is the same as the command format described in “REXEC command—Execute a command on the remote host and receive the results on your local host” on page 370. You enter the command as a parameter on the EXEC statement. The results of the command executed on the remote host are stored on the local host according to how you define the SYSPRINT DD statement. The data set characteristics should be consistent with the output from the command you are executing at the remote host.

When you invoke the REXEC command, a check is made to see if a data set is allocated to INPUT. If a data set is allocated, any input is read from that data set

rather than from your terminal. Similarly, a check is made to see if data set is allocated to OUTPUT. If so, all REXEC output is written to that data set rather than to your terminal.

The REXECD or RSH server does not support output being returned to output DD statements other than SYSTSPRT, SYSPRINT or OUTPUT. Sometimes it is necessary to direct the output from a REXEC or RSH batch request to an OUTPUT DD and to include a SYSPRINT DD with SYSOUT=* specified. This is particularly true if the REXEC or RSH command to be executed contains a slash(/).

There may be times when REXEC and RSH are being executed and the user does not want the output to be directed to the SYSPRINT DD file. If a //OUTPUT DD card is coded, output will be directed to it. This DD statement must be directed to a SYSOUT or a validly defined data set. If multiple REXEC or RSH commands are being executed in one step, then it is recommended that DISP=MOD be coded on the //OUTPUT DD card. This will allow each command execution to be appended to the previous output. If the //OUTPUT DD card specifies a nullfile (ie. DSN=NULLFILE or DD DUMMY), then the //OUTPUT DD statement *will not* be used.

When using the REXECD server, the procedure specified in the TSOPROC argument of the startup procedure must have the //SYSTSPRT DD statement appearing before any other output DD specifications in the procedure. For example, if the batch procedure specified was TSOPROC=TESTJOB, the following example would be the correct specification for the batch procedure for REXECD:

```
//TESTJOB EXEC PGM=IKJEFT01,REGION=4M,DYNAM=30,REGION=4M
//STEPLIB DD DSN=A.LOADLIB,DISP=SHR
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
```

Adding a PARM argument to the EXEC JCL DD statement for commands to be submitted to batch might cause unpredictable output, characters to be lost, or output to be presented out of order.

If DDs are dynamically allocated, the order of output returned might be unpredictable. For example, the following TSO/E CLIST were invoked as the remote execution command, using the procedure TESTJOB:

```
PROC 0
TIME
ALLOC FI(OUT) SYSOUT(*)
OPENFILE OUT OUTPUT
SET &OUT = &STR(THIS; IS THE FIRST LINE)
PUTFILE OUT
SET &OUT = &STR(THIS; IS THE SECOND LINE)
PUTFILE OUT
TIME
SET &OUT = &STR(THIS; IS THE LAST LINE)
PUTFILE OUT
CLOSFILE OUT
FREE FI(OUT)
EXIT
```

In this case, the output might be returned as:

```
THIS IS THE FIRST LINE
THIS IS THE SECOND LINE
THIS IS THE LAST LINE
output from time
output from time
```

In the following example, the TESTJOB procedure was modified to add the OUT DD statement:

```
//TESTJOB EXEC PGM=IKJEFT01,REGION=4M,DYNAM=30,REGION=4M
//STEPLIB DD DSN=A.LOADLIB,DISP=SHR
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//OUT DD SYSOUT=*
```

The CLIST was also modified, as in the following example (notice that the ALLOC FI(OUT) and the FREE FI(OUT) have been removed):

```
PROC 0
TIME
OPENFILE OUT OUTPUT
SET &OUT = &STR(THIS; IS THE FIRST LINE)
PUTFILE OUT
SET &OUT = &STR(THIS; IS THE SECOND LINE)
PUTFILE OUT
TIME
SET &OUT = &STR(THIS; IS THE LAST LINE)
PUTFILE OUT
CLOSFILE OUT
EXIT
```

The output appears as in the following example:

```
output from time
output from time
THIS IS THE FIRST LINE
THIS IS THE SECOND LINE
THIS IS THE LAST LINE
```

Be aware that output being returned to the client from DDs other than SYSTSPRT or SYSPRINT might have characters truncated. This behavior has been observed only in the first line of new output files other than SYSTSPRT or SYSPRINT. If you use DDs other than SYSTSPRT or SYSPRINT, you might want to ensure that the first line of the output file contains a blank line, so that no data is lost.

Notes:

1. You can also use the NETRC data set name described in “Using the NETRC data set” on page 372 to specify the user ID and password. You can override the NETRC data set search order by specifying a NETRC DD statement in the batch job. The NETRC DD statement identifies the NETRC data set to be used. You must provide all REXEC command information by using the NETRC data set and the PARM keyword on the EXEC statement.
2. Submitting a long running command may cause the REXEC program to end abnormally with a 522 system abend code. This can be avoided by specifying TIME=1440 on the EXEC statement of the JCL you submit. Job step timing is suppressed, including the collection of SMF job time accounting information.
3. If the command to be executed on the remote host contains a slash (/), you must use a preceding slash (/) in the input stream of the NETRC data set or the PARM.

Following is an example of invoking the RSH program in batch and executing the command:

```
LS ./bin/temp/*
//RSHBATCH EXEC PGM=RSH,
// PARM='/-l userid hostname ls ./bin/temp/*'
```

4. A condition code of 12 will be set when an REXEC batch request encounters one of the following error conditions:
 - The client cannot connect to TCP/IP.

- The host name cannot be resolved.
 - The translation table cannot be loaded.
5. A condition code of 12 will be set when an RSH batch request encounters an error condition in which the client cannot connect to TCP/IP or when the host name cannot be resolved.

The following example shows REXEC JCL Spooling Output to JES:

```
//REXEC   JOB   USERID,MSGLEVEL=(1,1),NOTIFY=USERID
//STP1    EXEC  PGM=REXEC,REGION=512K,
//        PARM='-l userid -p password foreign_host command'
//SYSPRINT DD   SYSOUT=*
```

Note: The data set containing the JCL cannot have sequence numbers.

The following example shows the use of the *userid*.NETRC.DATA containing the user ID and password. The output is sent to a permanent data set for later use.

```
//REXEC   JOB   USERID,MSGLEVEL=(1,1),NOTIFY=USERID
//STP1    EXEC  PGM=REXEC,REGION=512K,
//        PARM='foreign_host command'
//SYSPRINT DD   DSN=USERID.REXEC.SYSPRINT,DISP=(NEW,CATLG),
//        UNIT=3380,VOL=SER=MYVOL
```

Note: When running REXEC in batch, the user ID assigned to the job is used as the *userid* in the NETRC data set.

The following example shows the use of the NETRC DD statement in batch. The NETRC DD statement can be used in batch to override the default *userid*.NETRC.DATA or *userid*.NETRC files.

```
//REXEC   JOB   USERID,MSGLEVEL=(1,1),NOTIFY=USERID
//STP1    EXEC  PGM=REXEC,REGION=512K,
//        PARM='foreign_host command'
//SYSPRINT DD   SYSOUT=*
//NETRC    DD    DSN=TST.REXEC.NETRC,DISP=SHR
```

Note: The user ID and password are retrieved from TST.REXEC.NETRC instead of *userid*.NETRC.DATA or *userid*.NETRC.

RSH command—Execute a command on a remote host and receive the results on your local host

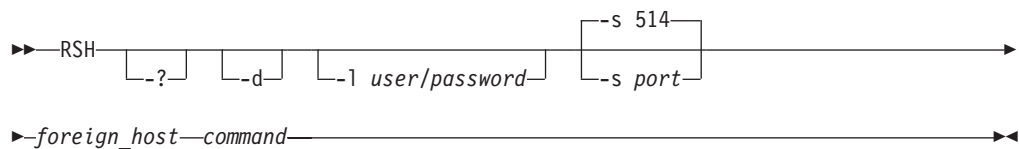
Purpose

The Remote Shell Protocol (RSH) is a remote execution client similar to REXEC that enables you to execute a command on a remote host and receive the results on your local host.

You can use the RSH command from TSO, or as a batch job.

Note: The TSO RSH command uses the z/OS LE C API, so VMCF must be started for the command to be successful. If VMCF is not started, an ABEND0D6 can occur.

Format



Note: The parameters for the RSH command could be case sensitive, depending on the remote host you are targeting.

Parameters

-? Lists the valid parameters for the RSH command.

-d Turns on debug tracing.

-l user/password

Specifies the remote user ID and password.

You must enter the slash (/) between the user ID and password if the target system is MVS. The character you must use can vary, depending on the target host. For VM hosts, you should use an @ character.

-s port

Specifies the server port. The default is 514.

foreign_host

Specifies the name or IP address of the remote host on which you are executing the command.

command

Specifies the command to be executed on the remote host.

Examples

- Execute a command on a remote host and receive the results on your local host:

```
READY

rsh -l user28/user28 mvsl lista

SYS1.HELP
BUILD.HELP
GIM.SGIMCLS0
ISR.V3R5M0.ISRCLIB
DSN230.DSNCLIST
DSN230.NEW.DSNCLIST
DSN230.DSNAMACS
USER.CLIST
BUILD.CLIST
SYS1.HRFCLST
ISP.V3R5M0.ISPEXEC

READY
```

- Use JCL to submit the RSH command as a batch job:

```
//USER28 JOB ,CARTER,MSGLEVEL=(1,1),NOTIFY=USER28
//RSH31 EXEC PGM=RSH,
//          REGION=800K,
//          PARM='/ -d -l user28/user28 mvsl lista'
//SYSPRINT DD  SYSOUT=*
//SYSTCPD DD  DSN=USER28.TCPIP.DATA,DISP=SHR
//SYSIN DD  DUMMY
```

Usage

- You must enter the required parameters on the command line. The RSH command does not prompt you for missing parameters, or enable you to use the NETRC.DATA set.
- A condition code of 12 will be set when an RSH batch request encounters an error condition in which the client cannot connect to TCP/IP or when the host name cannot be resolved.
- When RSH issues a command to a remote system and retrieves the output for presentation to the user, it expects a line of output to be no more than 32767 bytes. A warning message is issued when the size of the output line approaches this threshold. This condition has no effect on the job running on the remote host.

RHOSTS.DATA data set

The *user_id*.RHOSTS.DATA data set provides you with an alternative to specifying RSH parameters *user_id* and *password* when you invoke the RSH command.

The *user_id*.RHOSTS.DATA data set contains one or more entries. Each entry consists of two parts, a fully qualified name of a local host and a local userid associated with that local host. The local userid is case sensitive.

The user ID specified in *user_id*.RHOSTS.DATA can be either the user ID you would otherwise specify as an RSH parameter or your logon ID on your local host.

If your user ID is the same at both the local and remote hosts, use this common ID to create RHOSTS.DATA. In this case, you do not need to include the *user_id/password* parameter on the RSH command, as shown in the following example:

```
rsh mvstone lista
```

If your user ID at the remote host is different from your user ID at the local host, use the user ID of the remote host to create RHOSTS.DATA. In this case, you can invoke the RSH command without the password, as follows:

```
rsh -l user28 mvstone lista
```

If you do not create the RHOSTS.DATA data set on the remote host, you must specify both the user ID and the password with the RSH command, as shown in the following example:

```
rsh -l user28/abcdef mvstone lista
```

The host names in the following examples are the official, fully qualified names of local hosts from which you want to run RSH. The user IDs are the logon IDs for those local hosts. Nicknames are not allowed.

```
local.host.name user_id  
mvsthree.raleigh.ibm.com user30  
mvsthree.raleigh.ibm.com user31  
mvstfour.raleigh.ibm.com user30
```

Using remote execution clients in a z/OS UNIX environment

z/OS UNIX Remote Execution Protocol (z/OS UNIX REXEC) is a remote execution client that you can use to execute a command on a remote host and receive the results on the local host. z/OS UNIX RSH is also available as a remote execution client.

You must have the z/OS UNIX REXEC daemon (orexecd) running on the remote host to use z/OS UNIX REXEC to run z/OS UNIX commands. The z/OS UNIX REXEC client passes the user name, password, and command to the z/OS UNIX REXEC daemon. The daemon provides automatic logon and user authentication, depending on the parameters that you set.

You do not have to have the z/OS UNIX REXEC daemon (orexecd) running on the remote host if you are not running z/OS UNIX commands. The z/OS UNIX REXEC client can use any REXEC daemon (not just z/OS UNIX).

You must have the z/OS UNIX RSH daemon (orshd) running on the remote host to use z/OS UNIX RSH to run z/OS UNIX commands. The z/OS UNIX RSH

client passes the user name, password, and command to the z/OS UNIX RSH daemon. The daemon provides automatic logon and user authentication, depending on the parameters that you set.

You do not have to have the z/OS UNIX RSH daemon (orshd) running on the remote host if you are not running z/OS UNIX commands. The z/OS UNIX RSH client can use any RSH daemon (not just z/OS UNIX).

The z/OS UNIX orexec/rexec command—Execute a command on the remote host

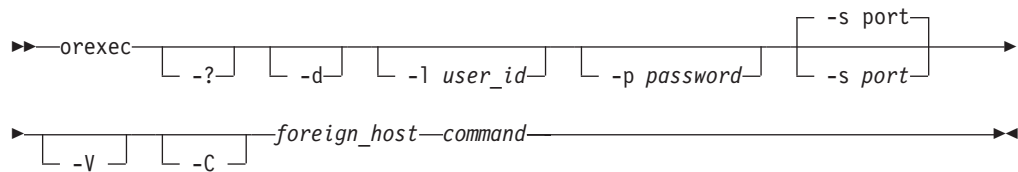
Purpose

Use the z/OS UNIX orexec/rexec command to execute a command on the remote host and receive the results on the local host.

Notes:

1. The rexec command is a synonym for the orexec command in the z/OS UNIX shell. The rexec command syntax is the same as that for the orexec command.
2. If the -s parameter is not used to specify the port, the port to be used by the client must be defined in the */etc/services* file as an exec entry defined to TCP. For information on */etc/services*, Protocol Number and Port Assignments, refer to the *z/OS Communications Server: IP Configuration Reference*.

Format



Note: Enter the orexec parameters -d, -l, -p, and -s in lowercase letters because they are case sensitive. The *user_id* and *password* parameters may be case sensitive, depending on the operating system of the remote host.

Parameters

-? Displays the help message.

-d Activates debug tracing.

-l user_id
Specifies the user ID on the foreign host.

-s port
Specifies the TCP port number of the rexec server on the foreign host. The default is the port number defined in */etc/services*.

foreign_host
Specifies the name or IP address of the foreign host to which you are sending the orexec command. Specify the foreign host by its host name or IP address.

command
Specifies the command that is sent to the foreign host. The command is composed of one or more words. Coding is assigned after checking the prefixed parameters (-l, -p, -s) and assigning the remaining string as the command. The command you specify must not require a response from you to complete. orexec cannot interact with you after you enter data in the command format.

Examples

Use the orexec command to execute a command on a remote host:

```
orexec -l user28 -s 512 mvs1 lista
```

```
SYS1.HELP  
GIM.SGIMCLS0  
DSN230.DSNCLIST  
USER.CLIST  
BUILD.CLIST  
SYS1.HRFCLST  
USER28.ORSHD5.JOB00160.D0000103.?  
.
```

The z/OS UNIX orsh/rsh Command—Execute a Command on the Remote Host

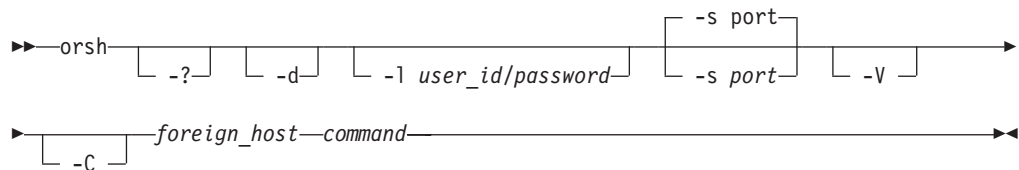
Purpose

Use the z/OS UNIX orsh/rsh command to execute a command on the remote host and receive the results on the local host.

Notes:

1. The rsh command is a synonym for the orsh command in the z/OS UNIX shell. The rsh command syntax is the same as the orsh command syntax.
2. If the -s parameter is not used to specify the port, the port to be used by the client must be defined in the */etc/services* file as an shell entry defined to TCP. For information on */etc/services*, Protocol Number and Port Assignments, refer to the *z/OS Communications Server: IP Configuration Reference*.

Format



Note: Enter the orsh parameters -d, -l, and -s in lowercase letters because they are case sensitive. The *user_id/password* parameter may be case sensitive, depending on the operating system of the remote host.

Parameters

-? Displays the help message.

-d Activates debug tracing.

-l *user_id/password*

Specifies the user ID and password. You must enter the slash (/) between the user ID and password if the target system is MVS. The character you must use can vary, depending on the target host. For VM hosts, you should use an @ character.

-s *port*

Specifies the TCP port number of the rsh server on the foreign host. The default is the port number defined in */etc/services*.

-V

Writes the name and the authorized program analysis report (APAR) level to syslog.

-C Changes all messages to uppercase.

foreign_host

Specifies the name or IP address of the foreign host to which you are sending the orsh command. Specify the foreign host by its host name or IP address.

command

Specifies the command that is sent to the foreign host. The command is composed of one or more words. Coding is assigned after checking the prefixed parameters (-l, -p, -s) and assigning the remaining string as the

command. The command you specify must not require a response from you to complete. orsh cannot interact with you after you enter data in the command format.

Examples

Use the orsh command to execute a command on a remote host:

```
orsh -l user28/password -s 512 mvsl lista
```

```
SYS1.HELP  
GIM.SGIMCLS0  
DSN230.DSNCLIST  
USER.CLIST  
BUILD.CLIST  
SYS1.HRFCLST  
USER28.ORSHD5.JOB00160.D0000103.?  
.
```

Usage

Enter the required parameters on the command line. The ORSH command does not prompt you for missing parameters.

Chapter 11. Using the Network Database System

This chapter describes the Network Database System (NDB), that is used to access relational database systems in a TCP/IP environment.

The Network Database System enables:

- Workstation or mainframe users to issue Structured Query Language (SQL) statements interactively
- Database sharing between computers with different system architectures and operating systems

The NDB client command enables you to issue SQL statements that you can enter directly from the client machine to query or access data from a DB2 subsystem. You can use the NDBCLNT command from the following environments:

- DOS
- MVS
- AIX on RS/6000®
- UNIX on Sun Microsystems
- VM

The following subjects are covered in this chapter:

- “NDBCLNT command—Issue SQL statements to a DB2 subsystem” on page 386
- “SQL statements” on page 389
- “NDB commands” on page 389
- “Return codes for NDB” on page 389
- “Format of output displayed on the client” on page 392

NDBCLNT command—Issue SQL statements to a DB2 subsystem

Purpose

Use the NDBCLNT command to issue SQL statements to a DB2 subsystem.

Note: The SQL statement that you want to enter is not part of the NDBCLNT command. You enter your SQL statement after the NDBC prompt message is displayed.

Format

```
➤ NDBCLNT [-h host_name] [-u userid] [-p password]
          [-d DB2_subsystem] [-o output_file -s] [-l] [-c]
          [-o output_file] ➤
```

Parameters

-h *host_name*

Specifies the host on which the DB2 subsystem resides. *host_name* must be IPv4. You are prompted for a name if you do not enter one.

Note: For the NDBCLNT command, substituting the IP address for *host_name* is accepted only if doing so is supported by the remote procedure call (RPC) implementation of the TCP/IP product running on the client machine.

-u *userid*

Specifies the host user ID to be used to access the DB2 system. You are prompted for an ID if you do not enter one.

-p *password*

Specifies the password for the TSO *userid*. You are prompted for a password if you do not enter one.

Note: If you enter your password from the command line as part of the NDBCLNT invocation, the password is displayed. If you do not enter your password as part of the invocation, you are prompted for the password and the password is not echoed to the screen.

-d *DB2_subsystem*

Specifies the name of the DB2 subsystem to be accessed for this NDB session. You are prompted for a DB2 subsystem name if you do not enter one.

-o *output_file*

Specifies the file that stores the SQL statement result. Ensure that you use the correct naming convention for the system being used. This option is required if you specify the -s option.

-s Prevents output from being displayed on the terminal. If you do not specify the -o option, it is assumed, and you are prompted for the name of the output file.

- l Write listing of NDB session to output file, if one is specified. This includes the SQL statement and the outcome of that SQL statement. If no output file is specified, this option is ignored.
- c Specifies that the output from an SQL statement should be sent as one continuous stream. The default is to have only one buffer of data at a time displayed (enter the word **continue** to get the next buffer of data).

Examples

```
ndbclnt -h mvs1 -d db2a -u user1 -p user1

Port server has allocated NDB Prog: 536870945.
NDBC: create table empinfo (empno int,name char(15),salary dec(8,2),hiredate date)
SQL statement completed successfully

NDBC: insert into empinfo values (10001, 'Andersen', 23456.78,'01/02/1983')
1 rows were affected by this SQL statement

NDBC: insert into empinfo values (10204,'Jones',25890.21,'02/01/1983')
1 rows were affected by this SQL statement

NDBC: insert into empinfo values (10997,'Smith',27654.32,CURRENT DATE)
1 rows were affected by this SQL statement

NDBC: commit
SQL statement completed successfully

NDBC: select * from empinfo
      10001 Andersen          23456.78 1983-01-02
      10204 Jones            25890.21 1983-02-01
      10997 Smith            27654.32 1994-07-25

NDBC: update empinfo set salary = salary * 1.50
3 rows were affected by this SQL statement

NDBC: select * from empinfo
      10001 Andersen          35185.17 1983-01-02
      10204 Jones            38835.31 1983-02-01
      10997 Smith            41481.48 1994-07-25

NDBC: rollback
SQL statement completed successfully

NDBC: select * from empinfo
      10001 Andersen          23456.78 1983-01-02
      10204 Jones            25890.21 1983-02-01
      10997 Smith            27654.32 1994-07-25

NDBC: drop table empinfo
SQL statement completed successfully

NDBC: end
```

Usage

- If you specify more than once any of the NDB invocation options that require a parameter (for example, -h, -u, -p, -d, -o), the last occurrence is the one used by the NDB client code.
- The NDBCLNT command format and parameter descriptions are displayed when you specify any of the following:
 - No parameters
 - No valid parameters
- After entering the NDBCLNT command, you are prompted by the NDBC: prompt for either an SQL statement or an NDB command.

- The reply buffer used by the NDB clients and servers is 8192 bytes. The size of the reply buffer can be reset by changing the value of the definition `NDB_REPLY_LENGTH` at the beginning of the `NDBCLT.C` program of the sample client code, and then recompiling the NDB client.

SQL statements

NDB accepts SQL statements up to 2048 characters long. NDB supports all SQL statements that DB2 allows to be interactively or dynamically prepared along with the SELECT statement.

If you are using NDBCLNT with an operating system that supports redirected input from a file, you must ensure that the last statement in the file is the NDB command END. Refer to the user's guide or online help facility for your workstation operating system for more information about using redirected input.

NDB commands

The NDB commands are as follows:

Command	Description
continue	Requests additional buffers of data when the SQL query returns more than one buffer of data.
end	Ends the NDB client session. END causes an implicit SQL commit work to take place. All changes made since the last commit or rollback (or since the beginning of the session if no commits or rollbacks were issued) become permanent.
eexit	Emergency use only. Certain errors can cause the NDB client to be unable to continue processing NDB commands or SQL statements, including the NDB END command. These error conditions result in the same or other error conditions continually being reported by the NDB client. If this happens, issue the NDB emergency exit command (EEXIT) to immediately exit. Note that using (EEXIT) does not allow the DB2 thread to terminate. This will cause the database resources (for example, locks and buffers) to continue to be held. The NDB server and the port that the NDB client is currently using will also continue to be held until the address space containing this NDB server has been cancelled and restarted.

Return codes for NDB

The valid NDB return codes and messages are:

Code	Message
1	Problem with RPC. Look at the error messages displayed before this one. Refer to the Remote Procedure Call (RPC) messages and codes information for the client platform from which you are running the NDB client.
-20000	RPC error. Unable to call the server. The NDB sample client code detected that the NDB client was unable to successfully send the SQL statement or NDB command to the NDB server and to receive a response. NDB uses RPC to handle requests between NDB clients and servers. Look at the error messages and RPC information that was displayed before this error. Refer to the RPC messages and codes information for the client platform from which you are running the NDB client.

Code	Message
-20100	<p>Invalid NDBC control block. Reason: <string></p> <p>The NDB server detected that the NDBC control block, used for communication between an NDB client and its assigned NDB Server, contained an incorrect value.</p> <p>Listed below are the possible reasons why the error occurred:</p> <ul style="list-style-type: none"> • NDB version numbers do not match. <p>The version number in the client code must match the version number in the server code. The NDB sample client code sets a field in the control block NDBC called <code>ndbver</code> to indicate the current version of the NDB client. The NDB server also contains a version number in its code.</p> <p>For TCP/IP for MVS 3.1, the version value is 2. For all previous releases of TCP/IP for MVS, the version value is 1. Since the version value for NDB changes when the NDBC control block is changed, one level (version, release and modification) of NDB for TCP/IP for MVS may not be compatible with another.</p> • NDB release numbers do not match. <p>The release number in the client code must match the release number in the server code. The NDB sample client code sets a field in the control block NDBC called <code>ndbre1</code> to indicate the current release of the NDB client. The NDB server also contains a release number in its code.</p> <p>For TCP/IP for MVS 3.1 and all previous releases, the release value is 1. Since the version value for NDB changes when the NDBC control block is changed, one level (version, release and modification) of NDB for TCP/IP for MVS may remain compatible with another, but there are differences in the control block field values that affect NDB server processing.</p> • Eyecatcher is not for NDBC control block. <p>The NDB sample client code sets a field in the control block NDBC called <code>ndbcb</code> to indicate the eyecatcher of the main control block being used by the NDB client. The NDB server looks for this eyecatcher before processing information contained in the control block.</p> <p>For TCP/IP for MVS 3.1 and all previous releases, the control block eyecatcher is NDBC.</p> • NDB Server name is unrecognized. <p>The NDB sample client code sets a field in the control block NDBC called <code>ndbsname</code> to indicate the NDB server name by which the NDB client code knows the NDB server. The NDB server did not find a recognized name in the <code>ndbsname</code> field of the NDBC control block. For TCP/IP for MVS 3.1 and all previous releases, the NDB server name is <code>netdbsrv</code>.</p> <p>Fix the NDBC control block field that is causing the error and rebuild the NDB client.</p>
-20101	<p>You (or PUBLIC) do not have authority to run DB2 plan EZAND320.</p> <p>For NDB to access data stored in DB2, the DBUTIL2 application program that acts as interface code was stored in DB2. DBUTIL2 is in the form of a DB2 plan name EZAND320. To use NDB (which uses the EZAND320), you must be granted execute authority for EZAND320 by your database administrator. This authority can be granted to your specific user ID or to everyone by granting it to PUBLIC.</p>

Code	Message
-20102	<p>DB2 Subsystem is unavailable. DB2 is not active at OPEN DB.</p> <p>The NDB server detected that the DB2 subsystem specified at NDB server startup was not running at the time the NDB server tried to establish a connection with DB2. Contact your system programmer.</p>
-20103	<p>Error occurred while using DB2 CAF.</p> <p>An error occurred when the NDB server used the DB2 Call Attachment Facility (CAF) to establish a connection with DB2. Contact your system programmer.</p>
-20104	<p>Error occurred while trying to allocate storage.</p> <p>An error occurred when the NDB server allocated storage for a data structure used by DB2 or for an internal buffer. Contact your system programmer.</p>
-20105	<p>Single row of query data is larger than reply buffer.</p> <p>The length of one row of data to be returned from the current query was greater than the length of the NDB reply buffer (size of which is specified in the NDBC field NDBRPDLN). You can take either of the following actions:</p> <ul style="list-style-type: none"> • Retrieve fewer columns per query either by issuing multiple queries or by making the query more restrictive in the number of columns requested. • Increase the size of the NDB reply buffer by changing the define compiler directive for NDB_REPLY_LENGTH in the program NDBCLT.C and rebuilding the NDB client.
-20108	<p>Host userid or password not valid.</p> <p>The NDB server has detected that the host user ID or host password did not pass the security check on the host system. Enter a valid user ID and password combination.</p>
-20999	<p>Should never occur error has occurred.</p> <p>During the execution of NDB server code, a programming error occurred. Contact your system programmer.</p>
+xxx	Positive return codes, other than +25, are informational and warning codes from DB2.
-xxx	Negative return codes between -001 and -999 or that are less than or equal to -30000 are from DB2.

Refer to *z/OS Communications Server: IP and SNA Codes* for more information about TCP/IP return codes. Refer to *IBM Database 2[™]: Messages and Codes* for more information about DB2 return codes.

Format of output displayed on the client

The output from an SQL query (SELECT) is presented in row and column format. The NDB Server distinguishes between a null value that is retrieved from a table in DB2 and a null value that is the result of an arithmetic error in the SQL SELECT statement (for example, division by 0). A null data value is represented by dashes (-----), while a null value due to an arithmetic error is represented by slashes (/////////).

For more information on null values, refer to *IBM DATABASE2: Application Programming and SQL Guide*.

NDB supports the following SQL data types:

Data type	Description
DECIMAL	All formats supported by DB2
FLOAT	Single and double precision
INTEGER	Long, or fullword, integer
SMALLINT	Short, or halfword, integer
CHAR	Fixed length, up to 254 characters
VARCHAR	Variable length, up to 254 characters
VARCHAR	Long variable length, over 254 characters
DATE	All formats supported by DB2
TIME	All formats supported by DB2
TIMESTAMP	All formats supported by DB2

For unsupported SQL data types, values are replaced with asterisks (*****) unless the value is null. If the value is null, it is represented as previously described. Refer to the *IBM DATABASE 2: SQL Reference* for information about SQL data types.

Appendix A. Specifying data sets and files

This appendix describes the file-naming formats for the following operating systems:

- “MVS data sets”
- “AIX and UNIX files” on page 397
- “AS/400 operating system” on page 397
- “VM files” on page 398

Examples of each format are provided to show how the files appear to a TCP/IP user who is logged on to the different operating systems.

MVS data sets

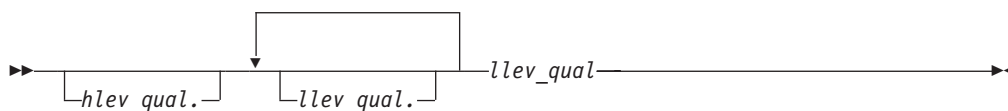
FTP subcommands can require a data set or file name. The format used to name a data set depends on the host system. Some systems limit the length of a data set name, and some systems are case sensitive.

Data set names in MVS consist of one or more names, called qualifiers, each from one to eight characters long, that are delimited from one another by periods.

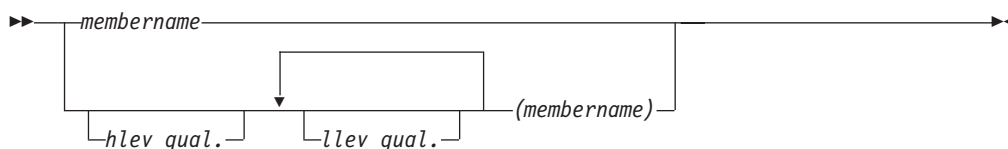
The leftmost qualifier in the data set name is the *high-level qualifier*. The rightmost qualifier in the data set name is the *low-level qualifier*. Partitioned data sets may be further qualified with a member name in the rightmost position. Qualifiers lying between them are called intermediate-level qualifiers.

For example, in the data set name `dog.bulldog.winston`, `dog` is the high-level qualifier, `bulldog` is the intermediate-level qualifier, and `winston` is the low-level qualifier.

Specify TSO sequential data sets in the following format:



Specify TSO partitioned data sets in the following format:



hlev_qual

Specifies the high-level qualifier of the data set. The default is the current working directory. If you specify this parameter, the complete data set name must be enclosed within single quotation marks (`'`).

llev_qual

Specifies the low-level qualifier of the data set. You must specify this qualifier for sequential data sets.

membername

Specifies the member name of a partitioned data set (PDS). You must include parentheses around *membername* only when you also specify *llev_qual* or *hlev_qual*.

Sequential data sets

A sequential data set is a single file that can be allocated with any record length specified. The naming requirements for a sequential data set on an MVS host are minimal, and most of the requirements apply to any data set name under MVS.

The naming requirements for a sequential data set are:

- No part of the name can start with a numeric.
- No part of the name can be more than 8 characters in length.
- Each part of the name is separated by a period.
- A sequential data set name can have a minimum of 2 and a maximum of 44 characters.
- If single quotation marks (') are not used when specifying the data set name, the MVS system appends the current working directory as the first part of the name.

The following examples show the naming conventions for sequential data sets on an MVS host.

To access the sequential data set KC00852.SEQ.NAMES, the user, with the current working directory KC00852, enters one of the following:

- 'KC00852.SEQ.NAMES'
- SEQ.NAMES

Either of these formats is acceptable for accessing a sequential data set.

Partitioned data sets

A partitioned data set (PDS) is a group of files contained in a library. The individual files that make up a PDS are called members. You can access an entire PDS or any individual member of a PDS.

The naming requirements for a partitioned data set are:

- No part of the name can start with a numeric.
- No part of the name can be more than eight characters in length.
- Each part of the name is separated by a period.
- If single quotation marks are not used when specifying the PDS name, the MVS system appends the current working directory as the first part of the name.

The difference between a sequential and partitioned data set specification is that the partitioned data set user accesses the directory of members in the PDS, and the sequential data set user accesses an individual file.

The following examples show the naming conventions for partitioned data sets on an MVS host.

To access the partitioned data set `KC00852.PDS.NAMES`, the user, with the current working directory `'KC00852'`, enters one of the following:

- `'KC00852.PDS.NAMES'`
- `PDS.NAMES`

Either of these formats is acceptable to access a partitioned data set.

Note: You can use the special character asterisk (*) as a global name character (wildcard) for pattern matching when you specify a data set name, with the following restrictions:

- The asterisk must be the last, or only, character specified for a level of qualifier.
- When the data set name is enclosed in quotation marks, you cannot use the asterisk as a wildcard in the high-level qualifier of the data set name. Data set names not enclosed in quotation marks will use the setting of the current directory as the high-level qualifier.
- You can use the asterisk more than once in the complete data set name, but the asterisk must be the last character for each level of data set name qualifier.
- If you specify a member name, you cannot use an asterisk anywhere in the data set name.
- If you use an asterisk as all or part of the member name, you cannot use an asterisk anywhere else in the data set name.

To access an individual member of a PDS, the member name is entered in parentheses.

To access the member `PROPER` in the PDS `KC00852.PDS.NAMES`, the user, with the current working directory `KC00852`, enters one of the following:

- `'KC00852.PDS.NAMES(PROPER)'`
- `PDS.NAMES(PROPER)`

Either of these formats is acceptable to access an individual member of a partitioned data set.

Transferring data between partitioned and sequential data sets

When transferring data between partitioned and sequential data sets, ensure that the *local_file* and *foreign_file* parameters of the FTP subcommands are compatible with the type of data set you are transferring to or from. For example, if your local working directory is a partitioned data set and you want to GET the sequential file `TEST.FILE1`, you cannot issue the subcommand `GET TEST.FILE1` to retrieve the file, because this subcommand by default tries to use the local PDS member name `TEST.FILE1`, which is not a valid member name.

To keep the local and remote file names compatible with the type of data set used, do one of the following:

- Specify both the local and remote file names

For example:

```
GET TEST.FILE TESTFL1
PUT TESTPDS(FILE1) FILE1
```

- Change the directory to the lowest level qualifier.

For example, to transfer between the PDS `'USER14.TESTPDS(NAME1)'` and the sequential data set `'USER17.SEQ.NAME1'`, do the following:

1. Change the local directory (LCD) to 'USER14.TESTPDS'
2. Change the directory (CD) to 'USER17.SEQ'
3. Enter one of the following:
 - GET NAME1 to get 'USER17.SEQ.NAME1' as 'USER14.TESTPDS(NAME1)'
 - PUT NAME1 to put 'USER14.TESTPDS(NAME1)' as 'USER17.SEQ.NAME1'

Data transfer methods

You must use the appropriate transmission attributes to preserve the content and structure of the data when you transfer data sets or files between two hosts. Use the FTP MODE subcommand to specify how the bits of data are to be transmitted, and the FTP TYPE subcommand to define the way that data is represented during the data transfer.

See “MOde subcommand—Set the data transfer mode” on page 216 for information about the MODE subcommand, and “TYpe subcommand—Set the data transfer type” on page 280 for information about the TYPE subcommand.

TCP/IP supports only the data transfer of a data set or file structured as a continuous sequence of data bytes. This ensures that the correct record format is preserved across MVS hosts.

Table 25 shows how to set the transmission attributes for different host systems. IBM mainframe operating systems (VM or MVS) are identified as EBCDIC transfer types. Systems with ASCII storage are identified as ASCII transfer types. A text file of an ASCII transfer type contains standard, displayable characters; a carriage return (ASCII X'0D' and EBCDIC X'15'); and line feed characters (ASCII X'0A' and EBCDIC X'25'). A text file of an EBCDIC transfer type contains standard, displayable characters only. A binary file can contain any characters.

Table 25. Recommended methods for data transfer

Transfer between host types	Transfer type	Mode
EBCDIC to EBCDIC—text data	EBCDIC	Stream
EBCDIC to EBCDIC—binary data	EBCDIC	Block
EBCDIC to ASCII—text data	ASCII	Stream
ASCII to EBCDIC—text data	ASCII	Stream
ASCII to EBCDIC—binary data	Image (binary)	Stream
ASCII to EBCDIC to ASCII—all data	Image (binary)	Stream

Note: The EBCDIC host is used for storage only. Data is not used on the EBCDIC host.

Transferring PDS directory information

When a PDS member is transmitted in block or compressed data transfer mode with a representation type of EBCDIC, the user data associated with the PDS member is also transferred to the directory on the target host. This transfer occurs only when using an MVS client. No PDS directory information is transferred if the member is null (empty).

AIX and UNIX files

For the Advanced Interactive Executive (AIX) and UNIX operating systems, data is stored in files. Related files are stored in a directory. z/OS CS files are UNIX files.

Specify AIX and UNIX files in the following format:

►—/directory/filename—◄

directory

Specifies a directory name. Directories contain the names of files, other directories, or both.

filename

Specifies a file name. It can be up to 14 characters long.

The complete name of an AIX and UNIX file contains the directory name and the file name. The following is an example:

/mailfiles/cooks

Where:

mailfiles

The directory name

cooks

The file name

In the AIX and UNIX operating systems, you specify the first slash (/) only when you begin at the root directory. If you are specifying a file in the current directory, enter only the file name. For example, if you are in the current directory *mailfiles* and you want to access the *cooks* file, specify:

cooks

The directory name and file name can each be up to 14 characters in length. The AIX and UNIX operating systems distinguishes between uppercase and lowercase letters in file names.

A directory name and file name should not include characters such as backslash (\), ampersand (&), and period (.) that have a special meaning to the shell.

AS/400 operating system

For the AS/400 operating system, data is stored in files.

Specify AS/400 files in the following format:

►—library/file.member—◄

library

A library name. Libraries contain the names of programs, files, and commands.

file.member

The file name.

In the AS/400 operating system, files can have one or more members. Each file can consist of data records, source programs, or database definitions.

The FTP subcommand PUT is used to copy a local file member into a file at the remote host. The following is an example:

```
PUT PDS.DATA(MBR1) LIB1/FILEA.MBR1
```

In this example, the PUT subcommand copies member MBR1 from the partitioned data set PDS.DATA on the local host to member MBR1 of file FILEA in the library LIB1 on the remote host. If the member already exists at the remote host, it is overwritten.

VM files

Data is stored in files on VM hosts. Specify VM files in the following format:

►—*filename.filetype*—◄

filename

Specifies the file name.

filetype

Specifies the file type.

Note: The file mode is not accepted by foreign VM hosts; it is taken to be the file mode associated with the current working directory. The file mode is not used in TCP/IP commands.

For example, if you want to specify a file named accounts with a file type cprog, enter the following:

```
accounts.cprog
```

Where *filename* is accounts and *filetype* is cprog.

All VM file specifications are treated as if they are entered in uppercase. The file name and the file type consist of 1 to 8 alphanumeric characters. Other valid characters are \$, #, @ (at character), + (plus), - (hyphen), and _ (underscore).

You can use the special character * (asterisk) for pattern matching.

Appendix B. Mapping values for the APL2 character set

This appendix lists the GDDMXD/MVS default mapping values for the APL2 character set. However, If the *hlq.GDXAPLCS.MAP* data set exists, the default mapping values are overridden.

Each entry in the *hlq.GDXAPLCS.MAP* data set (alternative character set) contains the mapping for a particular physical key that corresponds to three characters. The characters correspond to the physical key by:

- Pressing the key alone
- Pressing the key and the **Shift** key simultaneously
- Pressing the key and the **Alt** key simultaneously

The *hlq.GDXAPLCS.MAP* data set entries must contain the following seven single-byte hexadecimal values entered as EBCDIC characters:

- Value 1 is the hexadecimal keycode for the physical key.
- Values 2, 4, and 6 identify whether the character is in the primary or alternative character set for the emulated 3179G. If the character is in the primary set, the value is 0; if the character is in the alternative set, the value is 8.
- Values 3, 5, and 7 specify the EBCDIC code of the character in the character set.

The combination of values 2 and 3 define the bytes that describe the character when the key corresponding to the keycode is pressed alone.

The combination of values 4 and 5 define the bytes that describe the character when the key corresponding to the keycode and the **Shift** key are pressed simultaneously.

The combination of values 6 and 7 define the bytes that describe the character when the key corresponding to the keycode and the **Alt** key are pressed simultaneously.

Table 26 lists the mapping values for the APL2 character set.

Table 26. Mapping values for the APL2 character set

Character name	Character set value	EBCDIC value	Default keycode
Quad Jot	8	73	9 + Shift
Quad Slope	8	CE	9 + Alt
1	0	F1	A
Diaeresis	8	72	A + Shift
Down Tack Up Tack	8	DA	A + Alt
2	0	F2	B
Overbar	8	A0	B + Shift
Del Tilde	8	FB	B + Alt
3	0	F3	C
<	0	4C	C + Shift
Del Stile	8	DC	C + Alt

Table 26. Mapping values for the APL2 character set (continued)

Character name	Character set value	EBCDIC value	Default keycode
4	0	F4	D
Not Greater	8	8C	D + Shift
Delta Stile	8	DD	D + Alt
5	0	F5	E
=	0	7E	E + Shift
Circle Stile	8	CD	E + Alt
6	0	F6	F
Not Less	8	AE	F + Shift
Circle Slope	8	CF	F + Alt
7	0	F7	10
>	0	6E	10 + Shift
Circle Bar	8	ED	10 + Alt
8	0	F8	11
Not Equal	8	BE	11 + Shift
Circle Star	8	FD	11 + Alt
9	0	F9	12
Down Caret	8	78	12 + Shift
Down Caret Tilde	8	CB	12 + Alt
0	0	F0	13
Up Caret	8	71	13 + Shift
Up Caret Tilde	8	CA	13 + Alt
+	0	4E	14
-	0	60	14 + Shift
!	8	DB	14 + Alt
Times	8	B6	15
Divide	8	B8	15 + Shift
Quad Divide	8	EE	15 + Alt
Q	0	D8	19
?	0	6F	19 + Shift
Q Underbar	8	58	19 + Alt
W	0	E6	1A
Omega	8	B4	1A + Shift
W Underbar	8	66	1A + Alt
E	0	C5	1B
Epsilon	8	B1	1B + Shift
E Underbar	8	45	1B + Alt
R	0	D9	1C
Rho	8	B3	1C + Shift
R Underbar	8	59	1C + Alt

Table 26. Mapping values for the APL2 character set (continued)

Character name	Character set value	EBCDIC value	Default keycode
T	0	E3	1D
Tilde	8	80	1D + Shift
T Underbar	8	63	1D + Alt
Y	0	E8	1E
Up Arrow	8	8A	1E + Shift
Y Underbar	8	68	1E + Alt
U	0	E4	1F
Down Arrow	8	8B	1F + Shift
U Underbar	8	64	1F + Alt
I	0	C9	20
Iota	8	B2	20 + Shift
I Underbar	8	49	20 + Alt
O	0	D6	21
Circle	8	9D	21 + Shift
O Underbar	8	56	21 + Alt
P	0	D7	22
Star	0	5C	22 + Shift
P Underbar	8	57	22 + Alt
Left Arrow	8	9F	23
Right Arrow	8	8F	23 + Shift
Quad Quote	8	DE	23 + Alt
Left Brk Right Brk	8	CC	24
Iota Underbar	8	74	24 + Shift
Delta Underbar	8	FC	24 + Alt
Equal Underbar	8	E1	25
Epsilon Underbar	8	E1	25 + Shift
Diaeresis Dot	8	75	25 + Alt
A	0	C1	27
Alpha	8	B0	27 + Shift
A Underbar	8	41	27 + Alt
S	0	E2	28
Up Stile	8	8D	28 + Shift
S Underbar	8	62	28 + Alt
D	0	C4	29
Down Stile	8	8E	29 + Shift
D Underbar	8	44	29 + Alt
F	0	C6	2A
Underbar	0	6D	2A + Shift
F Underbar	8	46	2A + Alt

Table 26. Mapping values for the APL2 character set (continued)

Character name	Character set value	EBCDIC value	Default keycode
G	0	C7	2B
Del	8	BA	2B + Shift
G Underbar	8	47	2B + Alt
H	0	C8	2C
Delta	8	BB	2C + Shift
H Underbar	8	48	2C + Alt
J	0	D1	2D
Jot	8	AF	2D + Shift
J Underbar	8	51	2D + Alt
K	0	D2	2E
Quote	0	7D	2E + Shift
K Underbar	8	52	2E + Alt
L	0	D3	2F
Quad	8	90	2F + Shift
L Underbar	8	53	2F + Alt
Left Bracket	8	AD	30
(0	4D	30 + Shift
Down Tack Jot	8	FE	30 + Alt
Right Bracket	8	BD	31
)	0	5D	31 + Shift
Up Tack Jot	8	EF	31 + Alt
Z	0	E9	36
Left Shoe	8	9B	36 + Shift
Z Underbar	8	69	36 + Alt
X	0	E7	37
Right Shoe	8	9A	37 + Shift
X Underbar	8	67	37 + Alt
C	0	C3	38
Up Shoe	8	AA	38 + Shift
C Underbar	8	43	38 + Alt
V	0	E5	39
Down Shoe	8	AB	39 + Shift
V Underbar	8	65	39 + Alt
B	0	C2	3A
Down Tack	8	AC	3A + Shift
B Underbar	8	42	3A + Alt
N	0	D5	3B
Up Tack	8	BC	3B + Shift
N Underbar	8	55	3B + Alt

Table 26. Mapping values for the APL2 character set (continued)

Character name	Character set value	EBCDIC value	Default keycode
M	0	D4	3C
Stile	0	4F	3C + Shift
M Underbar	8	54	3C + Alt
,	0	6B	3D
;	0	5E	3D + Shift
Up Shoe Jot	8	DF	3D + Alt
period	0	4B	3E
:	0	7A	3E + Shift
Slope Bar	8	EB	3E + Alt
/	0	61	3F
\	0	E0	3F + Shift
Slash Bar	8	EA	3F + Alt
Space	0	40	45

Appendix C. TELNET extensions

This appendix describes the Telnet 3270 DBCS Transform special operations. The following sections are included:

- “Character set cross reference table”
- “Special key operation for TELNET” on page 407
- “Operation of PF and PA keys” on page 409
- “Sense codes for special key operation” on page 410

Character set cross reference table

Table 27 describes the language, codefiles, and character sets for the Telnet 3270 DBCS Transform extended language support.

Table 27. TCP/IP character set cross reference

Keyword	Codefiles	Description	Character set	Description	CCSID ¹	CPGID ²
KANJI						
JIS78KJ	J8EETA J8EATE	JIS 8 Bit English SBCS	ASCII	JIS X0201 8 Bit	none	none
			EBCDIC	English SBCS	none	none
	J8KETA J8KATE	JIS 8 Bit Katakana SBCS	ASCII	JIS X0201 8 Bit	none	none
			EBCDIC	Katakana SBCS	none	none
	JIS78ETA JIS78ATE	JIS 1978 Kanji DBCS	ASCII	JIS X0208 1978	00955	00955
			EBCDIC	Japanese Host DBCS	00300	00300
JIS83KJ	J8EETA J8EATE	JIS 8 Bit English SBCSI	ASCII	JIS X0201 8 Bit	none	none
			EBCDIC	English SBCS	none	none
	J8KETA J8KATE	JIS 8 Bit Katakana SBCS	ASCII	JIS X0201 8 Bit	none	none
		EBCDIC	Katakana SBCS	none	none	
	JIS83ETA JIS83ATE	JIS 1983 Kanji DBCS	ASCII	JIS X0208 1990	00952	00952
			EBCDIC	Japanese Host DBCS	00300	00300
SJISKANJI	A8EETA A8EATE	8 Bit English SBCS ASCII	ASCII	ISO/ANSI Multilingual	00819	00819
			EBCDIC	Japanese Latin Host SBCS	01027	01027
	A8KETA A8KATE	8 Bit Katakana SBCS	ASCII	ISO/ANSI Multilingual	00819	00819
			EBCDIC	Japanese Katakana Host SBCS	00290	00290
	SJISETA SJISATE	SJIS 1978 Kanji DBCS from EZAKJLAT	ASCII	SJIS 0941	0300	0300
			EBCDIC		0941	0941
	SJISETA SJISATE	SJIS 1995 Kanji DBCS from EZAKJ941	ASCII	SJIS 0941	0300	0300
			EBCDIC		0941	0941
DECKANJI	SJDCEETA SJDCEATE	DEC English SBCS	ASCII		none	none
			EBCDIC		none	none

Table 27. TCP/IP character set cross reference (continued)

Keyword	Codefiles	Description	Character set	Description	CCSID ¹	CPGID ²
	SJDKETA SJDKATE	DEC Katakana SBCS	ASCII		none	none
			EBCDIC		none	none
	JDECETA JDECATE	DEC Kanji DBCS	ASCII		none	none
			EBCDIC	Japanese Host DBCS	none	none
EUCKANJI	SJECEETA SJECEATE	8 Bit English SBCS	ASCII	JIS X0201 8 Bit	none	none
			EBCDIC	Japanese Latin Host SBCS	01027	01027
	SJECKETA SJECKATE	8 Bit Katakana SBCS	ASCII	JIS X0201 8 Bit	none	none
			EBCDIC	Japanese Katakana Host SBCS	00290	00290
	JEUCETA JEUCATE	Japanese Extended Unix DBCS	ASCII	JIS X0208 1990	00952	00952
			EBCDIC	Japanese Host DBCS	00300	00300
HANGEUL						
KSC5601	SKSHETA SKSHATE	Korean Standard Code KSC 5601 SBCS	ASCII	KSC 5601 SBCS	01088	01088
			EBCDIC	Korean Host SBCS	00833	00833
	KSHETA KSHATE	Korean Standard Code KSC 5601 DBCS	ASCII	KSC 5601 DBCS	00951	00951
			EBCDIC	Korean Host DBCS	00834	00834
HANGEUL	SHANETA SHANATE	Hangeul SBCS	ASCII	Korean PC SBCS	00891	00891
			EBCDIC	Korean Host SBCS	00833	00833
	HANETA HANATE	Hangeul DBCS	ASCII	Korean PC DBCS	00926	00926
			EBCDIC	Korean Host DBCS	00834	00834
TCHINESE						
TCHINESE	STCHETA STCHATE	Traditional Chinese SBCS	ASCII	T-Chinese PC SBCS	00904	00904
			EBCDIC	CECP Host SBCS	00037	00037
	TCHETA TCHATE	Traditional Chinese DBCS	ASCII I	T-Chinese PC DBCS	00927	00927
			EBCDIC	T-Chinese Host DBCS	00835	00835
BIG5	SBG5ETA SBG5ATE	Big-5 Chinese SBCS I	ASCII I	Big-5 Chinese PC SBCS	01114	01114
			EBCDIC	CECP Host SBCS	00037	00037
	BG5ETA BG5ATE	Big-5 Chinese DBCS	ASCII	Big-5 PC DBCS	00947	00947
			EBCDIC	T-Chinese Host DBCS	00835	00835
SCHINESE						
SCHINESE	SSCHETA SSCHATE	Simplified Chinese SBCS	ASCII	S-Chinese PC SBCS	01115	01115
			EBCDIC	S-Chinese Host SBCS	00836	00836
	SCHETA SCHATE	Simplified Chinese DBCS	ASCII	S-Chinese PC DBCS	01380	01380
			EBCDIC	S-Chinese Host DBCS	00837	00837
¹ Coded Character Set ID						
² Code Page Group ID						

Special key operation for TELNET

Table 28 contains information about the operation of special keys for the TELNET function when you are using a terminal that is not part of the 3270 family.

Use these key combinations if you are using TELNET and your terminal does not have the key that you want to use. For example, if you want to clear your screen and your terminal does not have an ERASE INPUT key, press CTRL+Y to get the same result.

To use the TELNET extensions, TCP/IP must be configured using the DBCSTRANSFORM option. For more information, refer to the *z/OS Communications Server: IP Configuration Reference*.

Table 28. Special key conversions

Function name	Input keys	Function description
Duplicate	Ctrl+D	Press CTRL and D together. This combination enters the Duplicate control code in the screen buffer and a TAB is performed on the screen.
Field Mark	Ctrl+K	Press CTRL and K together. This combination enters the Field Mark control code in the screen buffer and displays it as a blank on the screen.
Redisplay	Ctrl+V	Press CTRL and V together. This combination redisplayes the contents of the screen buffer on your screen.
Erase Input	Ctrl+Y	Press CTRL and Y together. This combination erases all characters in the unprotected fields on the screen and replaces them with blanks. The cursor is placed at the first unprotected character position on the screen.
Erase EOF	Ctrl+X	Press CTRL and X together. This combination erases all characters in an unprotected field from the cursor position to the end of the field and replaces them with blanks. If the cursor is on a protected field, the screen is inhibited and no characters are erased.
Delete One Character	Del	The DEL deletes the character at the cursor position, if the field is unprotected. The cursor does not move. All characters in the unprotected field to the right of the cursor are shifted one position to the left and blank characters are added at the end of the field.
Alphanumeric or Alphanumeric-Kana	Ctrl+B	Press CTRL and B together. This combination is a toggle switch that redisplayes the screen by switching between Alphanumeric and Alphanumeric-Kana mode.

Table 28. Special key conversions (continued)

Function name	Input keys	Function description
Field Forward Tab	Ctrl+F	Press CTRL and F together. This combination moves the cursor to the first character position in the next unprotected field. If the screen is unformatted or there are no unprotected fields on the screen, the cursor is placed in the first position on the screen.
Field Backward Tab	Ctrl+A F, or Ctrl+A Ctrl+F	Press CTRL and A together then press F, or Press CTRL and A together then press CTRL and F together. This combination moves the cursor to the first character position in the previous unprotected field. If the screen is unformatted or there are no unprotected fields on the screen, the cursor is placed in the first position on the screen.
Home	CSI P, or ESC [P	Press CSI then press P, or Press ESC then press [then press P. This combination moves the cursor to the first character position in the first unprotected field on the screen. If the screen is unformatted or there are no unprotected fields on the screen, the cursor is placed in the first character position on the screen.
Move Cursor Up	CSI A, or ESC [A	Press CSI then press A, or press ESC then press [then press A. This combination moves the cursor up one line in the same column. If the cursor is on the first line on the screen, it moves to the last line on the screen.
Move Cursor Down	CSI B, or ESC [B	Press CSI then press B, or press ESC then press [then press B. This combination moves the cursor down one line in the same column. If the cursor is on the last line on the screen, it moves to the first line on the screen.
Move Cursor Right	CSI C, or ESC [C	Press CSI then press C, or press ESC then press [then press C. This combination moves the cursor one character to the right. If the cursor is in the last column in a line, it moves to the first position in the next line on the screen. If the cursor is in the last position on the screen, it moves to the first position on the screen.
Move Cursor Left	CSI D, or ESC [D	Press CSI then press D, or press ESC then press [then press D. This combination moves the cursor one character to the left. If the cursor is in the first column in a line, it moves to the last position in the previous line on the screen. If the cursor is in the first position on the screen, it moves to the last position on the screen.

Table 28. Special key conversions (continued)

Function name	Input keys	Function description
Backspace One Character	Ctrl+H	Press CTRL and H together. This combination deletes one character before the cursor position in an unprotected field. The cursor moves one position to the left and all characters in the field shift one position to the left. If the cursor is on a protected field the screen is inhibited.
Reset	Ctrl+R	Press CTRL and R together. This combination releases the screen inhibit condition. When the screen is inhibited, only the RESET and MASTER RESET key combinations remain active.
Master Reset	Ctrl+A M, or Ctrl+A Ctrl+M	Press CTRL and A together then press M, or Press CTRL and A together then press CTRL and M together. This combination produces the same results that you get if you key in REDISPLAY followed by RESET.
Clear	Ctrl+L	Press CTRL and L together. This combination fills the screen with blanks and places the cursor at the first character position on the screen. MASTER RESET key combinations remain active.
Enter	Ctrl+M	Press CTRL and M together. This combination sends the data on the screen to the host system.
CSI stands for Control Sequence Indicator.		

Operation of PF and PA keys

This section describes the PF and PA keys for TELNET operations when you are using a terminal that is not part of the 3270 family.

When you press a key combination, a code that represents the 3270 equivalent symbol is sent to the application with which you have established TELNET communication. The application that you are using controls how these codes are used.

PF Key	Input Keys
PF1	Press ESC then press 1
PF2	Press ESC then press 2
PF3	Press ESC then press 3
PF4	Press ESC then press 4
PF5	Press ESC then press 5
PF6	Press ESC then press 6
PF7	Press ESC then press 7
PF8	Press ESC then press 8

PF9	Press ESC then press 9
PF10	Press ESC then press 0
PF11	Press ESC then press the period key (.)
PF12	Press ESC then press =
PF13	Press ESC ESC then press 1
PF14	Press ESC ESC then press 2
PF15	Press ESC ESC then press 3
PF16	Press ESC ESC then press 4
PF17	Press ESC ESC then press 5
PF18	Press ESC ESC then press 6
PF19	Press ESC ESC then press 7
PF20	Press ESC ESC then press 8
PF21	Press ESC ESC then press 9
PF22	Press ESC ESC then press 0
PF23	Press ESC ESC then press .
PF24	Press ESC ESC then press =
PA Key	Input Keys
PA1	Press Ctrl+P then press 1
PA2	Press Ctrl+P then press 2
PA3	Press Ctrl+P then press 3

Sense codes for special key operation

Table 29 describes the sense codes that are returned with the error messages for special key operations when you are using TELNET.

For information about error messages, see *z/OS Communications Server: IP Messages Volume 1 (EZA)*.

Table 29. Sense codes

Sense code	Problem description
8001	The command data length is less than 0 bytes.
8002	There is not enough data in an ERASE/WRITE or an ERASE/WRITE ALTERNATE command.
8003	There is not enough data in A WRITE command.
8004	There is not enough data in A WRITE STRUCTURED FIELD command.
21001	WCC is not a character. The error occurred in a WRITE command.
21002	There is not enough data in a START FIELD subcommand. The error occurred in a WRITE command.
21003	There is not enough data in a START FIELD EXTENDED subcommand. The error occurred in a WRITE command.
21004	There is not enough data in a MODIFY FIELD subcommand. The error occurred in a WRITE command.

Table 29. Sense codes (continued)

Sense code	Problem description
21005	There is not enough data in a SET BUFFER ADDRESS subcommand. The error occurred in a WRITE command.
21006	There is not enough data in a REPEAT TO ADDRESS subcommand. The error occurred in a WRITE command.
21007	There is not enough data in an ERASE UNPROTECTED TO ADDRESS subcommand. The error occurred in a WRITE command.
22001	The specified attribute is not a character. The error occurred in a START FIELD subcommand.
22002	A current buffer addressing error occurred. The error occurred in a START FIELD subcommand.
23001	An addressing error for the current buffer occurred. The error occurred in a START FIELD EXTENDED subcommand.
23002	The specified attribute is not a character. The error occurred in a START FIELD EXTENDED subcommand.
23003	The specified attribute is not an acceptable attribute type. The error occurred in a START FIELD EXTENDED subcommand.
24001	A current buffer addressing error occurred. The error occurred in a MODIFY FIELD subcommand.
24002	The specified attribute is not a character. The error occurred in a MODIFY FIELD subcommand.
24003	The specified attribute is not an acceptable attribute type. The error occurred in a MODIFY FIELD subcommand.
25001	The specified address is incorrect. The error occurred in a SET BUFFER ADDRESS subcommand.
26001	A current buffer addressing error occurred. The error occurred in a PROGRAM TAB subcommand.
28001	A current buffer addressing error occurred. The error occurred in a REPEAT TO ADDRESS subcommand.
28002	The specified address is incorrect. The error occurred in a REPEAT TO ADDRESS subcommand.
29001	A current buffer addressing error occurred. The error occurred in an ERASE UNPROTECTED TO ADDRESS subcommand.
29002	The specified address is incorrect. The error occurred in an ERASE UNPROTECTED TO ADDRESS subcommand.
30001	A current buffer addressing error occurred. The error occurred in the Write Data Process.
36001	Another structured field appeared after the READ PARTITION field. The error occurred in a WRITE STRUCTURED FIELD command.
36002	The length is too long or too short in the READ PARTITION field. The error occurred in a WRITE STRUCTURED FIELD command.
36003	A reserved character is incorrect in the READ PARTITION field. The error occurred in a WRITE STRUCTURED FIELD command.
36004	The type is incorrect in the READ PARTITION field. The error occurred in a WRITE STRUCTURED FIELD command.
38001	The length is too long or too short in the ERASE/RESET field. The error occurred in a WRITE STRUCTURED FIELD command.

Table 29. Sense codes (continued)

Sense code	Problem description
38002	The Partition ID is incorrect in the ERASE/RESET field. The error occurred in a WRITE STRUCTURED FIELD command.
39001	The length is too long or too short in the SET REPLY mode. The error occurred in a WRITE STRUCTURED FIELD command.
39002	The Partition ID is incorrect in the SET REPLY mode. The error occurred in a WRITE STRUCTURED FIELD command.
39003	The Reply Mode is incorrect in the SET REPLY mode. The error occurred in a WRITE STRUCTURED FIELD command.
40001	<p>The 3270 outbound data stream contains a command that is not in this list.</p> <ul style="list-style-type: none"> • WRITE • ERASE/WRITE • ERASE/WRITE ALTERNATE • ERASE ALL UNPROTECTED <p>The error occurred in a WRITE STRUCTURED FIELD command.</p>
50001	SO/SI is on longer a pair. SET REPLY mode. The error occurred in the GRFTOMAP Process.

Appendix D. ICMP/ICMPv6 types and codes

Table 30 lists the Internet Control Message Protocol (ICMP) types and codes from *TCP/IP Illustrated, Volume 1 The Protocols*, by W. Richard Stevens.

Table 30. ICMP types and codes

Type	Code	Description
0	0	echo reply
3	destination unreachable	
	0	network unreachable
	1	host unreachable
	2	protocol unreachable
	3	port unreachable
	4	fragmentation needed
	5	source route failed
	6	destination network unknown
	7	destination host unknown
	8	source host isolated
	9	destination network administratively prohibited
	10	destination host administratively prohibited
	11	network unreachable for ToS
	12	host unreachable for ToS
	13	communication administratively prohibited by filtering
	14	host precedence violation
	15	precedence cutoff in effect
4	0	source quench
5	redirect	
	0	redirect for network
	1	redirect for host
	2	redirect for type of service and network
	3	redirect for type of service and host
8	0	echo request
9	0	router advertisement
10	0	router solicitation
11	time exceeded	
	0	time-to-live equals 0 during transmit
	1	time-to-live equals 0 during reassembly
12	parameter problem	
	0	IP header bad
	1	required option missing
13	0	timestamp request

Table 30. ICMP types and codes (continued)

Type	Code	Description
14	0	timestamp reply
15	0	information request
16	0	information reply
17	0	address mask request
18	0	address mask reply

Table 31 lists the Internet Control Message Protocol for IPv6 (ICMPv6) types and codes.

Table 31. ICMPv6 types and codes

Type	Code	Description
1	destination unreachable	
	0	no route to destination
	1	communication with destination administratively prohibited
	2	beyond scope of source address
	3	address unreachable
	4	port unreachable
2	0	packet too big
3	time exceeded	
	0	hop limit exceeded in transit
	1	fragment reassembly time exceeded
4	parameter problem	
	0	erroneous header field encountered
	1	unrecognized Next Header type encountered
	2	unrecognized IPv6 option encountered
128	0	echo request
129	0	echo reply
130	0	group membership query
131	0	group membership reply
132	0	group membership reduction
133	0	router solicitation
134	0	router advertisement
135	0	neighbor solicitation
136	0	neighbor advertisement
137	0	redirect

Appendix E. Related protocol specifications (RFCs)

This appendix lists the related protocol specifications 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.

You can request RFCs through electronic mail, from the automated Network Information Center (NIC) mail server, by sending a message to `service@nic.ddn.mil` with a subject line of RFC *nnnn* for text versions or a subject line of RFC *nnnn*.PS for PostScript versions. To request a copy of the RFC index, send a message with a subject line of RFC INDEX.

For more information, contact `nic@nic.ddn.mil` or at:

Government Systems, Inc.
Attn: Network Information Center
14200 Park Meadow Drive
Suite 200
Chantilly, VA 22021

Hard copies of all RFCs are available from the NIC, either individually or by subscription. Online copies are available at the following Web address:
<http://www.rfc-editor.org/rfc.html>.

See "Internet Drafts" on page 424 for draft RFCs implemented in this and previous Communications Server releases.

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

RFC	Title and Author
768	<i>User Datagram Protocol</i> J. Postel
791	<i>Internet Protocol</i> J. Postel
792	<i>Internet Control Message Protocol</i> J. Postel
793	<i>Transmission Control Protocol</i> J. Postel
821	<i>Simple Mail Transfer Protocol</i> J. Postel
822	<i>Standard for the Format of ARPA Internet Text Messages</i> D. Crocker
823	<i>DARPA Internet Gateway</i> R. Hinden, A. Sheltzer
826	<i>Ethernet Address Resolution Protocol or Converting Network Protocol Addresses to 48.Bit Ethernet Address for Transmission on Ethernet Hardware</i> D. Plummer
854	<i>Telnet Protocol Specification</i> J. Postel, J. Reynolds
855	<i>Telnet Option Specification</i> J. Postel, J. Reynolds
856	<i>Telnet Binary Transmission</i> J. Postel, J. Reynolds

- 857 *Telnet Echo Option* J. Postel, J. Reynolds
- 858 *Telnet Suppress Go Ahead Option* J. Postel, J. Reynolds
- 859 *Telnet Status Option* J. Postel, J. Reynolds
- 860 *Telnet Timing Mark Option* J. Postel, J. Reynolds
- 861 *Telnet Extended Options—List Option* J. Postel, J. Reynolds
- 862 *Echo Protocol* J. Postel
- 863 *Discard Protocol* J. Postel
- 864 *Character Generator Protocol* J. Postel
- 877 *Standard for the Transmission of IP Datagrams over Public Data Networks* J. Korb
- 885 *Telnet End of Record Option* J. Postel
- 894 *Standard for the transmission of IP datgrams over Ethernet networks* C. Hornig
- 896 *Congestion Control in IP/TCP Internetworks* J. Nagle
- 903 *Reverse Address Resolution Protocol* R. Finlayson, T. Mann, J. Mogul, M. Theimer
- 904 *Exterior Gateway Protocol Formal Specification* D. Mills
- 919 *Broadcasting Internet Datagrams* J. Mogul
- 922 *Broadcasting Internet Datagrams in the Presence of Subnets* J. Mogul
- 950 *Internet Standard Subnetting Procedure* J. Mogul, J. Postel
- 951 *Bootstrap Protocol* W.J. Croft, J. Gilmore
- 952 *DoD Internet Host Table Specification* K. Harrenstien, M. Stahl, E. Feinler
- 959 *File Transfer Protocol* J. Postel, J. Reynolds
- 974 *Mail Routing and the Domain Name System* C. Partridge
- 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
- 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
- 1006 *ISO Transport Service on top of the TCP Version 3* M. Rose, D. Cass
- 1009 *Requirements for Internet Gateways* R. Braden, J. Postel
- 1011 *Official Internet Protocols* J. Reynolds, J. Postel
- 1013 *X Window System Protocol, Version 11: Alpha Update* R. Scheifler
- 1014 *XDR: External Data Representation Standard* Sun Microsystems Incorporated
- 1027 *Using ARP to Implement Transparent Subnet Gateways* S. Carl-Mitchell, J. Quarterman
- 1032 *Domain Administrators Guide* M. Stahl
- 1033 *Domain Administrators Operations Guide* M. Lottor
- 1034 *Domain Names—Concepts and Facilities* P. Mockapetris
- 1035 *Domain Names—Implementation and Specification* P. Mockapetris

- 1042 *Standard for the Transmission of IP Datagrams over IEEE 802 Networks* J. Postel, J. Reynolds
- 1044 *Internet Protocol on Network System's HYPERchannel: Protocol Specification* K. Hardwick, J. Lekashman
- 1055 *Nonstandard for Transmission of IP Datagrams over Serial Lines: SLIP* J. Romkey
- 1057 *RPC: Remote Procedure Call Protocol Version 2 Specification* Sun Microsystems Incorporated
- 1058 *Routing Information Protocol* C. Hedrick
- 1060 *Assigned Numbers* J. Reynolds, J. Postel
- 1073 *Telnet Window Size Option* D. Waitzman
- 1079 *Telnet Terminal Speed Option* C. Hedrick
- 1091 *Telnet Terminal-Type Option* J. VanBokkelen
- 1094 *NFS: Network File System Protocol Specification* Sun Microsystems Incorporated
- 1096 *Telnet X Display Location Option* G. Marcy
- 1101 *DNS encoding of network names and other types* P. Mockapetris
- 1112 *Host Extensions for IP Multicasting* S. Deering
- 1118 *Hitchhikers Guide to the Internet* E. Krol
- 1122 *Requirements for Internet Hosts—Communication Layers* R. Braden
- 1123 *Requirements for Internet Hosts—Application and Support* R. Braden
- 1155 *Structure and Identification of Management Information for TCP/IP-Based Internets* M. Rose, K. McCloghrie
- 1156 *Management Information Base for Network Management of TCP/IP-Based Internets* K. McCloghrie, M. Rose
- 1157 *Simple Network Management Protocol (SNMP)* J. Case, M. Fedor, M. Schoffstall, C. Davin
- 1158 *Management Information Base for Network Management of TCP/IP-based internets: MIB-II* M. Rose
- 1179 *Line Printer Daemon Protocol* The Wollongong Group, L. McLaughlin III
- 1180 *TCP/IP Tutorial* T. Socolofsky, C. Kale
- 1183 *New DNS RR Definitions* C. Everhart, L. Mamakos, R. Ullmann, P. Mockapetris, (Updates RFC 1034, RFC 1035)
- 1184 *Telnet Linemode Option* D. Borman
- 1187 *Bulk Table Retrieval with the SNMP* M. Rose, K. McCloghrie, J. Davin
- 1188 *Proposed Standard for the Transmission of IP Datagrams over FDDI Networks* D. Katz
- 1191 *Path MTU Discovery* J. Mogul, S. Deering
- 1198 *FYI on the X Window System* R. Scheifler
- 1207 *FYI on Questions and Answers: Answers to Commonly Asked "Experienced Internet User" Questions* G. Malkin, A. Marine, J. Reynolds

- 1208 *Glossary of Networking Terms* O. Jacobsen, D.Lynch
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- 1228 *SNMP-DPI Simple Network Management Protocol Distributed Program Interface* G.C. Carpenter, B. Wijnen
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- 1363 *A Proposed Flow Specification* C. Partridge
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- 1393 *Traceroute Using an IP Option* G. Malkin
- 1397 *Default Route Advertisement In BGP2 And BGP3 Versions of the Border Gateway Protocol* D. Haskin
- 1398 *Definitions of Managed Objects for the Ethernet-Like Interface Types* F. Kastenholz
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- 1469 *IP Multicast over Token-Ring Local Area Networks* T. Pusateri
- 1497 *BOOTP Vendor Information Extensions* J.Reynolds
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- 1535 *A Security Problem and Proposed Correction With Widely Deployed DNS Software* E. Gavron
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Internet Drafts

Internet drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Other groups may also distribute working documents as Internet drafts. You can see Internet drafts at <http://www.ietf.org/ID.html>.

Several areas of IPv6 implementation include elements of the following Internet drafts and are subject to change during the RFC review process.

Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification

A. Conta, S. Deering

Appendix F. Information APARs

This appendix lists information APARs for IP and SNA documents.

Notes:

1. Information APARs contain updates to previous editions of the manuals listed below. Documents updated for V1R6 are complete except for the updates contained in the information APARs that might be issued after V1R6 documents went to press.
2. Information APARs are predefined for z/OS V1R6 Communications Server and might not contain updates.
3. Information APARs for z/OS documents are in the document called *z/OS and z/OS.e DOC APAR and PTF ++HOLD Documentation*, which can be found at http://publibz.boulder.ibm.com:80/cgi-bin/bookmgr_OS390/BOOKS/ZIDOCMST/CCONTENTS.

Information APARs for IP documents

Table 32 lists information APARs for IP documents.

Table 32. IP information APARs for z/OS Communications Server

Title	V1R6	V1R5	V1R4	V1R2
New Function Summary (both IP and SNA)	II13824			
Quick Reference (both IP and SNA)	II13831		II13246	II12500
IP and SNA Codes	II13842		II13254	II12504
IP API Guide	II13844	II13577	II13255 II13790	II12861 II13655
IP CICS [®] Sockets Guide		II13578	II13257	II12862 II13627
IP Configuration Guide	II13826	II13568	II13244 II13541 II13652 II13646	II12498 II13087 II13364 II13634 II13651
IP Configuration Reference	II13827	II13569 II13789	II13245 II13521 II13647 II13739	II12499 II13394 II13637
IP Diagnosis	II13836	II13571	II13249 II13493	II12503 II13473
IP Messages Volume 1	II13838	II13572	II13624 II13250	II12857 II13229 II13405
IP Messages Volume 2	II13839	II13573	II13251	II12858
IP Messages Volume 3	II13840	II13574	II13252	II12859
IP Messages Volume 4	II13841	II13575	II13253 II13628	II12860

Table 32. IP information APARs for z/OS Communications Server (continued)

Title	V1R6	V1R5	V1R4	V1R2
IP Migration		II13566	II13242 II13738	II12497 II13636
IP Network and Application Design Guide	II13825	II13567	II13243	
IP Network Print Facility				II12864
IP Programmer's Reference	II13843	II13581	II13256	II12505
IP User's Guide and Commands	II13832	II13570	II13247	II12501 II13404
IP System Admin Commands	II13833	II13580	II13248 II13792	II12502 II13793

Information APARs for SNA documents

Table 33 lists information APARs for SNA documents.

Table 33. SNA information APARs for z/OS Communications Server

Title	V1R6	V1R5	V1R4	V1R2
New Function Summary (both IP and SNA)	II13824			
Quick Reference (both IP and SNA)	II13831		II13246	II12500
IP and SNA Codes	II13842		II13254	II12504
SNA Customization	II13857	II13560	II13240	II12872
SNA Diagnosis		II13558	II13236 II13735	II12490 II13034
SNA Diagnosis, Vol. 1: Techniques and Procedures	II13852			
SNA Diagnosis, Vol. 2: FFST Dumps and the VIT	II13853			
SNA Messages	II13854	II13559	II13238 II13736	II12491
SNA Network Implementation Guide	II13849	II13555	II13234 II13733	II13635 II12487
SNA Operation	II13851	II13557	II13237	II12489
SNA Migration		II13554	II13233 II13732	II12486
SNA Programming	II13858		II13241	II13033
SNA Resource Definition Reference	II13850	II13556	II13235 II13734	II12488
SNA Data Areas, Vol. 1 and 2			II13239	II12492
SNA Data Areas, 1	II13855			
SNA Data Areas, 2	II13856			

Other information APARs

Table 34 lists information APARs not related to documents.

Table 34. Non-document information APARs

Content	Number
index of recommended maintenance for VTAM	II11220
index of Communication Server IP information APARs	II12028
AHHC, MPC, and CTC	II01501
Collecting TCPIP CTRACEs	II12014
CSM for VTAM	II12657
CSM for TCP/IP	II12658
DLUR/DLUS for z/OS V1R2	II12986
DOCUMENTATION REQUIRED FOR OSA/2, OSA EXPRESS AND OSA QDIO	II13016
DYNAMIC VIPA (BIND)	II13215
DNS — common problems and solutions	II13453
Enterprise Extender	II12223
FTPing doc to z/OS Support	II12030
FTP problems	II12079
Generic resources	II10986
HPR	II10953
iQDIO	II11220
LPR problems	II12022
MNPS	II10370
NCPROUTE problems	II12025
OMPROUTE	II12026
OROUTED problems	II12024
PASCAL API	II11814
Performance	II11710 II11711 II11712
Resolver	II13398 II13399 II13452
Socket API	II11996 II12020
SMTP problems	II12023
SNMP	II13477 II13478
SYSLOGD howto	II12021
TCPIP connection states	II12449
Telnet	II11574 II13135
TN3270 TELNET SSL common problems	II13369

Appendix G. Accessibility

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. The major accessibility features in z/OS enable users to:

- Use assistive technologies such as screen readers and screen magnifier software
- Operate specific or equivalent features using only the keyboard
- Customize display attributes such as color, contrast, and font size

Using assistive technologies

Assistive technology products, such as screen readers, function with the user interfaces found in z/OS. Consult the assistive technology documentation for specific information when using such products to access z/OS interfaces.

Keyboard navigation of the user interface

Users can access z/OS user interfaces using TSO/E or ISPF. Refer to *z/OS TSO/E Primer*, *z/OS TSO/E User's Guide*, and *z/OS ISPF User's Guide Volume I* for information about accessing TSO/E and ISPF interfaces. These guides describe how to use TSO/E and ISPF, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

z/OS information

z/OS information is accessible using screen readers with the BookServer/Library Server versions of z/OS books in the Internet library at:

www.ibm.com/servers/eserver/zseries/zos/bkserv/

One exception is command syntax that is published in railroad track format; screen-readable copies of z/OS books with that syntax information are separately available in HTML zipped file form upon request to usib2hpd@vnet.ibm.com.

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Bibliography

z/OS Communications Server information

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

z/OS Communications Server documentation is available:

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

z/OS Communications Server library

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

Updates to documents are available on RETAIN[®] and in information APARs (info APARs). See Appendix F, “Information APARs,” on page 425 for a list of the documents and the info APARs associated with them.

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

Planning

Title	Number	Description
<i>z/OS Communications Server: New Function Summary</i>	GC31-8771	This document is intended to help you plan for new IP for SNA function, 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.
<i>z/OS Communications Server: IPv6 Network and Application Design Guide</i>	SC31-8885	This document is a high-level introduction to IPv6. It describes concepts of z/OS Communications Server's support of IPv6, coexistence with IPv4, and migration issues.

Resource definition, configuration, and tuning

Title	Number	Description
<i>z/OS Communications Server: IP Configuration Guide</i>	SC31-8775	This document describes the major concepts involved in understanding and configuring an IP network. Familiarity with the z/OS operating system, IP protocols, z/OS UNIX System Services, and IBM Time Sharing Option (TSO) is recommended. Use this document in conjunction with the <i>z/OS Communications Server: IP Configuration Reference</i> .

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

Operation

Title	Number	Description
<i>z/OS Communications Server: IP User's Guide and Commands</i>	SC31-8780	This document describes how to use TCP/IP applications. It contains requests that allow a user to log on to a remote host using Telnet, transfer data sets using FTP, send and receive electronic mail, print on remote printers, and authenticate network users.
<i>z/OS Communications Server: IP System Administrator's Commands</i>	SC31-8781	This document describes the functions and commands helpful in configuring or monitoring your system. It contains system administrator's commands, such as TSO NETSTAT, PING, TRACERTE and their UNIX counterparts. It also includes TSO and MVS commands commonly used during the IP configuration process.
<i>z/OS Communications Server: SNA Operation</i>	SC31-8779	This document serves as a reference for programmers and operators requiring detailed information about specific operator commands.
<i>z/OS Communications Server: Quick Reference</i>	SX75-0124	This document contains essential information about SNA and IP commands.

Customization

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

Writing application programs

Title	Number	Description
<i>z/OS Communications Server: IP Application Programming Interface Guide</i>	SC31-8788	This document describes the syntax and semantics of program source code necessary to write your own application programming interface (API) into TCP/IP. You can use this interface as the communication base for writing your own client or server application. You can also use this document to adapt your existing applications to communicate with each other using sockets over TCP/IP.
<i>z/OS Communications Server: IP CICS Sockets Guide</i>	SC31-8807	This document is for programmers who want to set up, write application programs for, and diagnose problems with the socket interface for CICS using z/OS TCP/IP.
<i>z/OS Communications Server: IP IMS Sockets Guide</i>	SC31-8830	This document is for programmers who want application programs that use the IMS™ TCP/IP application development services provided by IBM's TCP/IP Services.
<i>z/OS Communications Server: IP Programmer's Reference</i>	SC31-8787	This document describes the syntax and semantics of a set of high-level application functions that you can use to program your own applications in a TCP/IP environment. These functions provide support for application facilities, such as user authentication, distributed databases, distributed processing, network management, and device sharing. Familiarity with the z/OS operating system, TCP/IP protocols, and IBM Time Sharing Option (TSO) is recommended.
<i>z/OS Communications Server: SNA Programming</i>	SC31-8829	This document describes how to use SNA macroinstructions to send data to and receive data from (1) a terminal in either the same or a different domain, or (2) another application program in either the same or a different domain.
<i>z/OS Communications Server: SNA Programmer's LU 6.2 Guide</i>	SC31-8811	This document describes how to use the SNA LU 6.2 application programming interface for host application programs. This document applies to programs that use only LU 6.2 sessions or that use LU 6.2 sessions along with other session types. (Only LU 6.2 sessions are covered in this document.)
<i>z/OS Communications Server: SNA Programmer's LU 6.2 Reference</i>	SC31-8810	This document provides reference material for the SNA LU 6.2 programming interface for host application programs.
<i>z/OS Communications Server: CSM Guide</i>	SC31-8808	This document describes how applications use the communications storage manager.

Title	Number	Description
<i>z/OS Communications Server: CMIP Services and Topology Agent Guide</i>	SC31-8828	This document describes the Common Management Information Protocol (CMIP) programming interface for application programmers to use in coding CMIP application programs. The document provides guide and reference information about CMIP services and the SNA topology agent.

Diagnosis

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

Messages and codes

Title	Number	Description
<i>z/OS Communications Server: SNA Messages</i>	SC31-8790	This document describes the ELM, IKT, IST, ISU, IUT, IVT, and USS messages. Other information in this document includes: <ul style="list-style-type: none"> • Command and RU types in SNA messages • Node and ID types in SNA messages • Supplemental message-related information
<i>z/OS Communications Server: IP Messages Volume 1 (EZA)</i>	SC31-8783	This volume contains TCP/IP messages beginning with EZA.
<i>z/OS Communications Server: IP Messages Volume 2 (EZB)</i>	SC31-8784	This volume contains TCP/IP messages beginning with EZB.
<i>z/OS Communications Server: IP Messages Volume 3 (EZY)</i>	SC31-8785	This volume contains TCP/IP messages beginning with EZY.
<i>z/OS Communications Server: IP Messages Volume 4 (EZZ-SNM)</i>	SC31-8786	This volume contains TCP/IP messages beginning with EZZ and SNM.
<i>z/OS Communications Server: IP and SNA Codes</i>	SC31-8791	This document describes codes and other information that appear in z/OS Communications Server messages.

APPC Application Suite

Title	Number	Description
<i>z/OS Communications Server: APPC Application Suite User's Guide</i>	SC31-8809	This documents the end-user interface (concepts, commands, and messages) for the AFTP, ANAME, and APING facilities of the APPC application suite. Although its primary audience is the end user, administrators and application programmers may also find it useful.

Title	Number	Description
<i>z/OS Communications Server: APPC Application Suite Administration</i>	SC31-8835	This document contains the information that administrators need to configure the APPC application suite and to manage the APING, ANAME, AFTP, and A3270 servers.
<i>z/OS Communications Server: APPC Application Suite Programming</i>	SC31-8834	This document provides the information application programmers need to add the functions of the AFTP and ANAME APIs to their application programs.

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