z/OS Communications Server

IP User's Guide and Commands

Version 2 Release 2

SC27-3662-01

Note:
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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.

This document refers to Communications Server data sets by their default SMP/E distribution library name. Your installation might, however, have different names for these data sets where allowed by SMP/E, your installation personnel, or administration staff. For instance, this document refers to samples in SEZAINST library as simply in SEZAINST. Your installation might choose a data set name of SYS1.SEZAINST, CS390.SEZAINST or other high-level qualifiers for the data set name.

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 Communications Server V2R2.

Who should read this document

This document is written for users who want to use the applications that are available in z/OS Communications Server V2R2.

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 Communications Server V2R2 should already be installed and customized for your network. For information about installing, see the z/OS Program Directory. For information about customizing, see the z/OS Communications Server: IP Configuration Reference.

How this document is organized

This document contains the following:

- Chapter 1, “Getting started with TCP/IP,” 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 23 contains basic information about FTP.

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- 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 159 describes the FTP subcommands.
- Chapter 6, “Sending electronic mail using SMTP commands,” on page 337 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 365 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, “Sending electronic mail using the Communications Server SMTP application,” on page 367 describes how to use the mail forwarding SMTP client.
- Chapter 9, “Using remote printing,” on page 383 describes the remote printing commands.
- Chapter 10, “Using GDDMXD/MVS with the X Window System,” on page 403 describes GDDMXD/MVS and the GDDMXD CLIST and how to use GDDMXD/MVS user-specified options and keyboard functions.
- Chapter 11, “Executing commands on a remote host,” on page 417 describes how to use the REXEC and RSH clients.
- Appendix A, “Specifying data sets and files,” on page 431 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 437 lists the GDDMXD/MVS default mapping values for the APL2® character set.
- Appendix C, “TELNET extensions,” on page 443 describes the Telnet 3270 DBCS Transform special operations.
- Appendix D, “Related protocol specifications,” on page 451 lists the related protocol specifications for TCP/IP.
- Appendix E, “Accessibility,” on page 475 describes accessibility features to help users with physical disabilities.
- “Notices” on page 479 contains notices and trademarks used in this document.
- “Bibliography” on page 489 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 whether 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 2 characters of the publication's file name (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.

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Most problems can be resolved at this website, where you can submit questions and problem reports electronically, and 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 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 503.

Conventions and terminology that are used in this document

Commands in this book that can be used in both TSO and z/OS UNIX environments use the following conventions:

- When describing how to use the command in a TSO environment, the command is presented in uppercase (for example, NETSTAT).
- When describing how to use the command in a z/OS UNIX environment, the command is presented in bold lowercase (for example, **netstat**).
- When referring to the command in a general way in text, the command is presented with an initial capital letter (for example, Netstat).

All the exit routines described in this document are *installation-wide exit routines*. The installation-wide exit routines also called installation-wide exits, exit routines, and exits throughout this document.

The TPF logon manager, although included with VTAM®, is an application program; therefore, the logon manager is documented separately from VTAM.

Samples used in this book might not be updated for each release. Evaluate a sample carefully before applying it to your system.

Note: In this information, you might see the following Shared Memory Communications over Remote Direct Memory Access (SMC-R) terminology:

- RDMA network interface card (RNIC), which is used to refer to the IBM 10GbE RoCE Express® feature.

- Shared RoCE environment, which means that the 10GbE RoCE Express feature operates on an IBM z13 (z13) or later system, and that the feature can be used concurrently, or shared, by multiple operating system instances. The RoCE Express feature is considered to operate in a shared RoCE environment even if you use it with a single operating system instance.

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

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

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 that do not have their own syntax described elsewhere.

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.

Commands

Commands that can be used in both TSO and z/OS UNIX environments use the following conventions in syntax diagrams:

- When describing how to use the command in a TSO environment, the command is presented in uppercase (for example, NETSTAT).
- When describing how to use the command in a z/OS UNIX environment, the command is presented in bold lowercase (for example, netstat).

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.

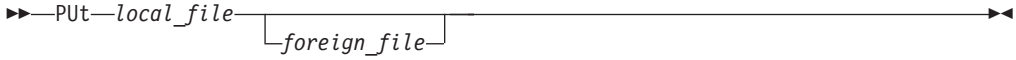
Parameters are classified as keywords or variables. For the TSO and MVS console commands, the keywords are not case sensitive. You can code them in uppercase or lowercase. If the keyword appears in the syntax diagram in both uppercase and lowercase, the uppercase portion is the abbreviation for the keyword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

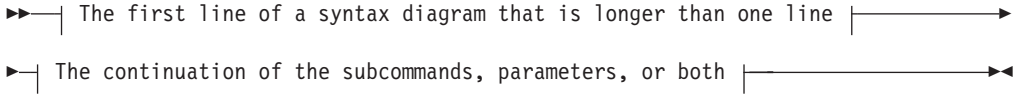
Syntax examples

In the following example, the PUt subcommand is a keyword. The required variable parameter is *local_file*, and the optional variable parameter is *foreign_file*. 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

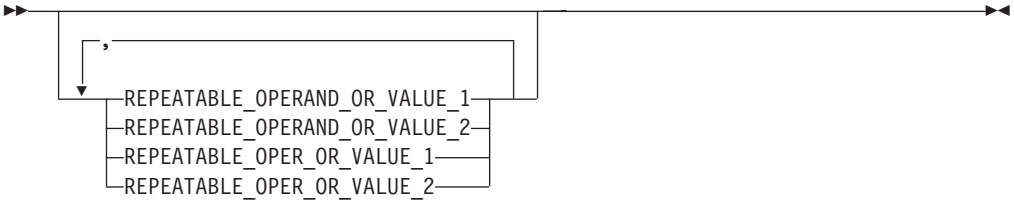
Required operands and values appear on the main path line. You must code required operands and values.

Optional values

Optional operands and values appear below the main path line. You do not have to code optional operands and values.

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:

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 "Bibliography" on page 489, 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.

Softcopy information

Softcopy publications are available in the following collection.

Titles	Order Number	Description
IBM System z Redbooks Collection	SK3T-7876	The IBM Redbooks® publications selected for this CD series are taken from the IBM Redbooks inventory of over 800 books. All the Redbooks publications that are of interest to the System z® platform professional are identified by their authors and are included in this collection. The System z subject areas range from e-business application development and enablement to hardware, networking, Linux, solutions, security, parallel sysplex, and many others. For more information about the Redbooks publications, see http://www-03.ibm.com/systems/z/os/zos/zfavorites/.

Other documents

This information explains how z/OS references information in other documents.

When possible, this information uses cross-document links that go directly to the topic in reference using shortened versions of the document title. For complete titles and order numbers of the documents for all products that are part of z/OS, see z/OS Information Roadmap (SA23-2299). The Roadmap describes what level of documents are supplied with each release of z/OS Communications Server, and also describes each z/OS publication.

To find the complete z/OS library, visit the z/OS library in IBM Knowledge Center (www.ibm.com/support/knowledgecenter/SSLTBW/welcome).

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 might be helpful to readers.

Title	Number
DNS and BIND, Fifth Edition, O'Reilly Media, 2006	ISBN 13: 978-0596100575
Routing in the Internet, Second Edition, Christian Huitema (Prentice Hall 1999)	ISBN 13: 978-0130226471
sendmail, Fourth Edition, Bryan Costales, Claus Assmann, George Jansen, and Gregory Shapiro, O'Reilly Media, 2007	ISBN 13: 978-0596510299
SNA Formats	GA27-3136
TCP/IP Illustrated, Volume 1: The Protocols, W. Richard Stevens, Addison-Wesley Professional, 1994	ISBN 13: 978-0201633467
TCP/IP Illustrated, Volume 2: The Implementation, Gary R. Wright and W. Richard Stevens, Addison-Wesley Professional, 1995	ISBN 13: 978-0201633542
TCP/IP Illustrated, Volume 3: TCP for Transactions, HTTP, NNTP, and the UNIX Domain Protocols, W. Richard Stevens, Addison-Wesley Professional, 1996	ISBN 13: 978-0201634952
TCP/IP Tutorial and Technical Overview	GG24-3376
Understanding LDAP	SG24-4986
z/OS Cryptographic Services System SSL Programming	*SC14-7495*
z/OS IBM Tivoli Directory Server Administration and Use for z/OS	*SC23-6788*
z/OS JES2 Initialization and Tuning Guide	*SA32-0991*
z/OS Problem Management	*SC23-6844*
z/OS MVS Diagnosis: Reference	*GA32-0904*
z/OS MVS Diagnosis: Tools and Service Aids	*GA32-0905*
z/OS MVS Using the Subsystem Interface	*SA38-0679*
z/OS Program Directory	*GI11-9848*
z/OS UNIX System Services Command Reference	*SA23-2280*
z/OS UNIX System Services Planning	*GA32-0884*
z/OS UNIX System Services Programming: Assembler Callable Services Reference	*SA23-2281*
z/OS UNIX System Services User's Guide	*SA23-2279*
z/OS XL C/C++ Runtime Library Reference	*SC14-7314*
zEnterprise System and System z10 OSA-Express Customer's Guide and Reference	*SA22-7935*

Redbooks publications

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

Title	Number
IBM z/OS V2R1 Communications Server TCP/IP Implementation, Volume 1: Base Functions, Connectivity, and Routing	SG24-8096
IBM z/OS V2R1 Communications Server TCP/IP Implementation, Volume 2: Standard Applications	SG24-8097
IBM z/OS V2R1 Communications Server TCP/IP Implementation, Volume 3: High Availability, Scalability, and Performance	SG24-8098
IBM z/OS V2R1 Communications Server TCP/IP Implementation, Volume 4: Security and Policy-Based Networking	SG24-8099
IBM Communication Controller Migration Guide	SG24-6298
IP Network Design Guide	SG24-2580
Managing OS/390 TCP/IP with SNMP	SG24-5866
Migrating Subarea Networks to an IP Infrastructure Using Enterprise Extender	SG24-5957
SecureWay Communications Server for OS/390 V2R8 TCP/IP: Guide to Enhancements	SG24-5631
SNA and TCP/IP Integration	SG24-5291
TCP/IP in a Sysplex	SG24-5235
TCP/IP Tutorial and Technical Overview	GG24-3376
Threadsafe Considerations for CICS	SG24-6351

Where to find related information on the Internet

z/OS

This site provides information about z/OS Communications Server release availability, migration information, downloads, and links to information about z/OS technology

http://www.ibm.com/systems/z/os/zos/

z/OS Internet Library

Use this site to view and download z/OS Communications Server documentation

www.ibm.com/systems/z/os/zos/bkserv/

IBM Communications Server product

The primary home page for information about z/OS Communications Server

http://www.software.ibm.com/network/commserver/

IBM Communications Server product support

Use this site to submit and track problems and search the z/OS Communications Server knowledge base for Technotes, FAQs, white papers, and other z/OS Communications Server information

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

IBM Communications Server performance information

This site contains links to the most recent Communications Server performance reports.

http://www.ibm.com/support/docview.wss?uid=swg27005524

IBM Systems Center publications

Use this site to view and order Redbooks publications, Redpapers™, and Technotes

http://www.redbooks.ibm.com/

IBM Systems Center flashes

Search the Technical Sales Library for Techdocs (including Flashes, presentations, Technotes, FAQs, white papers, Customer Support Plans, and Skills Transfer information)

http://www.ibm.com/support/techdocs/atsmastr.nsf

Tivoli® NetView® for z/OS

Use this site to view and download product documentation about Tivoli NetView for z/OS

http://www.ibm.com/support/knowledgecenter/SSZJDU/welcome

RFCs

Search for and view Request for Comments documents in this section of the Internet Engineering Task Force website, with links to the RFC repository and the IETF Working Groups web page

http://www.ietf.org/rfc.html

Internet drafts

View Internet-Drafts, which are working documents of the Internet Engineering Task Force (IETF) and other groups, in this section of the Internet Engineering Task Force website

http://www.ietf.org/ID.html

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

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

DNS websites

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

USENET news groups
comp.protocols.dns.bind

BIND mailing lists
https://lists.isc.org/mailman/listinfo

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 (This list might 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.

The z/OS Basic Skills Information Center

The z/OS Basic Skills Information Center is a web-based information resource intended to help users learn the basic concepts of z/OS, the operating system that runs most of the IBM mainframe computers in use today. The Information Center is designed to introduce a new generation of Information Technology professionals to basic concepts and help them prepare for a career as a z/OS professional, such as a z/OS systems programmer.

Specifically, the z/OS Basic Skills Information Center is intended to achieve the following objectives:

- Provide basic education and information about z/OS without charge
- Shorten the time it takes for people to become productive on the mainframe
- Make it easier for new people to learn z/OS

To access the z/OS Basic Skills Information Center, open your web browser to the following website, which is available to all users (no login required):
http://www-01.ibm.com/support/knowledgecenter/zosbasics/com.ibm.zos.zbasics/homepage.html?cp=zosbasics%2F0

Summary of changes for IP User's Guide and Commands

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

Changes made in z/OS Version 2 Release 2

This document contains information previously presented in z/OS Communications Server: IP User's Guide and Commands, SC27-3662-00, which supported z/OS Version 2 Release 1.

Changed information

- TLS Session Reuse Support for FTP and AT-TLS Applications, see Using security mechanisms.

Summary of changes for z/OS Version 2 Release 1

For specifics on the enhancements for z/OS Version 2, Release 1, see the following publications:

- z/OS Summary of Message and Interface Changes
- z/OS Introduction and Release Guide
- z/OS Planning for Installation
- z/OS Migration

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Chapter 1. Getting started with TCP/IP

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 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 topic:

- "Understanding TCP/IP"
- "How TCP/IP uses networks" on page 2
- "Understanding what you can do with TCP/IP" on page 4
- "What you need to get started with TCP/IP" 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, 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.

Understanding TCP/IP: The 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.

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Understanding TCP/IP: 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).

Understanding TCP/IP: Network devices

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

Understanding TCP/IP: 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.

How TCP/IP uses networks: 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.

How TCP/IP uses networks: 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.

How TCP/IP uses networks: 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: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 want to access resides. Each link (physical or virtual) on a host has an IP address.

How TCP/IP uses networks: 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.

How TCP/IP uses networks: 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 wanted 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 with TCP/IP

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" for additional information about command syntax.

z/OS Communications Server 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 23, 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 337 for more information about the SMTP mail facility.

See Chapter 7, "Sending electronic mail using z/OS UNIX sendmail," on page 365 for more information about the z/OS UNIX mail facility.

See Chapter 8, "Sending electronic mail using the Communications Server SMTP application," on page 367 for more information about the mail-forwarding SMTP client.

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 z/OS UNIX shell command **orexec** run client programs that 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. See 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 z/OS UNIX files.

Command	Description
LPQ	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.
LPR	Prints a data set on a remote printer. A variety of options enables you to specify how and where the data set is printed.
LPRM	Removes a job from a printer queue.
LPRSET	Specifies remote printer and remote host names when they are not specifically included in the Line Print commands.

What you need to get started with TCP/IP

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 Communications Server for V2R2 applications, you must be authorized to use z/OS UNIX System Services. For information about z/OS UNIX, see 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 want 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 Communications Server V2R2 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** displays 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 topic:

- "Using the TSO TELNET command"
- "Using the TELNET subcommands" on page 12
- "Using the TELNET function keys" on page 17
- "Suppressing carriage return and line feed" on page 18
- "Using TELNET 3270 DBCS transform mode" on page 19

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 that is 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 can 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 might be running UNIX, VM, or another 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 that are described in "Using the TELNET function keys" on page 17 can result in different actions.

When all of the display data does 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 cannot use applications in full-screen mode. Once in line-mode, all nested Telnet sessions 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
```

Restrictions:

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

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- The TELNET client 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.
- The TELNET client does not use the TCPSTACKSOURCEVIPA value for its local address. It uses any applicable SOURCEVIPA or SRCIP configuration.

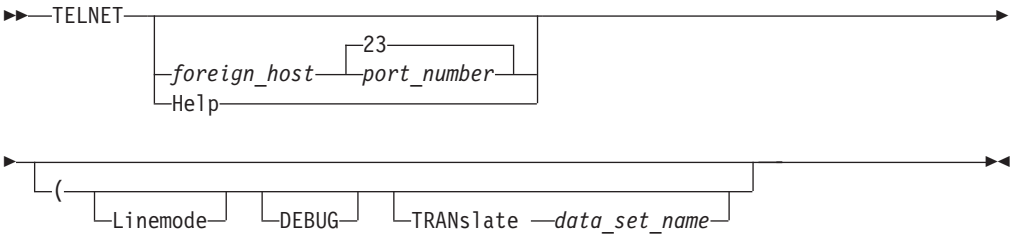
TELNET command

Purpose

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

Note: For information about how to read syntax diagrams, see "How to read a syntax diagram".

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 host name 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:
                READY
    User:      TELNET 1.1.2.3
  System:
                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 are prompted to enter a TELNET subcommand. You can enter TELNET subcommands in uppercase or lowercase characters. Table 1 lists the TELNET subcommands.

Table 1. TELNET subcommands

Subcommand	Description	See
AO	Stops the display of information	"AO—Terminate output display" on page 13
AYt	Queries the existence of the connection	"AYT—Query the connection" on page 13
Brk	Sends a **Break** or **Attn** keystroke	"BRK—Send a Break or Attention keystroke to a host" on page 13
Help or ?	Displays help information	"HELP or ?—Display help information" on page 14
Ip	Interrupts the current process	"IP—Interrupt the process" on page 15
Pa1	Sends a **PA1** keystroke in transparent mode	"PA1—Send the PA1 keystroke to a host" on page 15
Quit	Disconnects from the foreign host	"QUIT—End the TELNET session" on page 16
Synch	Clears the data path	"SYNCH—Clear the data path" on page 16

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

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

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

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: AO,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

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

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

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, see the z/OS Communications Server: IP Configuration Reference.

SYNCH—Clear the data path

Purpose

Use the SYNCH subcommand to clear the data path.

Format

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

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 15 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
PF4PF12, **PF16PF24**	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.

Table 3. TELNET function keys in line mode (continued)

Function key	Description
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 19 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.localNET : 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 : UCDLA-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.

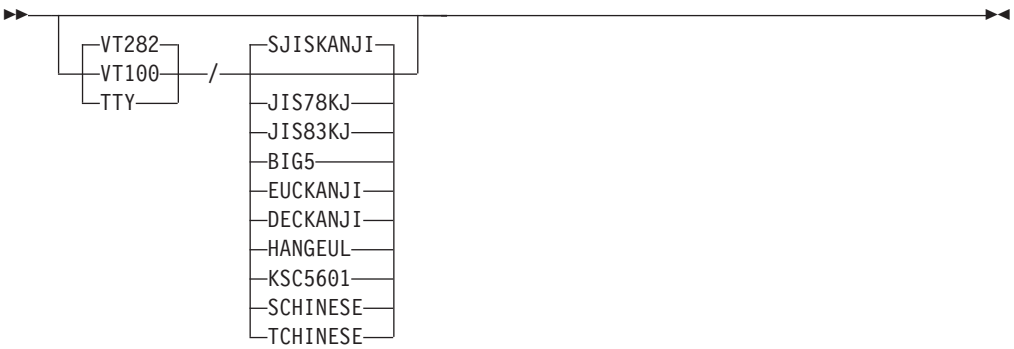
To log on to the server using 3270 DBCS transform mode, specify the `LINEMODE` option on the TELNET client command line. The following banner is displayed if transform mode is available:

```
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, see the z/OS Communications Server: IP Configuration Reference.

For information about character sets, see "Character set cross reference table" on page 443.

For information about the TELNET extensions for terminals other than the 3270 family, see Appendix C, "TELNET extensions," on page 443.

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 topic describes:

- "Using FTP"
- "FTP Help subcommands" on page 35
- "Establishing and exiting a connection" on page 36
- "Obtaining status and system information" on page 39
- "Working with directories on the remote host" on page 39
- "Working with directories on the local host" on page 44
- "Security issues when using FTP" on page 45

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.

You can use one of the following methods to enter the FTP environment.

- Code PGM=FTP in a batch job and pass parameters using the PARM keyword. See "Submitting FTP requests in batch" on page 101 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 Client API. See FTP Client API information in the z/OS Communications Server: IP Programmer's Guide and Reference for complete details on the FTP Client API.

FTP command — Entering the FTP environment

Purpose

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

Guidelines:

1. The FTP client expects to be invoked with POSIX(ON). If you invoke the FTP client with POSIX(OFF) you might experience unpredictable results because many of the status and result functions that are meant to inform the user of any errors during the transfer are dependent on POSIX(ON).
2. 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
   ```

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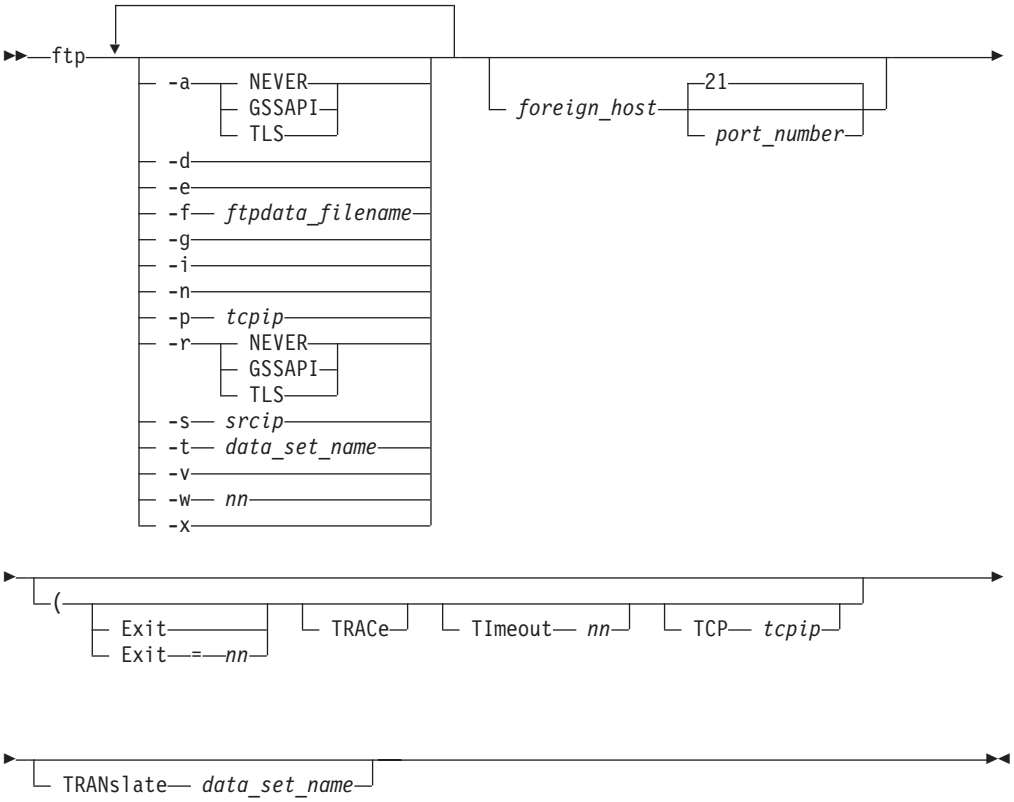
Format



Parameters

-a

NEVER
FTP does not attempt authentication upon initial connection.

GSSAPI
FTP attempts 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 proceeds by issuing ADAT commands.

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

Note: If you specify the TLS parameter, FTP attempts to authenticate for the control connection regardless of how you have configured FTP.DATA. FTP does not protect the data connection unless you have configured FTP.DATA to protect the data connection.

-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.

-f *ftpdata_filename*
Specifies the client file. You can specify a z/OS UNIX file, an MVS data set, or a ddname.

Result: If you specify the -f parameter and the file or data set cannot be used, the client will exit.

Tip: The following are some examples of using the -f parameter to specify the client's FTP.DATA:

- When the FTP client is invoked from the z/OS UNIX shell:
  - To specify a z/OS UNIX file enter:
    ftp -f /etc/ftpascii myftphost
  - To specify an MVS data set enter:
    ftp -f "//'USER12.FTP.DATA'" myftphost
- When the FTP client is called from TSO:
  - To specify a z/OS UNIX file enter:
    ftp -f "/etc/ftpascii" 127.0.0.1
  - To specify an MVS data set enter:
    ftp -f "//'USER1.MYFTP.DATA'" 127.0.0.1
  - To specify an MVS PDS member enter:
    ftp -f "//'SYS1.TCPPARMS(FTPCDATA)'" 127.0.0.1
  - To specify an MVS data set by its ddname enter:
    alloc fi(myftp) da('USER1.MYFTP.DATA') SHR ftp -f "//dd:myftp" 127.0.0.1

Rule: When using the -f parameter from the TSO client, enclose the ftpdata parameter in quotes. For example:

- ftp -f "/u/user1/my.ftp.data" myHost
- ftp -f "//dd:ftpdd" myHost
- ftp -f "//'SYS1.TCPPARMS(MYFTPDAT)'"

-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, preventing the FTP client from prompting the user for a user ID and password or password phrase. If you specify the -n parameter and you have defined a NETRC data set, the data set is not 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.

Result: If you specify the -r parameter, FTP attempts to authenticate for the control connection regardless of how you have configured FTP.DATA. FTP does not protect the data connection unless you have configured FTP.DATA to protect the data connection.

NEVER
FTP does not attempt to authenticate upon initial connection. This option overrides a value in the FTP.DATA file that would cause authentication.

GSSAPI
FTP attempts 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 proceeds by issuing ADAT commands. If the authentication type is not accepted, the client terminates the connection.

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

-s *srcip*
Indicates the source IP address that the FTP client uses for connections. You must specify this as an IP address rather than a host name. The address must be a unicast address. INADDR_ANY, the IPv6 unspecified address (in6addr_any), IPv4-mapped IPv6 addresses, and multicast addresses are not supported. If the IP address specified is not a valid home address on the TCP/IP stack, the FTP client cannot connect to the FTP server.

Restriction: Scope information cannot be specified for the source IP address.

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

Guideline: 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. When you use IPv6 link-local addresses, you can provide scope information along with the host name or IP address, as described in support for scope information in the z/OS Communications Server: IPv6 Network and Application Design Guide.

You are prompted for a host name if you do not specify a *foreign_host* value with the FTP command. If you specify a *foreign_host* value 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 65 534. 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 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

The name of each timer corresponds to an FTP.DATA statement available to set that timer. See the FTP.DATA data set statements information in the z/OS Communications Server: IP Configuration Reference for a description of each of these timers and its default value.

Results:

- If the value is not in the range 15 - 85600 or 0, FTP uses the default values for the TImeout parameters.
- If the value is not a number, all TImeout parameter 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 can 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 might want 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 that 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 89.
2. If you require the use of a customized DBCS translation table, but cannot or do not want to use the TRANSlate parameter, you can name the data set such that it is found in the client search order (for example, *userid*.FTP.TCPdbBIN). See 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 you enter the FTP flags (-a, -d, -e, -f, -g, -i, -n, -p, -r, -s -t, -v, -w, and -x) from z/OS UNIX the flags 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 fails the negotiation when the connection is IPv6.
- NOOPTMSS is no longer supported and is ignored.
- When FTP is started from the FTP Client API, some of the start parameters are ignored. See the FTP client behavior when started by the FTP Client API information in the z/OS Communications Server: IP Programmer's Guide and Reference for details.

Context

- See "Open subcommand—Connect to the FTP server" on page 263 and "QUIt subcommand—Leave the FTP environment" on page 273 for more information about the OPEN and QUIT subcommands.
- See FTP return codes for a description of return code handling in the FTP client.
- See "Changing local site defaults using FTP.DATA" on page 70 for information about the FTP.DATA data set.
- See 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.

Tips:

- You can use the data set NETRC to automatically provide user ID, password, and accounting information while logging in to a remote host. For information about using NETRC, see "NETRC data set" on page 33.
- You can respond to the NAME prompt with the same input that the FTP client accepts as arguments of the User subcommand. See "User subcommand—Identify yourself to a host or change your TSO user ID password" on page 333 for more information about the User subcommand.
- You can respond to the PASSWORD prompt with the same input that the FTP client accepts as arguments of the PAss subcommand. See "PAss subcommand—Supply a password" on page 264 for more information about the PAss subcommand.

Results:

- If you have enabled UTF-8 encoding of the control connection, the login sequence is different. See "UTF-8 enabled control connection" on page 32 for more information.
- You might see one or more 230- replies while logging in to the FTP server. These replies contain information about the current session. Reply code 230 or 230- always indicates that you have successfully logged in to the FTP server. However, the replies 230- sometimes contain information about errors encountered while logging in. These replies indicate errors in the z/OS FTP server configuration files:
  - 230- CWD cmd failed : *reason*
  - 230- Unrecognized parameter *parameter* on SITE command
  - 230- Unable to open FTPS.RC configuration file *error information*
  - 230- Unrecognized command *-cmd-* entered
  - 230- The message was truncated

Contact the system programmer for assistance. See FTPD reply codes in z/OS Communications Server: IP and SNA Codes for additional details about 230-type replies.

- When the FTP Client API is invoked by an application program, ddnames associated with the application are not available to the created FTP client process and the handling of prompts from the client differs. See FTP client behavior when started by the FTP Client API information in z/OS Communications Server: IP Programmer's Guide and Reference for details.

For the procedure to enter the FTP environment using the FTP command, see "Establishing and exiting a connection" on page 36 for more information.

Interpreting FTP client output

The z/OS FTP client output can be categorized as follows:

- Client messages
- Server replies
- Echo input
- Client trace

The following is an example of FTP client output:

```
1# ftp -v vic135
2EZY2640I Using 'USER1.FTP.DATA' for local site configuration parameters.
3EZYFT46E Error in 'USER1.FTP.DATA' file: line 580 near column 11.
4EZYFT25I Using //'TPOUSER.STANDARD.TCPXLBIN' for FTP translation tables for
  the control connection.
5EZYFT75I Using internal translate tables for the data connection.
6EZA1450I IBM FTP CS V1R7
7EZA1466I FTP: using TCPCS
8EZYFT18I Using catalog '/usr/lib/nls/msg/C/ftpdmsg.cat' for FTP messages.
9EZA1554I Connecting to: vic135.tcp.raleigh.ibm.com 9.42.103.37 port: 21.
10220-FTPD1 IBM FTP CS V1R7 at VIC135.tcp.raleigh.ibm.com, 21:21:49 on 2004-11-08.
11220 Connection will not timeout.
12EZA1459I NAME (vic135:USER1):
13EZA1701I >>> USER USER1
14331 Send password please.
15EZA1789I PASSWORD:
16230 USER1 is logged on. Working directory is "USER1.".
17EZA1460I Command:
18debug all
19PC0346 parseCmd: subcommand: debug
20PC0371 parseCmd: parameter 1: all
21EZA2923I Active client traces - FLO CMD PAR INT ACC UTL SEC FSC(1) SOC(1) SQL
22SC3392 resetLastReply: entered
23PC0657 parseCmd: using primary session.
24CU0307 getCommand: entered
25EZA1460I Command:
26debug time
27PC0346 parseCmd: subcommand: debug
28PC0693 fndCmd: entered with debug
29PC0775 fndCmd: command found is debug
30PC0371 parseCmd: parameter 1: time
31PC0404 parseCmd: fndCmd returned the cmdrecord for debug
32PC0536 parseCmd: using primary session
33CL0205 debug: entered
34GU2981 setDebug: entered
35EZA2923I Active client traces - FLO CMD PAR INT ACC UTL SEC FSC(1) SOC(1) SQL
3616:54:46 SC3392 resetLastReply: entered
3716:54:46 PC0657 parseCmd: using primary session.
3816:54:46 CU0307 getCommand: entered
39EZA1460I Command:
```

Following are descriptions of the numbered items in the example.

1 This is the command that starts the FTP client. The -v option directs FTP to precede each client message with its unique 7-character identifier.

For more information about FTP start options, see "FTP command — Entering the FTP environment" on page 23.

2 to 9 These are FTP client messages, whose identifiers are always 8 characters long. The message identifier appears only when you start FTP with the -v option. After you have started FTP, you can use the client subcommand, verbose, to toggle display of client message identifiers on and off.

The first three characters are always one of the following strings:

- EZA
- EZY
- EZZ

The final character can be E, I, or W.See z/OS Communications Server: IP Messages Volume 1 (EZA), z/OS Communications Server: IP Messages Volume 3 (EZY), and z/OS Communications Server: IP Messages Volume 4 (EZZ, SNM)for more information about FTP client messages.

10, 11 These are replies from the FTP server. FTP server replies are always prefixed with a 3-digit numeric reply code, in the range 100 - 555. For the meaning of the reply code, see RFC 959. If the server is a z/OS FTP server, you will also find the FTP server reply code and reply text documented in z/OS Communications Server: IP and SNA Codes.

12, 13, 15, 17, 21, 25, 39
These are FTP client messages, as indicated by the 3-letter prefix.

14, 16 These are FTP server replies, as indicated by the 3-digit prefix.

18 This is the echo of input entered in response to the FTP client command prompt at line **17**. The debug subcommand turns on the FTP client trace.

19, 20, 22 to 24
This is FTP client trace output. FTP client trace output lines are always composed of a 2-letter prefix with a 4-digit numeral. The FTP client trace is for the use of the IBM Service Center.

26 This is the echo of input entered in response to the FTP client command prompt at line **25**. The time option of the debug subcommand causes the FTP client trace to be time-stamped

27 to 34
This is client trace generated by the client processing the debug subcommand. This trace is not time-stamped because the client has not yet recognized that it is processing the TIME option.

35 This is a client message issued in response to the debug subcommand.

36 to 38
This is client trace output. At this point, the client has recognized the TIME option entered at line **26** and client trace is now time-stamped.

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 can 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 Client API is invoked by an application program, INPUT and OUTPUT ddnames are not available to the created FTP client process. See the z/OS Communications Server: IP Programmer's Guide and Reference for a description of the FTP Client 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. See 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 D, "Related protocol specifications," on page 451). 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* values 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** must be lowercase. The variables *user_ID* and *password* might be case sensitive, depending on the remote host. (For example, when using UNIX or AIX hosts, the *user_ID* and *password* values are case sensitive.) The *hostname* variable that is specified after the **machine** keyword can include scope information, as described in the support for scope information in the z/OS Communications Server: IPv6 Network and Application Design Guide.

Guidelines:

- If you include *scope* on the FTP command (for example, *hostname%scope*), there should be an entry defined in the *user_id*.NETRC data set that includes *scope* as part of the *hostname* value following the **machine** keyword. Defining this entry ensures that the correct *user_id* and *password* values are selected.
- Although the FTP client allows the keywords for a single machine entry to be split across multiple lines, REXEC requires all of the values to be on a single

line. If you specify the ACCOUNT keyword in the NETRC file, specify the **password** keyword; otherwise, the FTP client uses NULL as the password and sends it to the server.

Rules:

- Code a password phrase that contains blanks in NETRC by enclosing the entire password phrase in quotation marks. You can use single or double quotation marks. If the password phrase itself contains a quotation mark, use the other style of quotation mark to enclose the password phrase.

  Example: Code the password phrase *What's up, Doc?* in NETRC as "What's up, Doc?" but not as 'What's up, Doc?'.

  If you code user data for the z/OS FTP server user exit FTCHKPWD in NETRC, and either user data or the password contains blanks, enclose the password and user data in quotation marks.

  Example: Code the password phrase *What's up, Doc?* with the user data *FTCHKPWD exit parameter* as *"What's up, Doc?:FTCHKPWD exit parameter"*.
- Do not use quotation marks to enclose a password phrase that is comprised only of any of the following characters:
  - Uppercase or lowercase letters
  - Numerals from 0 to 9
  - The following special characters:
    - @
    - #
    - $
    - -
    - {
    - .
    - (
    -)
    - *
    - %
    - +

  Example: Code the password phrase *JoeIBMer@ibm.com* in NETRC as *JoeIBMer@ibm.com*, but not as *'JoeIBMer@ibm.com'*, nor as *"JoeIBMer@ibm.com"*.

Restriction:

- A password phrase that you code in the NETRC data set or file must not contain both single quotation mark and double quotation mark characters. You can use either style of quotation marks in the password phrase, but not both.

  Example: The password phrase *What's up, Doc?* is valid because it contains only single quotation marks. Code it in NETRC as *"What's up, Doc?"*. The password phrase *"What's up, Doc?"* with the double quotation marks as part of the password phrase cannot be entered at the z/OS FTP client or coded in NETRC because it contains both styles of quotation marks.

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 101.

Environment variables accessed by FTP

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 login to a value equal to the path name 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.

FTP Help subcommands

The FTP Help subcommands are listed in Table 5.

Table 5. FTP subcommands for getting help

Subcommand	Description	See
?	Provides an introduction to using FTP.	"HElp and ? subcommands—Display help information" on page 193
HElp	Displays help information for FTP.	"HElp and ? subcommands—Display help information" on page 193
man	UNIX Shell command provides help information about the z/OS UNIX FTP client.	"Obtaining command help" on page 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	See
ACCt	Sends host-dependent account information.	"ACCt subcommand—Supply account information" on page 164
CLose	Disconnects from the foreign host.	"CLose subcommand—Disconnect from a remote host" on page 174
Open	Opens a connection to a foreign host.	"Open subcommand—Connect to the FTP server" on page 263
PAss	Supplies a password or password phrase to the foreign host.	"PAss subcommand—Supply a password" on page 264
QUIt	Leaves the FTP command environment.	"QUIt subcommand—Leave the FTP environment" on page 273
User	Identifies you to a foreign host.	"User subcommand—Identify yourself to a host or change your TSO user ID password" on page 333

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: 2001:0DB8:c2d4::9:67:115:12 port 21
2. VM Host: 192.9.2.4

```
 ftp 2001:0DB8:c2d4::9:67:115:12
IBM FTP CS V1R5
FTP: using TCPCS
Connecting to:   2001:0DB8:c2d4::9:67:115:12 port: 21.
220-FTPD1 IBM FTP CS V1R4 at MVSVIC96, 12:38:19 on 2003-01-27.
220 Connection will close if idle for more than 5 minutes.
NAME (2001:0DB8: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 verify that you set up the default working directory correctly, perform 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 273.

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 the z/OS UNIX shell, the default local working directory is the directory from which 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	See
!	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.	"! subcommand—Invoke a z/OS UNIX System Services function" on page 163
DEBug	Sets general trace options.	"DEBug subcommand—Set general trace options" on page 176
DUMP	Sets extended trace options.	"DUMP subcommand—Set extended trace options" on page 184
FEature	Asks server which features or extensions it supports.	"FEature subcommand—Query FTP server for features it supports" on page 188
LOCSTat	Displays FTP status information for the local host.	"LOCSTat subcommand—Display local status information" on page 229
NOop	Checks whether the foreign host is still responding.	"NOop subcommand—Test the connection" on page 262
STAtus	Displays status information for the foreign host.	"STAtus subcommand—Retrieve status information from a remote host" on page 316
SYstem	Displays the name of the foreign host's operating system.	"SYstem subcommand—Display the operating system name" on page 326
TSO	Passes a TSO command to the local host TSO environment.	"TSO subcommand—Use TSO commands" on page 328

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	See
CD	Changes the working directory.	"CD subcommand—Change the directory on the remote host" on page 170
CDUp	Changes to the parent of the current working directory.	"CDUp subcommand—Change to the parent of the working directory" on page 172
CWd	Changes the working directory (synonymous with CD).	"CD subcommand—Change the directory on the remote host" on page 170
DIr	Lists the directory entries for files on the foreign host.	"DIr subcommand—Obtain a list of directory entries" on page 180
LS	Lists the names of files on the foreign host.	"LS subcommand—Obtain a list of file names" on page 237

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

Subcommand	Description	See
MKdir	Creates a directory on the foreign host.	"MKdir subcommand—Create a directory on the remote host" on page 246
PWd	Displays the name of the active working directory on the foreign host.	"PWd subcommand—Display the current working directory" on page 273
RMdir	Removes a directory on the foreign host.	"RMdir subcommand—Remove a directory on the remote host" on page 278

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 z/OS UNIX file system environments. For more information on how to change the directory levels, see the information on the CD, CDUP, and LCD subcommands.

```
  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 z/OS UNIX 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	See
LCd	Changes the current directory on the local host.	"LCd subcommand—Change the local working directory" on page 198
LMkdir	Creates a directory on the local host.	"LMkdir subcommand—Create a directory on the local host" on page 200
LPwd	Displays the name of the active working directory on the local host.	"LPwd subcommand—Display the current working-level qualifier" on page 237

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 issues when using FTP

The following information 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 can 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) can 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.

FTP assumes that the port configured by the TLSPORT statement (default TLSPORT is 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.

FTP support for SSL/TLS protected sessions is based on the Internet Draft, *On Securing FTP with TLS*. As of October, 2005, *On Securing FTP with TLS* has been published as RFC 4217. The RFC level is different from the Internet draft. You can set the TLSRFCLEVEL configuration option to choose which level of *On Securing FTP with TLS* you want FTP to support.

To use the new RFC 4217 or CCCNONOTIFY function, the client and server must have the same TLSRFCLEVEL value.

Table 10 identifies important differences between the draft level and the RFC level of the TLSRFCLEVEL value.

Table 10. Important differences between the draft, RFC, and CCCNONOTIFY levels

Draft level	RFC level	CCCNONOTIFY level
The server does not support the CCC and AUTH commands when the connection is secured with TLS.	The server supports the CCC and AUTH commands on connections that are secured with TLS but not implicitly secured by connecting to the port that is configured with the TLSPORT statement.	The server supports the CCC command but not the AUTH command on connections that are secured with TLS but not implicitly secured by connecting to the port that is configured with the TLSPORT statement. The server does not issue a TLSshutdown command when it receives the CCC command.

Table 10. Important differences between the draft, RFC, and CCCNONOTIFY levels (continued)

Draft level	RFC level	CCCNONOTIFY level
The client does not allow CCc or CProtect clear subcommands during a session that is secured with TLS.	The client allows the CCc and CProtect clear subcommands during a session that is secured with TLS but not implicitly secured by connecting to the port that is configured with the TLSPORT statement.	The client allows the CCc and CProtect clear subcommands during a TLS-secured session that is not implicitly secured by connecting to the port that is configured with the TLSPORT statement. The client does not issue a TLSshutdown command when it sends the CCC command.
The client does not allow an AUTH command to flow during a session that is secured with TLS.	The client allows the AUTH command during a session that is secured with TLS but not implicitly secured by connecting to the port that is configured with the TLSPORT statement.	The client does not allow an AUTH command to flow during a session that is secured with TLS.

The server does not allow the PROT or PBSZ commands to run on a control connection that has been cleared with the CCC command. After a successful CCc subcommand, the client does not allow clear, protect clear, private, and protect private subcommands for the remainder of the session.

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

- See "FTP command — Entering the FTP environment" on page 23 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 70 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
   SECURE_SESSION_REUSE
   SECUREIMPLICITZOS
   CIPHERSUITE
   KEYRING
   TLSPORT
   TLSRFCLEVEL
   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 72 for more information.

FTP client security user exits

The FTP client provides two user exits you can use to restrict commands the FTP client sends to the server, and to monitor FTP replies sent from the server to the client.

User exit EZAFCCMD is called for every command the FTP client sends to the server. A user exit routine you write for user exit EZAFCCMD can inspect an FTP command and its arguments, modify the arguments of an FTP command, prevent an FTP command from being sent to the server, or end the FTP client before the client sends the command to the server.

User exit EZAFCREP is called for every reply the FTP client receives from the server. For replies comprised of more than one line, EZAFCREP is called once for each line of the reply, as each line is received. A user exit routine you write for EZAFCREP can inspect the FTP server reply, or end the FTP client after the FTP client receives a certain line of the reply sent from the server.

For more information about FTP client security exits, see Configuring the optional FTP user exits in z/OS Communications Server: IP Configuration Guide and FTP client user exits in z/OS Communications Server: IP Configuration Reference.

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 topic describes information about:

- "Preparing the environment for FTP"
- "Transferring data with FTP" on page 51
- "Changing local site defaults using FTP.DATA" on page 70
- "Sample FTP.DATA data set (FTCDATA)" on page 72
- "Support for SBCS languages" on page 89
- "FTP with traditional DBCS support" on page 90
- "Support for MBCS languages" on page 93
- "Specifying values for new data sets" on page 94
- "Generation data group support" on page 97
- "Submitting FTP requests in batch" on page 101
- "Using the EXEC interface" on page 106
- "FTP return codes" on page 109
- "Restarting a failed data transfer" on page 117
- "Using z/OS UNIX System Services named pipes" on page 119
- "Interfacing with JES" on page 130
- "Performing DB2 SQL queries with FTP" on page 148
- "SUBSYS: Writing to BatchPipes" on page 154

Preparing the environment for FTP

You can use the subcommands that are listed in Table 11 to prepare the environment before working with data.

Table 11. FTP subcommands for preparing the environment

Subcommand	Description	See
AScii	Sets the transfer type to ASCII.	"AScii subcommand—Change the data transfer type to ASCII" on page 166
BINary	Sets the transfer type to IMAGE.	"BINary subcommand—Change the data transfer type to Image" on page 168
BLock	Sets the data transfer mode to block mode.	"BLock subcommand—Set the block data transfer mode" on page 169
COMpress	Sets the data transfer mode to compressed mode.	"COMpress subcommand—Set the compressed data transfer mode" on page 175
EBcdic	Sets the transfer type to EBCDIC.	"EBcdic subcommand—Change the data transfer type to EBCDIC" on page 186

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Table 11. FTP subcommands for preparing the environment (continued)

Subcommand	Description	See
FIle	Sets the file structure to **File**.	"FIle subcommand—Set the file structure to File" on page 188
GLob	Toggles globbing (the expansion of metacharacters in file names) for the MDELETE, MGET, and MPUT subcommands.	"GLob subcommand—Toggle expansion of metacharacters" on page 191
LOCSIte	Specifies information that is used by the local host to provide service specific to that host system.	"LOCSIte subcommand—Specify site information to the local host" on page 203
LANGuage	Sets language for server replies.	"LANGuage subcommand—Set the language used for FTP replies from the server" on page 197
MOde	Specifies the mode or data format of the transfer.	"MOde subcommand—Set the data transfer mode" on page 251
PROMpt	Toggles interactive prompting for MDELETE, MGET, and MPUT commands.	"PROMpt subcommand—Toggle interactive prompting for M* commands" on page 266
QUOte	Sends an uninterpreted string of data.	"QUOte subcommand—Send an uninterpreted string of data" on page 274
RECord	Sets the file structure to record.	"RECord subcommand—Set the file structure to record" on page 275
SENDPort	Enables or disables automatic transmission of the FTP server PORT command.	"SENDPort subcommand—Toggle the sending of port information" on page 280
SENDSite	Enables or disables automatic transmission of the SITE subcommand.	"SENDSite subcommand—Toggle the sending of site information" on page 280
SIte	Sends information to the foreign host using site-specific commands.	"SIte subcommand—Send site-specific information to a host" on page 281
STREam	Sets the data transfer mode to stream mode.	"STREam subcommand—Set the stream data transfer mode" on page 325
STRucture	Sets the file transfer structure.	"STRucture subcommand—Set the file structure" on page 325
SUnique	Changes the storage methods.	"SUnique subcommand—Changes the storage method" on page 325
TYpe	Specifies the transfer type.	"TYpe subcommand—Set the data transfer type" on page 328

Transferring data with FTP

You can use the subcommands listed in Table 12 to work with and transfer data.

Table 12. FTP subcommands for transferring data

Subcommand	Description	See
APpend	Appends a data set on your local host to a file on the foreign host.	"APpend subcommand—Append a local data set" on page 164
DELEte	Deletes a single file on the foreign host.	"DELEte subcommand—Delete files" on page 179
DELImit	Displays the delimiter character between the *file_name* and *file_type*.	"DELImit subcommand—Display the file name delimiter" on page 180
Get	Copies a file from the foreign host to your local host.	"Get subcommand—Copy files" on page 188
MDelete	Deletes multiple files on the foreign host.	"MDelete subcommand—Delete multiple files" on page 240
MGet	Copies multiple files from the foreign host to your local host.	"MGet subcommand—Copy multiple files" on page 243
MPut	Copies multiple files on your local host to the foreign host.	"MPut subcommand—Copy multiple data sets to the remote host" on page 252
MVSGet	Copies a remote z/OS data set into a local z/OS data set with the remote data set attributes	"MVSGet subcommand – Copy a remote data set into a local data set with the remote data set attributes" on page 254
MVSPut	Copies a local z/OS data set into a remote z/OS data set with the local data set attributes	"MVSPut subcommand – Copy a local data set into a remote data set name with the local data set attributes" on page 259
PUt	Copies a file on your local host to the foreign host.	"PUt subcommand—Copy data sets to the remote host" on page 271
REName	Renames a file on the foreign host.	"REName subcommand—Rename files" on page 276
REStart	Restarts a checkpointed data transfer.	"REStart subcommand - Restart a checkpointed data transfer" on page 276
SRestart	Restarts a stream mode data transfer.	"SRestart subcommand—Restart a stream data transfer" on page 314

How to transfer data with FTP

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 13 on page 52 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 13. 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 **Note:** The EBCDIC host is used for storage only. Data remains encoded in ASCII; therefore, the data cannot be used on the EBCDIC host.	Image (binary)	Stream

For more information about the DBCS data type keywords and examples, see "FTP with traditional DBCS support" on page 90.

For information about setting data transfer type, see "TYpe subcommand—Set the data transfer type" on page 328. For information about setting data transfer mode, see "MOde subcommand—Set the data transfer mode" on page 251.

Examples of Get, MGet and MVSGet subcommands

Results:

1. If the LISTSUBdir option is not specified on the SITE subcommand and the LISTSUBDIR statement is not specified in the server FTP.DATA file, the default is as if the LISTSUBdir option was specified on the SITE subcommand.
2. If the z/OS FTP server has the NOLISTSUBDIR option on the SITE subcommand or LISTSUBDIR FALSE in the server FTP.DATA file, then an mget * command gets only the files in the current directory.

Restrictions:

1. The LISTSUBDIR statement applies to z/OS UNIX file operations only. MVS data set operations are not affected.
2. The SITE LISTSUBDIR command is supported by z/OS FTP in V1R7 and later releases. The FTP client must be communicating with a z/OS V1R7 or later FTP server or an `unrecognized parameter` response results.

Example 1: 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 12 on page 51 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:  lmkdir '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-FTPD1 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

Restrictions:

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

Example 2: MGET with SITE LISTSUBDIR

Following is an example of mget * with SITE LISTSUBDIR. This setting affects processing of the NLST command. The z/OS FTP client sends an NLST command to the server as part of mget * subcommand processing. LISTSUBDIR specifies that both the current and next subdirectory should be retrieved from the server as a result of processing an mget * subcommand. In this example, the current directory has a file x and a subdirectory y and subdirectory y has a file x.

```
site listsubdir
>>> SITE listsubdir
200 SITE command was accepted
mget * (rep
>>> PORT 127,0,0,1,4,13
200 Port request OK.
>>> NLST *
125 List started OK
250 List completed successfully.
>>> PORT 127,0,0,1,4,14
200 Port request OK.
>>> RETR x
125 Sending data set /tmp/mgetmput/x
250 Transfer completed successfully.
>>> PORT 127,0,0,1,4,14
200 Port request OK.
>>> RETR y/x
125 Sending data set /tmp/mgetmput/y/x
250 Transfer completed successfully.
5 bytes transferred in 1.010 seconds.  Transfer rate 0.00 Kbytes/sec.
Command:
```

Example 3: MGET with SITE NOLISTSUBDIR

Following is an example of mget * with SITE NOLISTSUBDIR. This setting affects processing of the NLST command. The z/OS FTP client sends an NLST command to the server as part of mget * subcommand processing. NOLISTSUBDIR specifies that only the current directory should be retrieved from the server as a result of processing an mget * subcommand. In this example, the current directory has a file x and a subdirectory y and subdirectory y has a file x.

```
site nolistsubdir
>>> SITE nolistsubdir
200 SITE command was accepted
mget * (rep
>>> PORT 127,0,0,1,4,13
200 Port request OK.
>>> NLST *
125 List started OK
250 List completed successfully.
>>> PORT 127,0,0,1,4,14
200 Port request OK.
>>> RETR x
125 Sending data set /tmp/mgetmput/x
250 Transfer completed successfully.
5 bytes transferred in 1.010 seconds.  Transfer rate 0.00 Kbytes/sec.
Command:
```

Example 4: MVSGET with a physical sequential data set transferred

Following is a sample entry and response that is displayed after the MVSGET subcommand is used to transfer a physical sequential data set:

```
mvsget 'user1.ps.source' 'user1.ps.target' (REAllocate
EZA1701I >>> XDSS 'user1.ps.source'
200-LASTREF=2011/12/06 DSEMPTY=FALSE
200 SITE DSNTYPE=BASIC RECFM=VB BLKSIZE=6233 LRECL=256 PRIMARY=16   SECONDARY=1 TRACKS EA
TTR=SYSTEM  EZZ9815I local site variables have changed
EZA1701I >>> PORT 127,0,0,1,4,5
200 Port request OK.
EZA1701I >>> RETR 'user1.ps.source'
125 Sending data set USER1.PS.SOURCE
250 Transfer completed successfully.
EZA2108I Confidence=High for MVSGET of USER1.PS.TARGET
EZA1617I 286 bytes transferred in 0.020 seconds.  Transfer rate 14.30 Kbytes/sec
```

Restrictions: For more restrictions about the MVSGet subcommand, see "MVSGet subcommand – Copy a remote data set into a local data set with the remote data set attributes" on page 254

Example 5: MVSGet with a PDS data set transferred

Following is a sample entry and response that is displayed after the MVSGet subcommand is used to transfer a PDS data set:

```
mvsget 'user1.remote.pds' 'user1.local.pds' (REAllocate
 EZA1701I >>> XDSS 'user1.remote.pds'
200-LASTREF=2011/12/16 DSEMPTY=FALSE
200 SITE PDSTYPE=PDS RECFM=VB BLKSIZE=6233 DIRECTORY=27 LRECL=256 PRIMARY=1 SECO
NDARY=1 TRACKS EATTR=SYSTEM
EZZ9815I local site variables have changed
EZA2245I "USER1.LOCAL.PDS" created.
EZA2081I Local directory name set to partitioned data set USER1.LOCAL.PDS
EZA1701I >>> PWD
257 "'USER1.'" is working directory.
EZA1701I >>> CWD 'user1.remote.pds'
250 The working directory "USER1.REMOTE.PDS" is a partitioned data set
EZA1701I >>> PORT 127,0,0,1,4,5
200 Port request OK.
EZA1701I >>> NLST *
125 List started OK.
250 List completed successfully.
EZA1701I >>> PORT 127,0,0,1,4,6
200 Port request OK.
EZA1701I >>> RETR NEW1
125 Sending data set USER1.REMOTE.PDS(NEW1)
250 Transfer completed successfully.
EZA1617I 134 bytes transferred in 0.010 seconds.  Transfer rate 13.40 Kbytes/sec.
EZA1701I >>> PORT 127,0,0,1,4,7
200 Port request OK.
EZA1701I >>> RETR NEW2
125 Sending data set USER1.REMOTE.PDS(NEW2)
250 Transfer completed successfully.
EZA1617I 134 bytes transferred in 0.010 seconds.
Transfer rate 13.40 Kbytes/sec.
EZA2581I Local HFS directory is /u/user1 .
EZA1701I >>> CWD 'USER1.'
250 "USER1." is working directory name prefix
EZA2108I Confidence=High for MVSGET of USER1.LOCAL.PDS
```

Restrictions: For more restrictions about the MVSGet subcommand, see "MVSGet subcommand – Copy a remote data set into a local data set with the remote data set attributes" on page 254

Examples of PUt, MPut and MVSPut subcommands

Results:

1. If the LISTSUBdir option is not specified on the LOCSITE subcommand and the LISTSUBDIR statement is not specified in the client FTP.DATA file, the default is as if the LISTSUBdir option was specified on the LOCSITE subcommand.
2. If the z/OS FTP client has the NOLISTSUBDIR option on the LOCSITE subcommand or LISTSUBDIR FALSE in the client FTP.DATA file, an mput * stores only the files that are in the current directory.

Restriction: The LISTSUBDIR statement applies to z/OS UNIX file operations only; MVS data set operations are not affected.

Example 1: PUT and MPUT subcommands 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

USER121.FTP.EXAMPLE.XA2FILE3

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

Example 2: MPUT with LOCSITE LISTSUBDIR

Following is an example of mput * with the LOCSITE LISTSUBDIR option. The LISTSUBDIR option specifies that not only the current subdirectory, but also the next subdirectory should be searched for files to be sent from the client to the server. In this example, the current directory has a file x and a subdirectory y and subdirectory y has a file x.

```
locsite listsubdir
prompt
Interactive mode is off
Command:
mput *
>>> PORT 127,0,0,1,4,11
200 Port request OK.
>>> STOR x
125 Storing data set /u/user1/x
250 Transfer completed successfully.
5 bytes transferred in 0.070 seconds.  Transfer rate 0.07 Kbytes/sec.
>>> PORT 127,0,0,1,4,12
200 Port request OK.
>>> STOR x
125 Storing data set /u/user1/x
250 Transfer completed successfully.
5 bytes transferred in 0.020 seconds.  Transfer rate 0.25 Kbytes/sec.
Command:
```

Example 3: MPUT with LOCSITE NOLISTSUBDIR

Following is an example of mput * with the LOCSITE NOLISTSUBDIR option. The NOLISTSUBDIR option specifies that only the current directory should be searched for files to be sent from the client to the server. In this example, the current directory has a file x and a subdirectory y and subdirectory y has a file x.

```
locsite NOlistsubdir
prompt
Interactive mode is off
Command:
mput *
>>> PORT 127,0,0,1,4,11
200 Port request OK.
>>> STOR x
125 Storing data set /u/user1/x
250 Transfer completed successfully.
5 bytes transferred in 0.070 seconds.  Transfer rate 0.07 Kbytes/sec.
Command:
```

Example 4: MVSPut with a physical sequential data set transferred

Following is a sample entry and response that is displayed after the MVSPut subcommand is used to transfer a physical sequential data set:

```
mvsput 'user1.ps.source' 'user1.ps.target' (REAllocate
EZA1701I >>> XDSS 'user1.ps.target'
200-LASTREF=2011/12/07 DSEMPTY=FALSE
200 SITE DSNTYPE=BASIC RECFM=VB BLKSIZE=6233 LRECL=256 PRIMARY=1 SECONDARY=1 TRA
CKS EATTR=SYSTEM
EZA1701I >>> DELE 'user1.ps.target'
250 USER1.PS.TARGET deleted.
EZA1701I >>> SITE DSNTYPE=BASIC RECFM=VB BLKSIZE=6233 LRECL=256 PRIMARY=1 SECOND
ARY=1 TRACKS EATTR=SYSTEM
200 SITE command was accepted
EZA1701I >>> PORT 127,0,0,1,4,4
200 Port request OK.
EZA1701I >>> STOR 'user1.ps.target'
125 Storing data set USER1.PS.TARGET
250 Transfer completed successfully.
EZA2108I Confidence=High for MVSPUT of USER1.PS.TARGET
EZA1617I 2331 bytes transferred in 0.005 seconds.  Transfer rate 466.20 Kbytes/sec.
```

Restriction: For more restrictions about the MVSPut subcommand, see "MVSPut subcommand – Copy a local data set into a remote data set name with the local data set attributes" on page 259

Example 5: MVSPut with a PDS data set transferred

Following is a sample entry and response that is displayed after the MVSPut subcommand is used to transfer a PDS data set:

```
mvsput 'user1.local.pds''user1.remote.pds'(REAllocate
EZA1701I >>> PWD
257 "'USER1.'" is working directory.
EZA1701I >>> XDSS 'user1.remote.pds'
200-LASTREF=2011/12/16 DSEMPTY=FALSE
200 SITE PDSTYPE=PDS RECFM=VB BLKSIZE=6233 DIRECTORY=27 LRECL=256 PRIMARY=1 SECO
NDARY=1 TRACKS EATTR=SYSTEM
EZA1701I >>> DELE 'user1.remote.pds'
250 USER1.REMOTE.PDS deleted.
EZA1701I >>> SITE PDSTYPE=PDS RECFM=VB BLKSIZE=6233 DIRECTORY=27 LRECL=256 PRIMA
RY=1 SECONDARY=1 TRACKS EATTR=SYSTEM
200 SITE command was accepted
EZA2081I Local directory name set to partitioned data set USER1.LOCAL.PDS
EZA1701I >>> MKD 'user1.remote.pds'
257 "'USER1.REMOTE.PDS'" created.
EZA1701I >>> CWD 'user1.remote.pds'
250 The working directory "USER1.REMOTE.PDS" is a partitioned data set
EZA1701I >>> PORT 127,0,0,1,4,11
200 Port request OK.
EZA1701I >>> STOR NEW1
125 Storing data set USER1.REMOTE.PDS(NEW1)
250 Transfer completed successfully.
EZA1617I 134 bytes transferred in 0.005 seconds.  Transfer rate 26.80 Kbytes/sec.
EZA1701I >>> PORT 127,0,0,1,4,12
200 Port request OK.
EZA1701I >>> STOR NEW2
125 Storing data set USER1.REMOTE.PDS(NEW2)
250 Transfer completed successfully.
EZA1617I 134 bytes transferred in 0.005 seconds.  Transfer rate 26.80 Kbytes/sec.
EZA2581I Local HFS directory is /u/user1.
EZA1701I >>> CWD 'USER1.'
250 "USER1." is working directory name prefix
EZA2108I Confidence=High for MVSPUT of USER1.LOCAL.PDS
```

Restriction: For more restrictions about the MVSPut subcommand, see "MVSPut subcommand – Copy a local data set into a remote data set name with the local data set attributes" on page 259.

ddname support with FTP

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 ddname used on the allocation.

The FTP Client API does not support ddname transfers. The ddnames associated with a batch job that invokes an application program using the FTP Client API are not available to the created 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. See the z/OS MVS JCL Reference for restrictions on using backward references in the DCB parameter.

If the DD statement refers to a cataloged DASD data set, any DCB attributes that are 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 statement refers to a tape data set that is to be opened for input (PUT //DD:), the record format that is 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.

Restrictions:

- If you pass a dynamically allocated ddname to a batch job, do not allocate the ddname using the XTIOT, UCB nocapture, or DSAB above the 16 MB line options.
- The MVSGet subcommand does not support specifying the local data set as a ddname.
- To prevent transferring data from an empty file, FTP checks whether the first file in a concatenation series is empty and allocates an empty data set. No data is transferred.

  If you use BSAM to transfer a series of concatenated files, each file in the series must not be empty. That is, they must have a valid end of file indicator set.

  For concatenated data sets, if any of the files are empty, you can use the PUT and APPEND commands to transfer the data sets. If one of the data sets is empty, the next command continues to run and the additional data is concatenated.

  ```
  put     //dd:infile1 target.ds
  append  //dd:infile2 target.ds
  append  //dd:infile3 target.ds
  ```

  Following is a sample JCL that illustrates the problem where input consists of concatenated data sets with the first file USER35.GDG1 being empty and the remaining files not being empty. FTP checks an empty data set on the first file, resulting in the transfer of a null file.

  ```
  //STEP02 EXEC PGM=FTP,REGION=2048K,PARM='(TCP TCPCS TRACE'
  //STEPLIB DD DSN=USER33.LINKLIB,DISP=SHR
  //SYSPRINT DD SYSOUT=*
  //INFILE1 DD DSN=USER35.GDG1(+1),DISP=SHR
  ```

```
//        DD DSN=USER35.GDG2(+1),DISP=SHR
//        DD DSN=USER34.FILE,DISP=SHR
//OUTPUT DD SYSOUT=*
//INPUT DD *
9.67.113.57 21
USER33 **pw**
put //DD:INFILE1 remote.file
quit
/*
```

To resolve this problem, you can use the following sample JCL instead:

```
//STEP02 EXEC PGM=FTP,REGION=2048K,PARM='(TCP TCPCS TRACE'
//STEPLIB DD DSN=USER33.LINKLIB,DISP=SHR
//SYSPRINT DD SYSOUT=*
//INFILE1 DD DSN=USER35.GDG1(+1),DISP=SHR
//INFILE2 DD DSN=USER35.GDG2(+1),DISP=SHR
//INFILE3 DD DSN=USER34.FILE,DISP=SHR
//OUTPUT DD SYSOUT=*
//INPUT DD *
9.67.113.57 21
USER33 **pw**
put //DD:INFILE1 remote.file
append //DD:INFILE2 remote.file
append //DD:INFILE3 remote.file
quit
/*
```

Note: This restriction applies to all types of data sets, not only GDG data sets.

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  DSNAME=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  DSNAME=USER33.TEST.S.A,DISP=OLD
3 //DD02     DD  DSNAME=*.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 few selected 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 that was 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 with FTP

As long as your FTP client and FTP server are both at the z/OS Communications Server V2R10 or later, you can use FTP to transfer MVS load modules between load libraries on different hosts or the same host. MVS load modules transferred, using z/OS Communications Server V2R10 or later 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 (LMTR) is also supported for proxy transfer, in which case all three hosts (client, primary server, and secondary server) must be z/OS Communications Server V2R10 or later.

Load module transfer processing (at z/OS V1R2 Communications Server or later) 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
- mput
- mvsget
- mvsput
- put

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

- Do not transfer nonexecutable load modules, or load modules of size 0 or undefined size. Unpredictable results will occur.
- 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 be transferred only 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 subcommands. 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 are not 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      //1//
   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 MESSAGES AND CONTROL STATEMENTS  //3//        PAGE     1


   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' UCBTYPE=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 seen only when running with debug or trace on. Otherwise the IEBCOPY output is placed in the syslog.
4. The actual load module and all of its aliases are 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) is not 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 z/OS UNIX file and the MVS data set FTP.DATA.

The FTP.DATA configuration data set is optional. If you specify the -f parameter on the FTP invocation, that parameter is used; otherwise, the FTP client uses one of the search orders shown in Table 14 to obtain the local site parameter values.

Table 14. 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	

See z/OS Communications Server: IP Programmer's Guide and Reference for a description of the FTP.DATA search order used when FTP is started from the FTP Client 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 must be included. The hard-coded default is used for any statement that is not included in the FTP.DATA data set.

You can find a sample FTP.DATA file in the SEZAINST (FTCDATA) data set.

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 203 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 file. 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 is also accepted and is treated as CWD.)
- Each command must be contained in a single line.
- The 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.
- Each comment must begin with a semicolon.
- Comments can be entered between two or more command lines.

Note: Test your configuration file to ensure that 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.` is displayed during your login process. The 230-type reply indicates any errors encountered or whether the file was successfully opened and processed. Contact the system programmer if you cannot fix any errors reported or if the file cannot be opened or created. See 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 file.

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 by DNS names that resolve to IPv6 addresses.

See 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 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                                           *
;                                                                    *
;                 Copyright IBM Corp. 1977, 2011                     *
;                                                                    *
;                 US Government Users Restricted Rights -            *
;                 Use, duplication or disclosure restricted by       *
;                 GSA ADP Schedule Contract with IBM Corp.           *
;                                                                    *
;   Status:       CSV1R13                                            *
;                                                                    *
;                                                                    *
;   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.  Unix System Services 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                                                 *
;   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).                                                     *
;                                                                    *
;*********************************************************************
```

Figure 3. FTP.DATA for FTP client

```
; ----------------------------------------------------------------------
;
; 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
;SEQNUMSUPPORT FALSE             ; Support sequence numbers when input
                                    ; read from //INPUT DD file
                                    ; FALSE = (D) Do not support
                                    ;         sequence numbers.
                                    ;         EZYFS33I issued if
                                    ;         sequence numbers detected
                                    ; TRUE  = Support sequence numbers
```

```
; ----------------------------------------------------------------------
;
; 2. Unix System Services file options
;
; ----------------------------------------------------------------------
 UMASK             027           ; (S) Octal UMASK to restrict setting
                                    ; of permission bits when creating
                                    ; new z/OS Unix files and named
                                    ; pipes.
                                    ; Default value is 027.
 LISTSUBDIR        TRUE            ; Should wildcard searches span
                                    ; subdirectories?
                                    ; TRUE (D) - Yes
                                    ; FALSE - No
;UNIXFILETYPE      FILE          ; (S) Unix System Services file type
                                    ; FILE (D) - Treat files as regular
                                    ;  Unix files
                                    ; FIFO - Treat files as Unix named
                                    ;  pipes
;FIFOOPENTIME        60          ; (S) FIFO open timeout in seconds when
                                    ; opening a Unix named pipe.
                                    ; Default value is 60 seconds.
                                    ; Valid range is 1 through 86400.
;FIFOIOTIME          20          ; (S) FIFO timeout for I/O to or from a
                                    ; Unix named pipe
                                    ; Default value is 20 seconds.
                                    ; Valid range is 1 through 86400.
```

```
; ---------------------------------------------------------------------
;
; 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
;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.
;DSNTYPE           SYSTEM        ; (S) New data set allocation DSNTYPE
                                   ; for physical sequential data sets
                                   ; BASIC = allocate basic format
                                   ;       data set
                                   ; LARGE = allocate large format
                                   ;       data set
                                   ; SYSTEM = use system default (D)
 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
 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
;EATTR             SYSTEM        ; (S) New data set allocation EATTR
                                    ; specifies whether new data sets
                                    ; can have extended attributes and
                                    ; whether the data sets can reside
                                    ; in the EAS.
                                    ; NO = no extended attributes
                                    ; OPT = yes if volume supports them
                                    ; SYSTEM = use system default (D)
```

```
; ------------------------------------------------------------------
;
; 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
                                    ; This option applies to z/OS Unix
                                    ; files also
 DIRECTORYMODE     FALSE         ; (S) Specifies how to view the MVS
                                    ; data set structure:
                                    ; FALSE = (D) All qualifiers below
                                    ;         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)
;READVB            LE            ; (S) Specifies whether variable length
                                    ; MVS data sets are read using LE
                                    ; or BSAM (low level I/O)
                                    ; BSAM  =  Use BSAM
                                    ; LE    =  Use LE             (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 conjuction 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)
 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
;DBSUB             FALSE          ; (S) Specifies whether untranslatable
                                     ; data bytes should be replaced
                                     ; with substitution character in
                                     ; iconv() during data transfer.
                                     ; TRUE  =  Replace each
                                     ;  untranslatable byte
                                     ; FALSE =  Terminate transfer (D)
                                     ;  when untranslatable bytes are
                                     ;  detected
;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)
                                     ;
;EXTDBSCHINESE     TRUE           ; (S) Specifies whether to use extended
                                     ; double byte range for Simplified
                                     ; Chinese or the old range.
                                     ; TRUE = (D) Use the extended range
                                     ;        1st byte x'81' - x'FE'
                                     ;        2nd byte x'40' - x'FE'
                                     ; FALSE= Use the range of
                                     ;        1st byte x'8C' - x'FE'
                                     ;        2nd byte x'A1' - x'FE'
;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.
```

```
;MBSENDEOL         CRLF          ; (S) When translating multi-byte data
                                    ; to ASCII :
                                    ; CRLF = (D) Append a carriage
                                    ;        return (x'0D') and line
                                    ;        feed (x'0A') to each line
                                    ;        of text. This is the
                                    ;        default and the standard
                                    ;        line terminator defined by
                                    ;        RFC 959. The z/OS server
                                    ;        and client can receive
                                    ;        ASCII data only in this
                                    ;        format.
                                    ; CR   = Append a carriage return
                                    ;        (x'0D') only to each line
                                    ;        of text.
                                    ; LF   = Append a line feed (x'0A')
                                    ;        only to each line of text.
                                    ; NONE = Do not append a line
                                    ;        terminator to any line of
                                    ;        text.
;MBREQUIRELASTEOL TRUE           ; (S) Specifies whether the last
                                   ; record of an incoming multibyte
                                   ; transfer is required to have
                                   ; an EOL sequence.
                                   ; TRUE  A missing EOL on the last
                                   ; record received is treated as an
                                   ; error (D)
                                   ; FALSE  A missing EOL on the last
                                   ; record received is ignored
;REMOVEINBEOF      FALSE         ; (S) Remove final UNIX EOF from
                                    ; inbound ASCII transfers
                                    ; TRUE - final UNIX EOF is removed
                                    ; FALSE - final UNIX EOF is not
                                    ; removed (D)
;SBDATACONN  (IBM-1047,IBM-850)  ; (S) file system/network transfer
                                    ; code pages for data connection.
                                    ; Either a fully-qualified MVS
                                    ; data set name or z/OS Unix 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
                                    ; iconv supported code pages -
                                    ; for example
                                    ;     (IBM-1047,IBM-850)
                                    ; If SBDATACONN is not present,
                                    ; std. search order for a default
                                    ; translation table data set will
                                    ; be used.
```

```
;SBSENDEOL         CRLF          ; (S) When translating single-byte
                                   ; data to ASCII :
                                   ; CRLF = (D) Append a carriage
                                   ;        return (x'0D') and line
                                   ;        feed (x'0A') to each line
                                   ;        of text. This is the
                                   ;        default and the standard
                                   ;        line terminator defined by
                                   ;        RFC 959. The z/OS server
                                   ;        and client can receive
                                   ;        ASCII data only in this
                                   ;        format.
                                   ; CR   = Append a carriage return
                                   ;        (x'0D') only to each line
                                   ;        of text.
                                   ; LF   = Append a line feed (x'0A')
                                   ;        only to each line of text.
                                   ; NONE = Do not append a line
                                   ;        terminator to any line of
                                   ;        text.
;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 SBDATACONN is specified, that
                                   ; value overrides SBTRANS
```

```
;UCSHOSTCS         code_set      ; (S) Specify the EBCDIC code set
                                   ; to be used for data conversion
                                   ; to or from UCS-2.
                                   ; If UCSHOSTCS is not specified,
                                   ; the current EBCDIC code page
                                   ; for the data connection is used.
 UCSSUB            FALSE         ; (S) Specify whether UCS-2 to EBCDIC
                                   ; conversion should use the EBCDIC
                                   ; substitution character or
                                   ; cause the data transfer to be
                                   ; terminated if a UCS-2 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 UCS-2 data should be
                                   ; aborted if truncation
                                   ; occurs at the MVS host
                                   ; TRUE  = Truncation allowed
                                   ; FALSE = Terminate transfer (D)
;UNICODEFILESYSTEMBOM ASIS          ; (S) When storing UNICODE files,
                                   ; specifies whether to store a
                                   ; Byte Order Mark (BOM) as the
                                   ; first character of the file.
                                   ; ASIS   = (D) Store a BOM if one
                                   ;   was transmitted with the file
                                   ;   as the first character.
                                   ; ALWAYS = Always store a BOM as
                                   ;   the first character of the file
                                   ; NEVER   = Never store a BOM as
                                   ;   the first character of the file
                                   ;   regardless of whether a BOM was
                                   ;   was sent.  Although a BOM can
                                   ;   appear anywhere within the
                                   ;   file, only a BOM sent as the
                                   ;   first file character is
                                   ;   affected by this setting.
```

```
; ---------------------------------------------------------------------
;
; 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_HOSTNAME   OPTIONAL          ; Authentication of hostname in
                                     ; the server certificate
                                     ; OPTIONAL (D)
                                     ; REQUIRED
;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
;CIPHERSUITE       SSL_RC4_SHA       ; 05
;CIPHERSUITE       SSL_RC2_MD5_EX    ; 06
;CIPHERSUITE       SSL_DES_SHA       ; 09
;CIPHERSUITE       SSL_3DES_SHA      ; 0A
;CIPHERSUITE       SSL_AES_128_SHA   ; 2F
;CIPHERSUITE       SSL_AES_256_SHA   ; 35
;KEYRING           name              ; Name of the keyring for TLS
                                     ; It can be the name of a z/OS Unix
                                     ; 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
```

```
;SECUREIMPLICITZOS TRUE          ; (S) Specify whether client will
                                    ; connect to a z/OS FTP server
                                    ; when connecting to the TLS port.
                                    ; TRUE  (D)
                                    ; FALSE  Use FALSE if server is
                                    ; not z/OS or when not connecting
                                    ; to the TLS port as specified by
                                    ; the TLSPORT statement.
;TLSPORT           990               ; Specify which FTP port is
                                    ; implicitly secured with TLS
                                    ;   0   disable implicit security
                                    ; 990  (D) default value
                                    ; Valid range is 0 to 65534
;TLSRFCLEVEL       DRAFT         ; (S) Specify what level of RFC 4217,
                                    ; On Securing ; FTP with TLS, is
                                    ; supported
                                    ; DRAFT (D) Internet Draft level
                                    ; RFC4217   RFC level
```

```
; ------------------------------------------------------------------
;
; 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
 DATACTTIME        120              ; Timeout for send/receive data
                                    ; operations.
                                    ; Default value is 120 seconds.
                                    ; Valid range is 15 through 86400.
                                    ; 0 = do not timeout
;DATAKEEPALIVE    0              ; (S) Keepalive packets are sent
                                    ; after the data connection is
                                    ; idle for the specified number
                                    ; of seconds on the data
                                    ; connection.
                                    ; 0 seconds (D)
                                    ; 0 = use keepalive interval
                                    ; configured in the PROFILE.TCPIP
                                    ; for passive mode and no keepalive
                                    ; packets for active mode
                                    ; Valid range is 60 - 86400
 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
;DSWAITTIME        0              ; (S) The approximate number of
                                    ; minutes ftp waits when trying
                                    ; to access an MVS data set.
                                    ; Default is 0 minutes
                                    ; 0 (D)
                                    ; Valid range is 0 - 14400
 FTPKEEPALIVE      0                ; Keepalive packets are sent after
                                    ; the control 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
                                    ; 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 XXYYY format
                                    ;    XX - FTP subcommand
                                    ;    YYY - server reply code
                                    ; EXTENDED - 4 digit XXYY 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
;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
;
; ---------------------------------------------------------------------
 CHKCONFIDENCE     FALSE         ; (S) FALSE = (D) Do not perform
                                 ;         confidence checks of
                                 ;         data transfers.
                                 ; TRUE  = Check and report on
                                 ;         the confidence in the
                                 ;         successful completion of
                                 ;         a data transfer. The FTP
                                 ;         client reports the level
                                 ;         of confidence after each
                                 ;         file transfer with the
                                 ;         message EZA2108I.
;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
;PASSIVEIGNOREADDR FALSE         ; (S) Specifies whether the FTP client
                                 ; should ignore the IP address in
                                 ; the FTP server PASV reply for
                                 ; the data connection and use the
                                 ; IP address that was used to log
                                 ; into the FTP server.
                                 ; TRUE - Ignore FTP Server PASV
                                 ; reply IP address
                                 ; FALSE (D) - Use FTP Server PASV
                                 ; reply IP address
;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
;TRACECAPI         CONDITIONAL   ; When the FTP client is invoked
                                 ; from the FTP Callable API, write
                                 ; records to the API trace spool
                                 ; data set based on this setting
                                 ; CONDITIONAL (D)
                                 ;   Trace requests for which the
                                 ;   application has set the
                                 ;   FCAI_TraceIt field to
                                 ;   FCAI_TraceIt_Yes (1)
                                 ; ALL
                                 ;   Trace all requests, regardless
                                 ;   of the value in FCAI_TraceIt
                                 ; NONE
                                 ;   Trace no requests, regardless
                                 ;   of the value in FCAI_TraceIt
```

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. See 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 the FTP.DATA file.
- 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 that contains the binary translation table you require. See 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 applies to both control and data connections.

If you code EXTENSIONS UTF8 in the client FTP.DATA file, the control connection uses 7-bit ASCII for commands and, when negotiated with the server, UTF-8 encoding of path names. 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 for instructions for activating extended trace point 81 for the server. See the "DUMP subcommand—Set extended trace options" on page 184 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. See Using translation tables in 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 command `TYPE B n` or the 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 LOCSITE 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 15.

Table 15. FTP subcommands for DBCS support

Subcommand	Description	See
BIG5	Sets the transfer type to BIG-5	"BIG5 subcommand—Change the data transfer type to BIG5" on page 167
EUckanji	Sets the transfer type to EUCKANJI	"EUckanji subcommand—Change the data transfer type to EUCKANJI" on page 187
HAngeul	Sets the transfer type to HANGEUL	"HAngeul subcommand—Change the data transfer type to HANGEUL" on page 192
Ibmkanji	Sets the transfer type to IBMKANJI	"Ibmkanji subcommand—Change the data transfer type to IBMKANJI" on page 194
JIS78kj	Sets the transfer type to JIS78KJ	"JIS78kj subcommand—Change the data transfer type to JIS78KJ" on page 195
JIS83kj	Sets the transfer type to JIS83KJ	"JIS83kj subcommand—Change the data transfer type to JIS83KJ" on page 195
Ksc5601	Sets the transfer type to KSC5601	"Ksc5601 subcommand—Change the data transfer type to KSC-5601" on page 196
QUOte	Sends an uninterpreted string of data	"QUOte subcommand—Send an uninterpreted string of data" on page 274
SChinese	Sets the transfer type to SCHINESE	"SChinese subcommand—Change the data transfer type to SCHINESE" on page 278
SJiskanji	Sets the transfer type to SJISKANJI	"SJiskanji subcommand—Change the data transfer type to SJISKANJI" on page 313
TChinese	Sets the transfer type to TCHINESE	"TChinese subcommand—Change the data transfer type to TCHINESE" on page 327
TYpe	Specifies the transfer type	"TYpe subcommand—Set the data transfer type" on page 328

Server commands and client subcommands

Table 16 shows examples of the server command that would be generated for each client subcommand:

Table 16. 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'
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 17 on page 93 shows how CCSIDs map to DBCS keywords.

For more information about CCSIDs, see Character Data Representation Architecture Reference and Registry.

Table 17. 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 90. 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 the FTP.DATA file, 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 subcommands 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 of new data sets

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
data set name type	DSNTYPE
extended attributes	EATTR
logical record length	LRECL
management class	MGMTCLASS
model DCB values	DCBDSN
PDS type	PDSTYPE
primary space	PRIMARY
record format	RECFM
retention period	RETPD
secondary space	SECONDARY
storage class	STORCLASS
unit	UNITNAME
volume count	VCOUNT
unit count	UCOUNT
volume serial number	VOLUME

The MVSGet and MVSPut subcommands affect the values that are configured with the PDSTYPE, DIRECTORY, DSNTYPE, RECFM BLKSIZE, LRECL, PRIMARY, SECONDARY, EATTR and SPACETYPE parameters. The subcommands reset these configured values to match the attributes of the source data set in the same way as if you had configured the values with the SITE or LOCSITE subcommand.

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.
- If the data set organization is PO (PDS or PDSE), the data set name type specification is not sent.
- Otherwise, all variables are sent to dynamic allocation where the order of precedence is:
  1. Any attributes set by the MVSGet or MVSPut subcommand
  2. Any FTP.DATA, SITE, or LOCSITE configuration options explicitly specified or defaulted
  3. Any attributes picked up from the model DCB and not otherwise explicitly specified
  4. Any attributes picked up from the data class and not previously derived from 1 or 2
  5. 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 subcommand 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 subcommand can be used to toggle the automatic sending of the SITE subcommand information. See "SENDSite subcommand—Toggle the sending of site information" on page 280 for more information.

The MVSPut subcommand automatically generates the SITE subcommand. The MVSPut subcommand affects server PDSTYPE, DIRECTORY, DSNTYPE, RECFM BLKSIZE, LRECL, PRIMARY, SECONDARY, EATTR and SPACETYPE configured values. However, the SITE subcommand is issued regardless of whether the SENDSITE subcommand is issued.

Storage Management Subsystem (SMS)

An FTP client can specify one or more of the 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
extended attributes	EATTR
logical record length	LRECL
primary space	PRIMARY
record format	RECFM
retention period	RETPD
secondary space	SECondary

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

We can use a DCBDSN model to specify the data set attributes to create a new data set.

Procedure

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
   ```

Results

Restriction: If more than one concurrent FTP user attempts to update a partitioned data set (PDS) using the FTP REName, DELEte, or PUt subcommands, the PDS directory might be accessed by more than one user simultaneously. This situation can cause problems with the PDS directory. To avoid this situation, when concurrent users are using FTP REName, DELEte, or PUt subcommands to update a PDS, use a partitioned data set extended (PDSE).

Statistics for PDS members

ISPFStats can be set to either TRUE or FALSE in a client FTP.DATA file 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 a PDS member that already has the statistics and have the same statistics copied over to the target 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 or 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 that follows).

  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.
  5. The REName subcommand does not guarantee serialization of the GDG data set. Use the PUt subcommand instead. See Informational APAR II08285 for more information.

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 explicit values are 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 MVSGet and MVSPut subcommands configure LRECL, BLKSIZE and RECFM values which override the values that are associated with the model DSCB.

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, see z/OS DFSMS 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 subcommands 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.

Rules: When coding the data set, file, or input stream for the ddname INPUT statement as described in Figure 4 on page 103, the following rules apply:

- When you specify a data set for input as shown in Figure 4 on page 103, the SEQNUMSUPPORT statement that is coded in the client FTP.DATA file determines the disposition of sequence numbers that are in the data set:
  - If the FTP.DATA file has SEQNUMSUPPORT FALSE coded (this is the default), the file, data set, or input stream that is designated in the DDNAME INPUT statement that contains the FTP commands cannot contain sequence line numbers. You must save the FTP command file as an unnumbered file.
  - If the FTP.DATA file has SEQNUMSUPPORT TRUE coded, the file, data set, or input stream that is designated in the DDNAME INPUT statement that contains the FTP commands can contain sequence numbers. These sequence numbers are removed.
- You can add comments to the command input file using the REXX program that stacks the commands. The support includes standalone comment records and comments that are appended to the end of the line.

  To add standalone comments, use a semicolon (;) as the first non-space character on a line. For example:

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

To add a command-line comment, append a space and a semicolon to the end of the command line, followed by the comment. For example:

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

When a user ID, password, or password phrase is expected (including passwords that are required for read or write access to files or disks), the entire line must be blank. The following example shows a blank password between the user ID and a comment line.

```
USER userx

; The line above is a blank password
```

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

```
 ; This below is a blank userid

 mypasswd
```

- If a command is too long to insert on a line, enter a plus sign (+) in place of the next command option and then enter the remaining options on the next line. For example:

  ```
  put local_file +
  remote_file
  ```

- Use a blank followed by a plus sign (+) at the end of an FTP subcommand line as a continuation indicator for all FTP subcommands, except as noted under Restrictions. When the continuation indicator is encountered at the end of an FTP subcommand line, the next line is appended to the subcommand. For example, the following command is interpreted as `PUT SOURCE.DS.NAME DEST.DS.NAME`:

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

Tips:

- You can run FTP in batch mode either by specifying data sets for input and output as in Figure 4 on page 103, or without referring to data sets for input and output as in Figure 6 on page 104. See "Allocating FTP input and output data sets" on page 31 for the attributes that are allowed on the INPUT and OUTPUT DD statements.
- Use the EXIT parameter or code the CLIENTEXIT TRUE statement in the FTP.DATA file to display an error return code, and exit when certain errors are detected. See FTP return codes for more information.

Requirements:

- 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.
- 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.

Restrictions:

- When the FTP Client API is used by an application program invoked from a batch job, the ddnames in the batch job are not available to the created FTP client process.
- You cannot use a plus sign to continue a QUOTE subcommand.

- You cannot use a plus sign to continue a password or password phrase on another line. You must take this into consideration when assigning password phrases used to log in to the FTP server from batch jobs.

See "Logging in to FTP" on page 29, and each subcommand that you code in your batch job for additional information.

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 23 for more information. These parameters are supported only on the `PARM=` field of the EXEC card.

As shown in Figure 4, to run FTP in batch mode, you must include the following three DD statements:

SYSPRINT DD
: Alternative name for the OUTPUT DD statement. You can use SYSPRINT DD in place of 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, to provide user ID, password or password phrase, and account information for a batch-processed remote login. You can also specify the user ID, password or password phrase, and account information in the INPUT DD data set.

Figure 5 on page 104 shows the records in an INPUT DD data set that contains the FTP subcommands 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 remote host that you want FTP to log into. The second line contains the user ID followed by its password. The next three lines contain the FTP subcommands that you want FTP to perform. In this example,

- FTP lists its current working directory at the FTP server host.
- FTP sends the file MYFILE.LISTING to the server.
- FTP ends the session and disconnects from the server.

Any client messages and server replies to the subcommands 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.

Tip: If you do not want your password or password phrase to be copied to the output file, specify your user ID, and password or password phrase 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 on page 105 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.

Submitting a batch job with concatenated files

```
//USERIDX  JOB USERID,MSGLEVEL=(1,1),NOTIFY=USERID,MSGCLASS=H,TIME=9
//FTP   EXEC PGM=FTP,REGION=4096K
//SYSFTPD DD DSN=SYS1.TCPPARMS(FTPCDATA),DISP=SHR
//        DD *  see NOTE 1
SEQNUMSUPPORT TRUE
DEBUG BAS
//INPUT DD DSN=FTP.SUBCMDS(LOGIN),DISP=SHR
//      DD DSN=FTP.SUBCMDS(FTPINFO),DISP=SHR
//      DD DSN=FTP.SUBCMDS(FTPCMDS1),DISP=SHR
//      DD DSN=FTP.SUBCMDS(FTPCMDS2),DISP=SHR
```

Figure 8. Submitting an FTP batch job with concatenated input

Tips:

- Additional FTP parameters can be concatenated to the FTP.DATA file. This technique is useful when you need additional debugging information and you do not want to change the source FTP data file or FTP command input.
- Multiple data sets can be concatenated as input as long as you follow MVS JCL concatenation guidelines. See z/OS MVS JCL Reference for additional information. If concatenated files contain both sequenced and unsequenced input command files, each file must have a semicolon (;) in the first data column. See FTP.DATA statement SEQNUMSUPPORT information in z/OS Communications Server: IP Configuration Reference for additional information.

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 z/OS UNIX 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 a z/OS UNIX file when invoking the FTP command.

The following examples are written in REXX. See 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 9 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 9. How to issue the FTP subcommands from a data set

Figure 10 on page 107 is an example of an EXEC that issues FTP subcommands from a z/OS UNIX 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 - z/OS UNIX file containing FTP commands               */
/*        outfile - z/OS UNIX 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 TCPIP" 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 10. How to issue the FTP subcommands from a z/OS UNIX file system

The following is an example of the input file (either the input data set FTPIN1 or the z/OS UNIX 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 11 on page 108 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 TCPIP"               /* 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               /* running under             */
                                      /* UNIX System Services      */
                                      /* invoke ftp client         */
   call bpxwunix 'ftp -v -p tcpip',stack
else                                  /* running under TSO         */
   "FTP" cmdargs                      /* invoke ftp client         */

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

exit 0                                /* return                    */
```

Figure 11. How to issue FTP subcommands from an EXEC

Note: If data set DUMMY does not exist, FTP exits with a return code.

Figure 12 is an example of how to call FTP from a TSO/E REXX EXEC and enable it to solicit its FTP subcommands interactively from the user's TSO terminal. This requires that TSO/E has prompting enabled.

```
/* rexx */
newstack;                             /* set up a null stack for FTP*/
                                      /*  so as to not disturb any  */
                                      /*  commands currently stacked*/
save_rexx_prompt_state = prompt();    /* save REXX prompt state     */
temp = prompt('ON');                  /* set prompting on to enable */
                                      /*  interactive retrieval of  */
                                      /*  ftp commands running      */
                                      /*  under TSO                 */
"FTP ( exit"                          /* invoke ftp client          */
save_rc = rc;                         /* save FTP return code       */
temp= prompt(save_rexx_prompt_state);/* restore prompt setting     */
delstack;                             /* delete null stack for FTP  */
return save_rc;                       /* return                     */
```

Figure 12. How FTP subcommands can be solicited interactively from an EXEC

Tips:

- You can call this EXEC from another TSO/E REXX EXEC by invoking this EXEC as a function call. For example, if this EXEC is named rexxftp, invoke it with the following call: return_code = rexxftp()
- If commands are stacked for processing and the newstack and delstack statements are removed from the sample, FTP subcommands are retrieved and processed from the stack. If no QUIT command is processed, FTP obtains commands interactively until a QUIT command is received.

- See the FTP Client API REXX function information in the z/OS Communications Server: IP Programmer's Guide and Reference for an alternate method of using REXX to invoke the FTP client.

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 using one of the following methods:

- Specify the EXIT or EXIT=*nn* parameter on the FTP command
- Code the CLIENTEXIT TRUE statement in the FTP.DATA file

You can use several methods 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 the FTP.DATA file has no effect on the FTP Callable API. See the z/OS Communications Server: IP Programmer's Guide and 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 FTP is configured to exit on error, and an error occurs. The standard return code is described in "FTP standard return codes" on page 110; the client error code is described in "FTP client error codes" on page 114. 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 116 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. If you configure FTP to exit on error, the EXIT_IF_ERROR flag determines whether the FTP client exits when an error occurs. You can configure FTP to exit on error by using one of the following methods:

- Specify the EXIT or EXIT=*nn* parameter on the FTP command
- Code the CLIENTEXIT TRUE statement in the FTP.DATA file

See "FTP subcommand codes" on page 111 for a list of the FTP subcommand codes and their EXIT_IF_ERROR settings.

You can use the following methods to compute return codes.

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 if you configure FTP to exit on error. This type of return code is described in "FTP standard return codes" on page 110. 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 available return code options is recommended. You can use this method with client error logging even if you do not configure FTP to exit on error.

See "FTP client error logging" on page 116 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 114, 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.

You can use this method with client error logging even if you do not configure FTP to exit on error. See "FTP client error logging" on page 116 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 116. 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.

You can use this method with client error logging even if no EXIT parameter is in use. See "FTP client error logging" on page 116 for more information about logging client errors.

FTP standard return codes

Standard FTP return codes are computed when you specify CLIENTERRCODES FALSE or the default value in the FTP.DATA file and when one of the following cases occurs:

- EXIT is specified with no parameter.
- The CLIENTEXIT FALSE statement is specified or the default value is specified in the FTP.DATA file.

Standard FTP return codes might also be displayed in the text of message EZZ9830I if LOGCLIENTERR TRUE and CLIENTERRCODES FALSE are specified in the FTP.DATA file, regardless of the following conditions:

- Whether you specified the EXIT parameter on the FTP command
- Whether you coded the CLIENTEXIT statement in the FTP.DATA file

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. If you configure FTP to exit on error, the EXIT_IF_ERROR flag determines whether the FTP client exits when an error occurs. You can configure FTP to exit on error by using one of the following methods:

- Specify the EXIT or EXIT=*nn* parameter on the FTP command
- Code the CLIENTEXIT TRUE statement in the FTP.DATA file

Table 18 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 D, "Related protocol specifications," on page 451.

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 is issued in one of the following situations:

- when the EXIT parameter is specified when the FTP client was started
- whether the CLIENTEXIT TRUE statement is specified in the FTP.DATA file

This message contains FTP standard return codes and FTP client error codes.

FTP subcommand codes

Table 18 lists the valid FTP subcommand codes. Information in the EXIT_IF_ERROR column specifies whether an error causes FTP to end if you specify the EXIT parameter on the FTP command or specify the CLIENTEXIT TRUE statement in the FTP.DATA file.

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

Table 18. 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

Table 18. FTP subcommand codes (continued)

Code number	Subcommand	EXIT_IF_ERROR
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
37	SUNIQUE	true
38	SYSTEM	true
40	TYPE	true
41	LCD	true
42	LOCSITE	true (see previous note in "FTP subcommand codes" on page 111)
43	LPWD	false
44	MKDIR	true

Table 18. FTP subcommand codes (continued)

Code number	Subcommand	EXIT_IF_ERROR
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
79	FEATURE	true
80	SRESTART	true
81	AUTH	true
82	mkfifo	true
83	MVSGET	true
84	MVSPUT	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 D, "Related protocol specifications," on page 451. For a complete list of the replies used by the z/OS FTP server, see z/OS Communications Server: IP and SNA Codes.

FTP client error codes

Table 19 lists error codes that are used in the following situations:

- If the EXIT parameter is specified, or the CLIENTEXIT TRUE statement is specified in the FTP.DATA file, these error codes are used as condition codes for batch jobs.
- Whenever the FTP client detects one of the described errors and the FTPDATA statement CLIENTERRCODES is TRUE, these error codes are used as return codes from REXX execs.
- When CLIENTERRCODES is EXTENDED, these codes are also used to build the return code.

Message EZA1735I was issued when the EXIT parameter was specified when the client was started, or when the CLIENTEXIT TRUE statement was coded in the FTP.DATA file. This message contains FTP standard return codes and FTP client error codes.

Result: The return code 24 might supersede condition codes that were used in earlier releases.

Table 19. 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.

Table 19. Client error codes (continued)

Code	Error	Examples of cause
10	FTP_SESSION_ERROR	Socket error, other send/receive errors.
11	FTP_LOGIN_FAILED	User ID, password, or account info is not valid.
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.
25	FTP_EOD_BEFORE_EOF	In a block mode transfer, the last record did not include the EOF marker. In a stream mode transfer, the last record received before the connection was closed did not end with a `<CRLF>` (carriage return followed by line feed) sequence.
26	FTP_NEEDS_CONNECTION	Possible causes include using a subcommand that requires a connection to the server when no connection exists.
27	FTP_EXIT_EZAFCCMD_PREVENT	User exit EZAFCCMD rejects the command.
28	FTP_EXIT_EZAFCCMD_TERM	User exit EZAFCCMD ends the client.
29	FTP_EXIT_EZAFCCMD_WRONG_RC	The FTP client ends because of an invalid return code from user exit EZAFCCMD.
30	FTP_EXIT_EZAFCREP_TERM	User exit EZAFCREP ends the client.

Table 19. Client error codes (continued)

Code	Error	Examples of cause
31	FTP_EXIT_EZAFCREP_WRONG_RC	The FTP client ends because of an invalid return code from user exit EZAFCREP .

Guideline: Codes 27 - 31 are caused by a user exit that is installed on this system. Contact your local system programmer for assistance in determining why the action was rejected.

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 used for return code generation, and it supplements the information returned. See the following format of the return code:

ecyy

Where:

ec The client error code set by the FTP client. See "FTP client error codes" on page 114 for more information.

yy The subcommand code, which is a number in the range of 0 - 99. See "FTP subcommand codes" on page 111 for a list of the subcommand codes.

The return code 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. Configure FTP to exit on error by using one of the following methods:

- Specify the EXIT or EXIT=*nn* parameter on the FTP command
- Code the CLIENTEXIT TRUE statement in the FTP.DATA file

Otherwise, client error logging drives message EZZ9830I.

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. If you configure FTP to exit on error, the EXIT_IF_ERROR flag determines whether the FTP client exits when an error occurs. You can configure FTP to exit on error by using one of the following methods:

- Specify the EXIT or EXIT=*nn* parameter on the FTP command
- Code the CLIENTEXIT TRUE statement in the FTP.DATA file

See "FTP subcommand codes" on page 111 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).
- Information about whether EXIT was specified when the client was started or the CLIENTEXIT TRUE statement was specified in the FTP.DATA file.
- 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

About this task

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 314 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 276 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 parameters CHKPTINT and RESTPUT control the checkpoint and restart processing at the server.

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

If the local file or the remote file is a z/OS UNIX named pipe, do not use the srestart or restart subcommands to restart the file transfer. If the transfer type is binary and the local file is the named pipe, you can resume the transfer using the

restart instructions below, or you can use the instructions below to start the transfer again. If the transfer type is not binary, or if the remote file is the named pipe, you must start the transfer again.

Procedure

- To start the transfer again:
  - If you are trying to restart a file transfer into a named pipe, use these steps to restart it:
    1. Stop the named pipe reader, directing it to discard the data it has received so far.
    2. Empty the named pipe. This prevents FTP from appending to any residual data in the named pipe.
    3. Restart the named pipe reader.
    4. Repeat the original file transfer subcommand.
  - If you are trying to restart a file transfer from a named pipe, use these steps to restart it:
    1. Stop the named pipe writer.
    2. Empty the named pipe. This prevents the named pipe writer from appending to any residual data in the named pipe.
    3. Restart the named pipe writer, having it re-create the data stream.
    4. Issue the original file transfer subcommand.
- To restart the file transfer (for binary transfers only):
  - If you were trying to restart a transfer into a named pipe in the FTP client file system, take these steps to resume the file transfer:
    1. Figure out the number of bytes, *bytes*, the named pipe reader on the FTP client host read from the named pipe.
    2. Ensure that the named pipe is empty.
    3. From the z/OS FTP client, issue QUOTE REST *bytes* to direct the server to start the next file transfer from offset *bytes* into the server file.
    4. Issue the original file transfer subcommand.

    Note: The z/OS FTP server supports the REST command in stream mode only when EXTENSIONS REST_STREAM is coded in the server FTP.DATA.
  - If you were trying to restart a transfer from a named pipe in the FTP client file system, follow these steps to resume the file transfer:
    1. Do one of the following from the FTP client to learn the number of bytes, *bytes*, stored in the server file:
       - Issue the DIr subcommand
       - Issue the LS -l subcommand
       - Issue QUOTE SIZE *serverfile*
    2. Ensure that the named pipe is empty.
    3. Restart your named pipe writer, telling it to regenerate the data starting from point bytes.
    4. Issue the APpend subcommand to append the named pipe to the server file.

    Note: The z/OS FTP server supports the SIZE command only for regular z/OS UNIX files, and only when the EXTENSIONS SIZE statement is coded in the server FTP.DATA.

Using z/OS UNIX System Services named pipes

The z/OS FTP client and server support named pipes (or FIFO files) in the z/OS UNIX System Services file system. The terms named pipe and FIFO file are synonymous. A named pipe can be specified as an argument on the following subcommands:

- APpend
- DELEte
- DIr
- Get
- LOCSIte, (when the CHMOD parameter is specified)
- LS
- MDelete
- MGet
- MKFifo
- MPut
- Put
- REName
- SIte, (when the CHMOD parameter is specified)

The following FTP configuration options for client and server are related to sending data from and receiving data into the named pipe:

- FIFOIOTIME
- FIFOOPENTIME
- UNIXFILETYPE

Before you start a transfer to or from a named pipe, you must configure the following on the named pipe host:

- FILETYPE=SEQ (the default value)
- UNIXFILETYPE=FIFO

FTP uses default values for FIFOIOTIME and FIFOOPENTIME if you do not configure these values.

You can configure these options by coding statements in the FTP.DATA file. For the z/OS FTP client, you can also use the LOCSIte subcommand to configure these options. Alternatively, for the z/OS FTP server, you can configure these values by doing the one of the following:

- Issuing the SIte subcommand from the z/OS FTP client
- Sending SITE commands to the server from any FTP client

When you transfer data from a named pipe to another host using FTP, the following apply:

- FTP cannot open the named pipe until another process on the named pipe host opens the named pipe for reading. If FTP is the first process to open the named pipe, it is blocked until the read process opens the named pipe, or until the FIFOOPENTIME timer expires.
- The data is permanently removed from the named pipe, rather than being copied from the named pipe.

When you use FTP to transfer data to a named pipe, the following conditions apply:

- FTP cannot open the named pipe until another process on the named pipe host opens the named pipe for reading. If FTP is the first process to open the named pipe, it is blocked until the read process opens the named pipe, or until the FIFOOPENTIME timer expires.
- FTP always appends to any existing data in the named pipe. You cannot use FTP to replace the contents of a named pipe.
- FTP applies the UNICODEFILESYSTEMBOM setting to inbound transfers when it is storing Unicode data into the named pipe. In cases when FTP would store a byte order mark (BOM) into a regular file, FTP appends a BOM byte sequence to existing data. If the BOM byte sequence appears outside of the first character position, it is interpreted as a zero-width nonbreaking space character. You must take this into consideration when you code UNICODEFILESYTEMBOM.

Guidelines:

- If FTP is the only process writing to the named pipe, and you are sending all data to the named pipe with a single transfer, you can configure any value for UNICODEFILESYSTEMBOM.
- If your application can tolerate a superfluous zero-width nonbreaking space character in the named pipe, you can configure any value for UNICODEFILESYSTEMBOM.
- You can always configure UNICODEFILESYSTEMBOM=NEVER.
- If your application requires a BOM in the named pipe, but cannot tolerate a zero-width nonbreaking space character, consider setting UNICODEFILESYTEMBOM=NEVER after the first transfer into the named pipe.

For information about the UNICODEFILESYSTEMBOM configuration option, see UNICODEFILESYSTEMBOM (FTP client and server) UNICODEFILESYSTEMBOM (FTP client and server) information in z/OS Communications Server: IP Configuration Reference.

The z/OS operating system does not provide serialization for named pipes. Multiple processes can read from or write to the same named pipe concurrently. When a process reads from a named pipe, data is removed from the named pipe. The same data is not presented to the other processes that are reading from the pipe. When a process writes to a named pipe, it is possible that the data it writes will be interleaved with data written by other processes. You must take this into consideration when planning to use z/OS UNIX named pipes.

Named pipes in the z/OS UNIX file system for the client

When files exist as named pipes in the z/OS Unix file system, you can change their file permissions using the LOCSIte chmod subcommand.

You can use the following z/OS FTP subcommands to transfer data into named pipes in the client file system:

- Get
- MGet

The named pipe can exist before you issue Get or MGet subcommands or the FTP client can create the named pipe for you as part of Get and MGet subcommand processing.

You can use the following z/OS FTP subcommands to send data from existing named pipes in the client z/OS UNIX file system:

- APpend
- Put
- MPut

You must configure UNIXFILETYPE=FIFO to transfer data to or from a named pipe in the FTP client file system.

When UNIXFILETYPE=FIFO is configured on the client, all z/OS UNIX files that are created by the client during Get and MGet processing are created as named pipes. The FTP client always requests file permissions 777 when it creates a named pipe, but the configured UMASK value determines the actual file permissions. See the UMASK (FTP client and server) statement information in z/OS Communications Server: IP Configuration Reference for more details about the UMASK statement and "LOCSIte subcommand—Specify site information to the local host" on page 203 for information about configuring the UMASK value.

Unlike most types of z/OS UNIX files, data written to a named pipe is always appended to existing data rather than replacing existing data. You cannot specify the REPLACE parameter on Get and MGEt subcommands when UNIXFILETYPE=FIFO is configured.

Unlike most types of z/OS UNIX files, data read from a named pipe is removed from the named pipe instead of being copied from the named pipe. The client must read from a named pipe to send it to the server. Sending a named pipe empties the named pipe.

Restrictions:

- The z/OS operating system does not provide serialization for named pipes. Multiple processes on the client can read from or write to the same named pipe at one time.
- Restarting of file transfers to or from named pipes is not allowed.
- You cannot specify the REPLACE option when you transfer data into a named pipe.

Results: The following results apply when the z/OS FTP client stores a file as a named pipe in the z/OS UNIX file system:

- The client waits up to the number of seconds specified by the FIFOOPENTIME configuration option to open the named pipe for writing. The FTP client is unable to open the named pipe until the process that reads from the named pipe opens the pipe. This is true even when FTP created the named pipe. A large FIFOOPENTIME value gives you more time to start the named pipe reader, but could cause the data connection to time out if the client waits the entire length of time specified by the FIFOOPENTIME value.

  If you are issuing the MGet subcommand, the client blocks for the length of time specified by the FIFOOPENTIME configuration option for each local named pipe that is not opened for reading by a process on the FTP client host at the time of transfer.
- The client waits up to the number of seconds specified by the FIFOIOTIME configuration option for each write to the named pipe to complete. In general, the client does not block during writes unless it writes to the named pipe much faster than the named pipe reader reads from the pipe. If the client cannot write

any data to the named pipe for the number of seconds specified by the FIFOIOTIME configuration option, it fails the file transfer.

The following are the results of sending data from a named pipe in the z/OS UNIX file system:

- The client waits up to the number of seconds specified by the FIFOIOTIME configuration option to open the named pipe for reading. The FTP client is not able to open the named pipe until the process that writes to the named pipe opens the pipe. A large FIFOOPENTIME value gives you more time to start the named pipe writer, but could cause the data connection to time out if the client waits the entire length of time specified by the FIFOOPENTIME value.

If you are issuing the MPut subcommand, the client blocks for the number of seconds specified by the FIFOIOTIME configuration option for each local named pipe that is not opened for writing by a process on the FTP client host at the time of transfer.

- The client waits up to the number of seconds specified by the FIFOIOTIME configuration option for each read from the named pipe to complete. The client can block if the pipe write process stops writing to the named pipe but does not close it. If the FTP client cannot read any data from the named pipe during the number of seconds specified by the FIFOIOTIME value, it fails the file transfer.

Steps to save a file as a named pipe in the z/OS FTP client UNIX file system

Before you begin

You must start an application that can read from the named pipe, and it must open the named pipe, before FTP can transfer data into the named pipe.

Procedure

1. Do one of the following to set the UNIXFILETYPE FIFO value at the client host:
   - Code a UNIXFILETYPE statement in the client FTP.DATA file before starting the FTP daemon. See the UNIXFILETYPE (FTP client and server) statement information in z/OS Communications Server: IP Configuration Reference for more details about the UNIXFILETYPE statement.
   - Issue a LOCSIte subcommand with the UNIXFILETYPE parameter after starting the FTP client. See "LOCSIte subcommand—Specify site information to the local host" on page 203 for more information about the LOCSIte subcommand.
2. Do one of the following to set the FILETYPE=SEQ value at the client host:
   - Code the FILETYPE statement in the client FTP.DATA file before you start the FTP client. See the FILETYPE (FTP client and server) statement information in z/OS Communications Server: IP Configuration Reference for more details about the FILETYPE statement.
   - Issue the LOCSIte subcommand with the FILEtype parameter after starting the client. See "LOCSIte subcommand—Specify site information to the local host" on page 203 for more information about the LOCSIte subcommand.

     Tip: FILETYPE=SEQ is the default value for FILETYPE. You can issue the `locstat filetype` subcommand from the z/OS FTP client to determine whether you need to reset the FILETYPE value:

3. Optional: Do one of the following to set the FIFOOPENTIME and FIFOIOTIME values at the client:
   - Code the FIFOOPENTIME and FIFOIOTIME statements in the client FTP.DATA file before you start the FTP daemon. See z/OS Communications Server: IP Configuration Reference for more information about the FIFOOPENTIME and FIFOIOTIME statements.
   - Issue a LOCSIte subcommand with the FIFOOPENTIME and FIFOIOTIME configuration options after you start the client. See "LOCSIte subcommand—Specify site information to the local host" on page 203 for more information about the LOCSIte subcommand.

   The FTP client uses default values for FIFOOPENTIME and FIFOIOTIME parameters if you do not configure these values explicitly.
4. On the FTP client host, start the process that reads from the named pipe.
5. Use the Get subcommand to transfer a file from the client to the server, specifying a target file in the z/OS UNIX file system. For example, `get local_named_pipe remote_file`.

Results

You know that you have completed these steps correctly when the following events occur:

- The client receives reply 226 or 250 from the server, which indicates that the server sent the file.
- The client issues message EZA2536I or EZA1617I to indicate the total number of bytes that it received.

Tips:

- You do not need to create the named pipe with FTP before you initiate the transfer. FTP creates the named pipe during file transfer if the named pipe is not already in the file system. However, FTP is not able to transfer data into a named pipe that it creates until another process on the FTP client host opens the named pipe for reading.
- If the FTP client creates the named pipe for you, the configured umask value determines the file permissions. See the UMASK parameter information in "LOCSIte subcommand—Specify site information to the local host" on page 203, or the UMASK (FTP client and server) statement information in z/OS Communications Server: IP Configuration Reference for more details about the UMASK statement.

Steps for sending data from a named pipe in the z/OS FTP client UNIX file system

Before you begin

- You must start an application that can write from the named pipe, and it must open the named pipe, before FTP can transfer data into the named pipe.
- You must create the named pipe. See MKFIFO command information in z/OS UNIX System Services Command Reference for more details.

Procedure

1. Do one of the following to set the UNIXFILETYPE FIFO value at the client host:
   - Code a UNIXFILETYPE statement in the client FTP.DATA file before you start the FTP daemon. See the UNIXFILETYPE (FTP client and server)

statement information in z/OS Communications Server: IP Configuration Reference for more details about the UNIXFILETYPE statement.

- Issue a LOCSIte subcommand with the unixfiletype parameter after you start the FTP client. See "LOCSIte subcommand—Specify site information to the local host" on page 203 for more information about the LOCSIte subcommand.

2. Do one of the following to set the FILETYPE=SEQ value at the client host:
   - Code the FILETYPE statement in the client FTP.DATA file before you start the FTP client. See the FILETYPE (FTP client and server) statement information in z/OS Communications Server: IP Configuration Reference for more details about the FILETYPE statement.
   - Issue the LOCSIte subcommand with the FILEtype parameter after you start the client. See "LOCSIte subcommand—Specify site information to the local host" on page 203 for more information about the LOCSIte subcommand.

     Tip: `SEQ` is the default value for the FILETYPE configuration option. You can use the **locstat** *filetype* subcommand from the z/OS FTP client to determine whether you need to reset the FILETYPE value.
3. Optional: Do one of the following to set the FIFOOPENTIME and FIFOIOTIME values at the client:
   - Code the FIFOOPENTIME and FIFOIOTIME statements in the client FTP.DATA file before starting the FTP daemon. See z/OS Communications Server: IP Configuration Reference for more information about the FIFOOPENTIME and FIFOIOTIME statements.
   - Issue the LOCSIte subcommand with the FIFOOPENTIME and FIFOIOTIME parameters after you start the client. See "LOCSIte subcommand—Specify site information to the local host" on page 203 for more information about the LOCSIte subcommand.

     The FTP client uses default values for the FIFOOPENTIME and FIFOIOTIME configuration options if you do not configure these values explicitly.
4. On the FTP client host, start the process that writes to the named pipe.
5. Issue the Put subcommand to transfer a file from the client to the server. Specify the named pipe as the local file as follows:

   ```
   put local_named_pipe remote_file
   ```

Results

You know you have completed these steps correctly when both of the following events occur:

- The client receives reply 226 or 250 from the server, which indicates that the server received the file.
- The client issues message EZA2536I or EZA1617I, which indicate the total number of bytes that it sent.

Named pipes in the server z/OS UNIX file system

When files are stored in the server z/OS UNIX file system as named pipes, you can delete, rename, and list the named pipes using these z/OS FTP subcommands:

- DELEte
- DIr
- LS
- MDelete

- REName

With other FTP clients, you can specify a named pipe as the argument of these commands: DELE, RNFR, RNTO, LIST, NLST.

Using the z/OS FTP client, you can create a named pipe in the server z/OS UNIX file system with this subcommand:

- MKFifo

From other FTP clients, you can use the QUOTE subcommand to send an XFIF command to the remote host:

- QUOTE XFIF <*pathname*>

When you configure UNIXFILETYPE FIFO at the FTP server, all files you send to the server z/OS UNIX file system are stored as named pipes, and you can retrieve data from named pipes in the server z/OS UNIX file system.

You can use these z/OS FTP subcommands to retrieve from named pipes in the FTP server file system:

- Get
- MGet

From other FTP clients, use the RETR command to retrieve data from named pipes.

The FTP server can retrieve data only from existing named pipes. You can create the named pipe as described earlier in this section, or another process on the FTP server host can create the named pipe.

You can use these z/OS FTP subcommands to send files to named pipes in the server z/OS UNIX file system:

- APpend
- Put
- MPut

Use the SUnique subcommand to set store-unique off before using the Put or MPut subcommand to send files to named pipes.

From other FTP clients, you can use APPE or STOR commands to store a file as a named pipe in the server file system.

Unlike most types of z/OS UNIX files, data written to a named pipe is always appended to existing data rather than replacing existing data. Therefore, the STOR command is equivalent to the APPE command when UNIXFILETYPE=FIFO is configured. You cannot replace a named pipe by issuing the STOR command as you can with other types of files in the z/OS UNIX file system.

Unlike most types of z/OS UNIX files, data read from a named pipe is removed from the named pipe permanently. Retrieving data from a named pipe in the server file system destroys the contents of the named pipe.

Restrictions:

- Anonymous users are not allowed to read from or write to named pipes in the z/OS FTP server z/OS UNIX file system.

- The STOU (Store-unique) command is not allowed when UNIXFILETYPE=FIFO is configured.
- The z/OS operating system does not provide serialization for named pipes. Multiple processes on the server can read from or write to the same named pipe concurrently.
- Restart of file transfers to or from named pipes is not allowed.

Results: The following results apply when the server stores a file as a named pipe in the z/OS UNIX file system:

- The server waits up to the number of seconds specified by the FIFOOPENTIME configuration option to open the named pipe for writing. The FTP server cannot open the named pipe until the process that reads from the named pipe opens the pipe. A large FIFOOPENTIME value gives you more time to start the named pipe reader, but could cause the data connection to time out if the server waits for the number of seconds specified by the FIFOOPENTIME value.

  If you issue the MPut subcommand, the server blocks for the number of seconds specified by the FIFOOPENTIME value for each remote named pipe that is not opened for reading by a process on the FTP server host at the time of transfer.
- The server waits up to the number of seconds specified by the FIFOIOTIME value for each write to the named pipe to complete. In general, the server does not block during writes unless it writes to the named pipe much faster than the named pipe reader reads from the pipe. If the server does not write any data to the named pipe for the number of seconds specified by the FIFOIOTIME value, it fails the file transfer.

The following results apply when the server retrieves data from a named pipe in the z/OS UNIX file system:

- The server waits up to the number of seconds specified by the FIFOOPENTIME value to open the named pipe for reading. The FTP server cannot open the named pipe until the process that writes to the named pipe opens the pipe. A large FIFOOPENTIME value gives you more time to start the named pipe writer, but could cause the data connection to time out if the server waits for the number of seconds specified by the FIFOOPENTIME value.

  If you issue the MGet subcommand, the server blocks for the number of seconds specified by the FIFOOPENTIME value for each remote named pipe that is not opened for writing by a process on the FTP server host at the time of transfer.
- The server waits up to the number of seconds specified by the FIFOIOTIME value for each read from the named pipe to complete. The server might block if the pipe write process stops writing to the named pipe but does not close it. If the FTP server cannot read any data from the named pipe for the number of seconds specified by the FIFOIOTIME value, it fails the file transfer.

Steps for storing a file as a named pipe in the z/OS FTP server UNIX file system using the z/OS FTP client

Before you begin

You must start an application that can read from the named pipe, and it must open the named pipe, before FTP can transfer data into the named pipe.

Procedure

1. Optional: Create the named pipe on the server host:
   a. Issue the SIte subcommand to configure the server UMASK value. For example: `site UMASK=<mask>`

You can also configure the server UMASK value by coding the UMASK statement in the FTP.DATA file. See the UMASK (FTP client and server) statement information in z/OS Communications Server: IP Configuration Reference for more details about the UMASK statement.

Tip: After you create the named pipe, you can change the file permissions by issuing the SIte subcommand with the CHMOD parameter.

b. Issue the the MKFifo subcommand to create the named pipe at the server. For example: `mkfifo <pathname>`

   See "MKFifo subcommand—Create a named pipe at the FTP server host" on page 250 for information about the MKFifo subcommand.

   Tips:

   - You do not need to create the named pipe with FTP before initiating the transfer. FTP creates the named pipe during file transfer if the named pipe is not already in the file system, or another process on the server host can create the named pipe for you.
   - After you create a named pipe, you can display and manipulate it with the following FTP subcommands:
     - DELEte
     - DIr
     - Ls
     - REName
     - SIte subcommand with CHMOD parameter

2. Do one of the following to set the UNIXFILETYPE FIFO value at the server host:
   - Code a UNIXFILETYPE statement in the server FTP.DATA file before you start the FTP daemon. See the UNIXFILETYPE (FTP client and server) statement information in z/OS Communications Server: IP Configuration Reference for more details about the UNIXFILETYPE statement.
   - Issue the SIte subcommand with the UNIXFILETYPE parameter after you log in to the server. See "SIte subcommand—Send site-specific information to a host" on page 281 for more information about the SIte subcommand.
3. Do one of the following to set the FILETYPE=SEQ value at the server host:
   - Code the FILETYPE statement in the server FTP.DATA file before you start the FTP daemon. See the FILETYPE (FTP client and server) statement information in z/OS Communications Server: IP Configuration Reference for more details about the FILETYPE statement.
   - Issue the SIte subcommand with the FILEtype parameter after you log in to the server. See FILETYPE statement information in "SIte subcommand—Send site-specific information to a host" on page 281 for more details about the SIte subcommand.

   Tip: FILETYPE=SEQ is the default FILETYPE value. You can use the `stat (filetype` subcommand from the z/OS FTP client to determine whether you need to reset the FILETYPE value.
4. Optional: Do one of the following to set the FIFOOPENTIME and FIFOIOTIME values at the server:
   - Code FIFOOPENTIME and FIFOIOTIME statements in the server FTP.DATA file before you start the FTP daemon. See z/OS Communications Server: IP Configuration Reference for more information about the FIFOOPENTIME and FIFOIOTIME statements.

- Issue the SIte subcommand with the FIFOOPENTIME and FIFOIOTIME parameters after you log in to the server. See "SIte subcommand—Send site-specific information to a host" on page 281 for more information about the SIte subcommand.

  The FTP server uses default values for the FIFOOPENTIME and FIFOIOTIME configuration options if you do not configure these values explicitly.

5. On the FTP server host, start the process that reads from the named pipe.
6. Issue the APpend subcommand to send the file from the client to the server, specifying a target file in the z/OS UNIX file system as follows: `append localFile named_pipe`

Results

You know that you have completed these steps correctly when the following occurs:

- The server sends reply 226 or 250 to the client to indicate that it received the file successfully.
- The client issues message EZA2536I or EZA1617I to indicate the total number of bytes that were sent.

Guidelines: Use these guidelines for using any FTP client to store a file as a named pipe in the z/OS FTP server UNIX file system:

- You can issue the QUOTE subcommand to send a SITE command with the UMASK, FILETYPE UNIXFILETYPE, FIFOOPENTIME, and FIFOIOTIME parameters to the FTP server, or to send an XFIF command to the server. See "Steps for storing a file as a named pipe in the z/OS FTP server UNIX file system using the z/OS FTP client" on page 126 for details.
- You can use the APPE or STOR commands to send data to a named pipe on the server.

  Tip: When you send data to a named pipe on the z/OS server, the STOR command is treated the same as an APPE command.

Steps for retrieving data from a named pipe in the z/OS FTP server UNIX file system using the z/OS FTP client

Before you begin

You must start an application that can write to the named pipe, and it must open the named pipe, before FTP can transfer data from the named pipe.

Procedure

1. Create the named pipe on the server host. You can use FTP to create the named pipe, or another process on the server host can create the named pipe.

   To create the named pipe using FTP:

   a. Issue the SIte subcommand to configure the server UMASK value. For example, `site UMASK=<mask>`.

      You can also configure the server UMASK value by coding the UMASK statement in FTP.DATA. See the UMASK (FTP client and server) statement information in z/OS Communications Server: IP Configuration Reference for more details about the UMASK statement.

Tip: After you create the named pipe, you can change the file permissions by issuing the SIte subcommand with the CHMOD parameter.

b. From the z/OS FTP client, issue the MKFifo subcommand to create the named pipe. For example, `mkfifo <pathname>`.

   See "MKFifo subcommand—Create a named pipe at the FTP server host" on page 250 for information about the MKFifo subcommand.

   Tip: After you create a named pipe, you can display and manipulate it with the following FTP subcommands:

   - DELEte
   - DIr
   - Ls
   - REName
   - SIte subcommand with the CHMOD parameter

2. Do one of the following to set the UNIXFILETYPE FIFO value at the server host:
   - Code a UNIXFILETYPE statement in the server FTP.DATA file before you start the FTP daemon. See the UNIXFILETYPE (FTP client and server) statement information in z/OS Communications Server: IP Configuration Reference for more details about the UNIXFILETYPE statement.
   - Issue the SIte subcommand with the UNIXFILETYPE parameter after you log in to the server. See "SIte subcommand—Send site-specific information to a host" on page 281 for more information about the SIte subcommand.
3. Do one of the following to set the FILETYPE configuration option to the value SEQ at the server host:
   - Code the FILETYPE statement in the server FTP.DATA file before you start the FTP daemon. See the FILETYPE (FTP client and server) statement information in z/OS Communications Server: IP Configuration Reference for more details about the FILETYPE statement.
   - Issue the SIte subcommand with the FILEtype parameter after you log in to the server. See "SIte subcommand—Send site-specific information to a host" on page 281 for more information about the SIte subcommand.

   Tip: `SEQ` is the default value for the FILETYPE configuration option. You can issue the `stat (filetype` subcommand from the z/OS FTP client to determine whether you need to reset the FILETYPE value.
4. Optional: Do one of the following to set FIFOOPENTIME and FIFOIOTIME values at the server:
   - Code FIFOOPENTIME and FIFOIOTIME statements in the server FTP.DATA file before you start the FTP daemon.

     See z/OS Communications Server: IP Configuration Reference for more information about the FIFOOPENTIME and FIFOIOTIME statements.
   - Issue the SIte subcommand with the FIFOOPENTIME and FIFOIOTIME parameters after you log in to the server.

     See "SIte subcommand—Send site-specific information to a host" on page 281 for more information about the SIte subcommand.

   The FTP server uses the default values for the FIFOOPENTIME and FIFOIOTIME configuration options if you do not configure these values explicitly.
5. On the FTP server host, start the process that writes to the named pipe.

6. Issue the Get subcommand to retrieve data from the named pipe. For example, `get <named pipe>`.

Results

You know that you have completed these steps correctly when both of the following events occur:

- The server sends reply 226 or 250 to the client to indicate that it sent the file successfully.
- The client issues message EZA2536I or EZA1617I to indicate the total number of bytes that it received.

Guidelines: Use these guidelines for using any FTP client to retrieve from a named pipe in the z/OS FTP server UNIX file system:

- You can issue the QUOTE subcommand to send a SITE command with the UMASK, UNIXFILETYPE, FIFOOPENTIME, and FIFOIOTIME parameters to the FTP server, or to send an XFIF command to the server. See "Steps for storing a file as a named pipe in the z/OS FTP server UNIX file system using the z/OS FTP client" on page 126 for details.
- Issue the RETR command to retrieve data from a named pipe on the server.

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. You can use FTP to submit a job.

Procedure

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 in to 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 does 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 138 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 logged into the server, 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
   ```

Results

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
```

See z/OS MVS JCL Reference for more information about using JCL.

Result: If the submitted JCL does not specify the MSGCLASS value on the JOB statement, the default value sysout class A is used.

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 JESMSGLG      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.

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.

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 while FILEtype=JES is specified, specify the job ID and either the number of the spool file or the JES data set name of the spool file that 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 J6235.USER1.USER1.TSU00072.D0000002.JESMSGLG OUTPUT
GET JOB00275.4
GET J7438.3
```

In these examples, *foreign_file* is specified first, followed by *local_file* (on your client workstation) 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. The fourth command has differing results depending on the JESGETBYDSN value that is configured. You can specify the JESGETBYDSN value as an option on the SITE subcommand or in the server FTP.DATA file, or accept the default value JESGETBYDSN FALSE.

If JESGETBYDSN FALSE is configured, the file named JOB06235.USER1.USER1.TSU00072.D0000002.JESMSGLG of job JOB06235 on the server host is submitted to JES. The resulting output is saved on the client in file OUTPUT. If the JESINTERFACELEVEL 2 statement is coded in the server FTP.DATA file and either the JESGETBYDSN option is specified on the SITE subcommand or JESGETBYDSN TRUE is coded in the server FTP.DATA file, the spool file with the JES data set name USER1.USER1.TSU00072.D0000002.JESMSGLG on the server host is stored on the client host in file OUTPUT. The JES spool file data set name has the same format as an MVS data set name and is case sensitive. You can find this data set using the SDSF utility on the Job Data Set (JDS) panel. Even though the JES spool file data set name has the same format as an MVS data set name, the name can be longer than an MVS data set name and can allow different character sets; it should not be enclosed in quotation marks. See z/OS SDSF Operation and Customization for more information about JES data set names. See “Steps for submitting a job and automatically receiving output” on page 137 for more information about the behavior of the JESGETBYDSN parameter.

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 subcommand 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.

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.

Delete a job 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 by using the JCL that you have built on the FTP server rather than on the FTP client. Automatic retrieval of jobs works only if the file contains a single job. It does not work for files that include more than one job (multiple JOB cards).

Procedure

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 z/OS UNIX file. If JESINTERFACELEVEL=1, then the job name in the JCL must be USERID*x*, where *x* is a 1-character letter or number. Additionally, the output class for any data sets you want 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 logged into the server, specify that you want to interface to JES with a site parameter by entering the following code:

   ```
   SITE FILEtype=JES NOJESGETBYDSN
   ```

   ---

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.

Results

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 cases:

- 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 DATACTTIME 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.
- The control or data connection is closed. This is usually caused by a firewall that timed out the session because of inactivity. Add FTPKEEPALIVE (control connection) and DATAKEEPALIVE (data connection) statements in the FTP.DATA data file.
- 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, specify a value of JESSTATUS=OUTPUT.

The subcommands DIR, LS, MDELETE, and MGET allow 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 files 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* (*)
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 set the JESINTERFACELevel to 2, the FTP server behaves as in releases prior to z/OS Communications Server level V2R10. 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 be specified only 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 class 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 READ access to the resource, it can list, retrieve, or GET the job output. (JESINTERFACELevel 2 uses the SAPI interface to JES, so READ authority is required to list job status or retrieve job output.) See the z/OS JES2 Initialization and Tuning Guide for more information on JES security. See 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>:tsouserid):
  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.JESMSGLG
           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 9,67,112,25,45
           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 9,67,112,25,46
           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 JESMSGLG        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 subcommand 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 an 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 Nlst started OK
250-JESENTRYLIMIT of 2 reached.  Additional entries not received
250 Nlst 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 about installing the SQL query function for the FTP client or server, see 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 150 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 151 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” on page 150 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 280.

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=
```

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 70 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, see http://www-01.ibm.com/support/knowledgecenter/SSEPH2/welcome.

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 value 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" on page 151.

- 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 70 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

Procedure

1. To have the FTP client perform SQL queries and have the results sent to an FTP server, specify:

   ```
   LOCSITE FILEtype=SQL
   ```

2. Perform a PUT command specifying the name of the file on the client that contains the SQL query.

Example

For example, if the client has a file named `userid.SQL.IN` that contains an SQL query, 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

Procedure

1. To have the FTP server perform the query and have the results sent to the client, specify:

   ```
   SITE FILEtype=SQL
   ```

2. Perform a GET command specifying the name of the file on the server that contains the SQL query.

Example

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 output is 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
```

SUBSYS: Writing to BatchPipes

The FTP server supports binary transfer to IBM BatchPipes®. BatchPipes connect jobs so that data from one or more job can pass through processor storage to another job (or jobs) without being written to DASD or tape. For more information about BatchPipes see *IBM BatchPipes OS/390® Introduction*.

Steps for writing to BatchPipes

You can transfer a file or data set from the FTP client to the FTP server by writing to BatchPipes.

Procedure

To transfer a file to BatchPipes, perform the following steps:

1. Start the BatchPipes subsystem.

   When you successfully start the BatchPipes subsystem, messages similar to the following ones are displayed on the MVS console.

   ```
   11.33.43  IEF403I BP01 - STARTED - TIME=11.33.43
   11.33.43  ASFP000I BATCHPIPES FOR OS/390 SUBSYSTEM BP01:
     PRODID=5655-D45 PRODLVL=HACH301 COMPID=565506500
     CONTAINS LICENSED MATERIALS - PROPERTY OF IBM CORP.
     CONTAINS RESTRICTED MATERIALS OF IBM CORP.
     5655-D45 (C) COPYRIGHT IBM CORP. 1992, 2000
     ALL RIGHTS RESERVED.
     U.S. GOVERNMENT USERS RESTRICTED RIGHTS -
     USE, DUPLICATION, OR DISCLOSURE RESTRICTED BY
     GSA ADP SCHEDULE CONTRACT WITH IBM CORP.
   11.33.43  ASFP007I BATCHPIPES BP01 COMMAND PREFIX IS BP01
   11.33.43  ASFP011I BATCHPIPES BP01 INITIALIZATION COMPLETE.
   11.33.43  ASFP017I BATCHPIPES BP01 MODE(LOCAL) PIPEPLEX(**NONE**)
   ```

   ---

2. Start the BatchPipes reader.

You must start the BatchPipes reader before you can use the FTP server to write to BatchPipes. The following is an example of the Job Control Language (JCL) statements that you can use to start a BatchPipes subsystem reader of data set USER3.SUBSYS.OUTPUT3.

```
//USER3@2 JOB MSGCLASS=A,CLASS=A
//STEP1   EXEC PGM=IEBGENER
//SYSIN   DD DUMMY
//SYSPRINT DD SYSOUT=*
//SYSUT1   DD DSN=USER3.SUBSYS.OUTPUT2,SUBSYS=BP01,
//            DCB=(LRECL=80,RECFM=FB)
//SYSUT2   DD DSN=USER3.SUBSYS.OUTPUT3,
//            DISP=(NEW,CATLG,DELETE),
//            UNIT=SYSDA,
//            SPACE=(TRK,(10,10),RLSE),
//            DCB=(LRECL=80,RECFM=FB)
```

When BatchPipes is open for read, messages similar to the following are displayed in the JOBLOG output:

```
00  11.35.13  $HASP100 USER3@2  ON INTRDR                    FROM TSU00033 USER2
  - 11.35.13  ICH70001I USER2   LAST ACCESS AT 11:05:39 ON FRIDAY, MARCH 2, 2007
  - 11.35.13  $HASP373 USER3@2  STARTED - INIT 1    - CLASS A - SYS 3090
  - 11.35.13  IEF403I USER3@2 - STARTED - TIME=11.35.13
  - 11.35.14  ASFP394I BATCHPIPES READER JOB WAITING FOR OPEN.
  -       JOB=USER3@2 STEP=STEP1 DD=SYSUT1 SUBSYS=BP01
  -       PIPE=USER3.SUBSYS.OUTPUT2
```

---

3. Start the job that reads from BatchPipes.

   Requirement: The BatchPipes reader must be active for the FTP server to write to BatchPipes.

---

4. Configure the FTP server for writing to BatchPipes.

   Use the SITE command to specify the following:

   - The BatchPipes subsystem name. Use the SUBSYS parameter. For example, if your BatchPipes subsystem is named BP01, specify the following:

     ```
     SITE SUBSYS=BP01
     ```

   - A record format that is compatible with BatchPipes. Supported record formats are F, FB, V, and VB. Specify the RECFM parameter.
   - A logical record length and block size that are compatible with BatchPipes. Specify the LRECL and BLKSIZE parameters.

---

5. Set up the client and server for binary (Type I) file transfer.

   Guideline: With most FTP clients, including the z/OS FTP client, you can use the Binary subcommand from the client to set up a binary file transfer.

   Restrictions: The following restrictions apply when you specify a SUBSYS value:

   - APPE and REST commands are not supported.
   - Only binary (type I) file transfer is supported.
   - Only FILETYPE SEQ is supported.
   - Checkpointing and file transfer restart are not supported. Checkpointing is described in “Restarting a failed data transfer” on page 117.
   - SMS-managed data sets (data sets with an assigned storage class) cannot be used.

- Only RECFM values F, FB, V, and VB are supported.

---

6. Transfer a file or data set to the FTP server, specifying BatchPipes as the destination. You must put directly to the BatchPipes subsystem rather than appending to BatchPipes, for example:

   ```
   put 'user3.source.data' 'user3.subsys.output1'
   ```

SUBSYS examples

The following are examples of using FTP to transfer a file to IBM BatchPipes.

Example 1:

In this example, the FTP server writes the file USER3.SUBSYS.OUTPUT1 to a BatchPipes reader. This JCL starts the BatchPipes reader. The file USER3.SUBSYS.OUTPUT1 has the record format FB and a logical record length of 80. The name of the BatchPipes subsystem is BP01 as specified by the SUBSYS parameter.

```
//USER3@2 JOB MSGCLASS=A,CLASS=A
//STEP1   EXEC PGM=IEBGENER
//SYSIN   DD DUMMY
//SYSPRINT DD SYSOUT=*
//SYSUT1   DD DSN=USER3.SUBSYS.OUTPUT1,SUBSYS=BP01,
//            DCB=(LRECL=80,RECFM=FB)
//SYSUT2   DD DSN=USER3.SUBSYS.OUTPUT2,
//            DISP=(NEW,CATLG,DELETE),
//            UNIT=SYSDA,
//            SPACE=(TRK,(10,10),RLSE),
//            DCB=(LRECL=80,RECFM=FB)
```

Because the BatchPipes reader has the logical record length 80 and a record format FB, you must configure the FTP server to use those values for the file transfer:

```
230 USER1 is logged on.  Working directory is "USER1.".
Command:
ftp> bin                                        ====> Setting Binary Transfer
200 Representation type is Image
Command:
site lrecl=80 recfm=fb subsys=bp01              ====> Sets SITE variables for
                                                ====> RECFM, LRECL, and SUBSYS.
>>> SITE lrecl=80 recfm=fb subsys=bp01
200-BLOCKSIZE must be a multiple of LRECL for RECFM FB
200-BLOCKSIZE being set to 6160
200 SITE command was accepted
Command:
put 'user3.source.data' 'user3.subsys.output1' ====> Transferring 'user3.source.data'
                                                ====> to Reader end of the BatchPipes
                                                ====>'user3.subsys.output1'
>>> PORT 9,42,104,22,4,6
200 Port request OK.
>>> STOR 'user3.subsys.output1'
125-Waiting for Batchpipes subsystem BP01 reader end to open.
125 Storing data set USER3.SUBSYS.OUTPUT1
250 Transfer completed successfully.
820 bytes transferred in 0.005 seconds.  Transfer rate 164.00 Kbytes/sec.
Command:
```

Example 2:

```
//USER3@2 JOB MSGCLASS=A,CLASS=A
//STEP1   EXEC PGM=IEBGENER
//SYSIN   DD DUMMY
//SYSPRINT DD SYSOUT=*
//SYSUT1   DD DSN=USER3.SUBSYS.VBOUPT1,SUBSYS=BP01,
```

```
//            DCB=(LRECL=32756,RECFM=VB)
//SYSUT2   DD DSN=USER3.SUBSYS.VBOUPT2,
//            DISP=(NEW,CATLG,DELETE),
//            UNIT=SYSDA,
//            SPACE=(TRK,(10,10),RLSE),
//            DCB=(LRECL=32756,RECFM=VB)
```

Because the BatchPipes reader has the logical record length 32 756 and the record format VB, you must configure the FTP server to use those values for the file transfer. For this example use record structure.

```
ftp> bin                                          ====> Setting Binary Transfer
200 Representation type is Image
ftp> quote stru r                                 ====> Setting Record Structure
250 Data structure is Record
ftp> quote site lrecl=32756 recfm=vb subsys=bp01 ====> Setting SITE variables for
                                                  ====> RECFM, LRECL, and SUBSYS.
200-BLOCKSIZE must be at least 4 more than LRECL for RECFM VB
200-BLOCKSIZE being set to 32760
200 SITE command was accepted
ftp> put new.txt 'user3.subsys.vboupt1'
200 Port request OK.
125-Waiting for Batchpipes subsystem BP01 reader end to open.
125 Storing data set USER3.SUBSYS.VBOUPT1

250 Transfer completed successfully.
ftp: 126 bytes sent in 0.00Seconds 126000.00Kbytes/sec       .
ftp>
```

For more information, see the following:

- z/OS MVS JCL Reference
- *IBM BatchPipes OS/390 Introduction*
- *SmartBatch BatchPipeWorks Reference*
- z/OS MVS Programming: Authorized Assembler Services Guide

Chapter 5. FTP subcommands

The FTP subcommands are listed in Table 20. The minimum abbreviation, a description, and the link to each subcommand are also included. You must be in the FTP environment to use the FTP subcommands. See "Using FTP" on page 23 for more information.

Table 20. FTP subcommands

Subcommand	Description	See
?	Provides information to use FTP.	"HElp and ? subcommands—Display help information" on page 193
!	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.	"! subcommand—Invoke a z/OS UNIX System Services function" on page 163
ACCount	Sends host-dependent account information.	"ACCt subcommand—Supply account information" on page 164
APpend	Appends a data set on your local host to a file on the foreign host.	"APpend subcommand—Append a local data set" on page 164
AUth	Requests a security mechanism for the session.	"AUth subcommand—Request security mechanism" on page 166
AScii	Sets the transfer type to ASCII.	"AScii subcommand—Change the data transfer type to ASCII" on page 166
BIG5	Sets the transfer type to BIG5. BIG is the minimum abbreviation for BIG5.	"BIG5 subcommand—Change the data transfer type to BIG5" on page 167
BINary	Sets the transfer type to IMAGE.	"BINary subcommand—Change the data transfer type to Image" on page 168
BLock	Sets the data transfer mode to block mode. This is equivalent to specifying the MOde B subcommand.	"BLock subcommand—Set the block data transfer mode" on page 169
CCc	Turns off integrity protection on the command channel.	"CCc subcommand—Turn off integrity protection" on page 169
CD	Changes the working directory.	"CD subcommand—Change the directory on the remote host" on page 170
CDUp	Changes to the parent of the current working directory.	"CDUp subcommand—Change to the parent of the working directory" on page 172
CLEar	Sets the protection level for data transfers to CLEAR.	"CLEar subcommand—Set the protection level for data transfers to CLEAR" on page 174
CLose	Disconnects from the foreign host.	"CLose subcommand—Disconnect from a remote host" on page 174

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Table 20. FTP subcommands (continued)

Subcommand	Description	See
COMpress	Sets the data transfer mode to compressed mode. This is equivalent to specifying the MOde C subcommand.	"COMpress subcommand—Set the compressed data transfer mode" on page 175
CProtect	Sets the protection level on commands. CProtect CLEar is equivalent to the CCc command.	"CProtect subcommand— Set the protection level on commands" on page 175
CWd	Changes the working directory (Synonymous with CD).	"CD subcommand—Change the directory on the remote host" on page 170
DEBug	Enables or disables general internal tracing.	"DEBug subcommand—Set general trace options" on page 176
DELEte	Deletes a single file on the foreign host.	"DELEte subcommand—Delete files" on page 179
DELImit	Displays the delimiter character between the *file_name* and *file_type*.	"DELImit subcommand—Display the file name delimiter" on page 180
DIr	Lists the directory entries for files on the foreign host.	"DIr subcommand—Obtain a list of directory entries" on page 180
DUMP	Enables or disables extended internal tracing.	"DUMP subcommand—Set extended trace options" on page 184
EBcdic	Sets the transfer type to EBCDIC.	"EBcdic subcommand—Change the data transfer type to EBCDIC" on page 186
EUckanji	Sets the transfer type to EUCKANJI.	"EUckanji subcommand—Change the data transfer type to EUCKANJI" on page 187
FEature	Queries FTP Server for features it supports.	"FEature subcommand—Query FTP server for features it supports" on page 188
FIle	Sets the file structure to file. This is equivalent to specifying the STRucture F subcommand.	"FIle subcommand—Set the file structure to File" on page 188
Get	Copies a file from the foreign host to your local host.	"Get subcommand—Copy files" on page 188
GLob	Toggles globbing (the expansion of metacharacters in file names) for the MDelete, MGet, and MPut subcommands.	"GLob subcommand—Toggle expansion of metacharacters" on page 191
HAngeul	Sets the transfer type to HANGEUL.	"HAngeul subcommand—Change the data transfer type to HANGEUL" on page 192
HElp	Displays help information for FTP.	"HElp and ? subcommands—Display help information" on page 193
Ibmkanji	Sets the transfer type to IBMKANJI.	"Ibmkanji subcommand—Change the data transfer type to IBMKANJI" on page 194
JIS78kj	Sets the transfer type to JIS78KJ.	"JIS78kj subcommand—Change the data transfer type to JIS78KJ" on page 195

Table 20. FTP subcommands (continued)

Subcommand	Description	See
JIS83kj	Sets the transfer type to JIS83KJ.	"JIS83kj subcommand—Change the data transfer type to JIS83KJ" on page 195
Ksc5601	Sets the transfer type to KSC5601.	"Ksc5601 subcommand—Change the data transfer type to KSC-5601" on page 196
LANGuage	Sets the language used for FTP replies from the server.	"LANGuage subcommand—Set the language used for FTP replies from the server" on page 197
LCd	Changes the current directory on the local host.	"LCd subcommand—Change the local working directory" on page 198
LOCSIte	Specifies information that is used by the local host to provide service specific to that host system.	"LOCSIte subcommand—Specify site information to the local host" on page 203
LOCSTat	Displays FTP status information for the local host.	"LOCSTat subcommand—Display local status information" on page 229
LMkdir	Creates a directory on the local host.	"LMkdir subcommand—Create a directory on the local host" on page 200
LPwd	Displays the name of the active working directory on the local host.	"LPwd subcommand—Display the current working-level qualifier" on page 237
LS	Lists the names of files on the foreign host.	"LS subcommand—Obtain a list of file names" on page 237
MDelete	Deletes multiple files on the foreign host.	"MDelete subcommand—Delete multiple files" on page 240
MGet	Copies multiple files from the foreign host to your local host.	"MGet subcommand—Copy multiple files" on page 243
MKdir	Creates a directory on the foreign host.	"MKdir subcommand—Create a directory on the remote host" on page 246
MKFifo	Creates a UNIX named pipe on the remote host.	"MKFifo subcommand—Create a named pipe at the FTP server host" on page 250
MOde	Specifies the mode or data format of the transfer.	"MOde subcommand—Set the data transfer mode" on page 251
MPut	Copies multiple files on your local host to the foreign host.	"MPut subcommand—Copy multiple data sets to the remote host" on page 252
MVSGet	Copies a remote data set into a local data set with the remote data set attributes	"MVSGet subcommand – Copy a remote data set into a local data set with the remote data set attributes" on page 254
MVSPut	Copies a local data set into a remote data set with the local data set attributes	"MVSPut subcommand – Copy a local data set into a remote data set name with the local data set attributes" on page 259
NOop	Checks whether the foreign host is still responding.	"NOop subcommand—Test the connection" on page 262

Table 20. FTP subcommands (continued)

Subcommand	Description	See
Open	Opens a connection to a foreign host.	"Open subcommand—Connect to the FTP server" on page 263
PAss	Supplies a password or password phrase to the foreign host.	"PAss subcommand—Supply a password" on page 264
PRIvate	Sets the protection level for data transfers to PRIVATE.	"PRIvate subcommand—Set the protection level for data transfers to PRIVATE" on page 266
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.	"PROMpt subcommand—Toggle interactive prompting for M* commands" on page 266
PROTect	Sets the protection level for data transfers on the data connections.	"PROTect subcommand—Set the protection level for data transfers" on page 267
PROXy	Executes an FTP subcommand on a secondary control connection.	"PROXy subcommand—Execute FTP subcommand on secondary control connections" on page 268
PUt	Copies a file on your local host to the foreign host.	"PUt subcommand—Copy data sets to the remote host" on page 271
PWd	Displays the name of the active working directory on the foreign host.	"PWd subcommand—Display the current working directory" on page 273
QUIt	Leaves the FTP command environment.	"QUIt subcommand—Leave the FTP environment" on page 273
QUOte	Sends an uninterpreted string of data.	"QUOte subcommand—Send an uninterpreted string of data" on page 274
RECord	Sets the file structure to record. This is equivalent to specifying the STRucture R subcommand.	"RECord subcommand—Set the file structure to record" on page 275
REName	Renames a file on the foreign host.	"REName subcommand—Rename files" on page 276
REStart	Restarts a checkpointed data transfer.	"REStart subcommand - Restart a checkpointed data transfer" on page 276
RMdir	Removes a directory.	"RMdir subcommand—Remove a directory on the remote host" on page 278
SAfe	Sets the protection level on data transfers to *safe*.	"SAfe subcommand—Set the protection level to safe" on page 278
SChinese	Sets the transfer type to SCHINESE.	"SChinese subcommand—Change the data transfer type to SCHINESE" on page 278
SENDPort	Enables or disables automatic transmission of the FTP server PORT command.	"SENDPort subcommand—Toggle the sending of port information" on page 280

Table 20. FTP subcommands (continued)

Subcommand	Description	See
SENDSite	Enables or disables automatic transmission of the SIte subcommand.	"SENDSite subcommand—Toggle the sending of site information" on page 280
SIte	Sends information to the foreign host using site-specific commands.	"SIte subcommand—Send site-specific information to a host" on page 281
SJiskanji	Sets the transfer type to SJISKANJI.	"SJiskanji subcommand—Change the data transfer type to SJISKANJI" on page 313
SRestart	Restarts an interrupted stream mode data transfer.	"SRestart subcommand—Restart a stream data transfer" on page 314
STAtus	Displays status information for the foreign host.	"STAtus subcommand—Retrieve status information from a remote host" on page 316
STREam	Sets the data transfer mode to stream mode. This is equivalent to specifying the MOde S subcommand.	"STREam subcommand—Set the stream data transfer mode" on page 325
STRucture	Sets the file transfer structure.	"STRucture subcommand—Set the file structure" on page 325
SUnique	Toggles the storage methods.	"SUnique subcommand—Changes the storage method" on page 325
SYstem	Displays the name of the foreign host operating system.	"SYstem subcommand—Display the operating system name" on page 326
TChinese	Sets the transfer type to TCHINESE.	"TChinese subcommand—Change the data transfer type to TCHINESE" on page 327
TSO	Passes a TSO command to the local host TSO environment.	"TSO subcommand—Use TSO commands" on page 328
TYpe	Specifies the transfer type.	"TYpe subcommand—Set the data transfer type" on page 328
UCs2	Changes the data transfer type to Unicode UCS-2. UC is the minimum abbreviation for UCs2.	"UCs2 subcommand—Change data transfer type to Unicode UCS-2" on page 332
User	Identifies you to a foreign host or changes your TSO user ID password or password phrase.	"User subcommand—Identify yourself to a host or change your TSO user ID password" on page 333
Verbose	Enables or disables verbose mode.	"Verbose subcommand - Toggle verbose mode" on page 335

! 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

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

Parameters

account_information
Specifies the account information required by the host. See 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 might 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

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 a z/OS UNIX 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:
```

Results:

- The following information applies when the *local_data_set* value is a named pipe in the z/OS UNIX file system:
  - FTP cannot send the named pipe until you start a process on the client host to write to the named pipe. If FTP is the first process to open the named pipe, it blocks until another process opens the named pipe for writing, or until the FIFOOPENTIME timer expires.
  - Appending a named pipe to a remote file permanently removes data from the named pipe in the FTP client file system.
- 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 can 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 want the Server to request that unused space be released on a newly-created data set, use the PUT subcommand instead of APPEND.

Related topics:

- See "Using z/OS UNIX System Services named pipes" on page 119 for more information about using named pipes.
- See "CD subcommand—Change the directory on the remote host" on page 170 for more information about working with current directories.
- See Appendix A, "Specifying data sets and files," on page 431 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 268 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

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 13 on page 52.

AUth subcommand—Request security mechanism

Purpose

Use the AUth subcommand to request a security mechanism for the session.

Format

Parameters

security_mechanism
The possible value is:

TLS
Request or reset TLS security for the session.

Result: The server might not support the security mechanism that you specify, or it might not accept the security mechanism that you specify.

Restrictions:

- This subcommand is not valid with a TLSPORT implicit connection.
- This subcommand is not valid during a TLS-secured session when TLSRFCLEVEL parameter is set to DRAFT. See "Using security mechanisms" on page 45 for more information.
- This subcommand is not valid during a Kerberos-secured session.

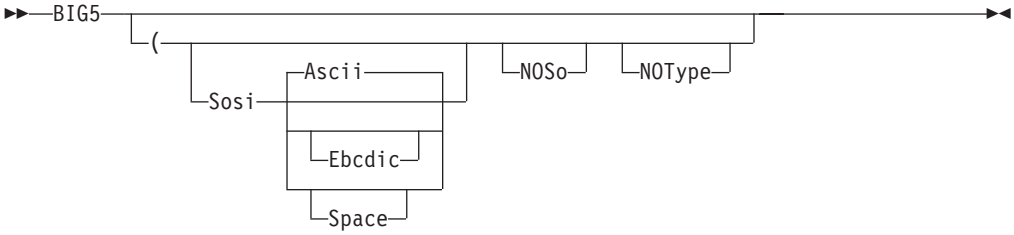
BIG5 subcommand—Change the data transfer type to BIG5

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' andX'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 TYpe command to the server. Use this parameter when translation is to be performed by the FTP client only.

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 90 and “Support for MBCS languages” on page 93 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

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 13 on page 52.

BLock subcommand—Set the block data transfer mode

Purpose

Use the BLock subcommand to set the data transfer mode to block mode. This is equivalent to specifying the MOde B subcommand. See "MOde subcommand—Set the data transfer mode" on page 251 for more information.

Format

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

Parameters

There are no parameters for this subcommand.

Rule: Because turning off integrity protection potentially enables an attacker to insert commands onto the control connection, some FTP servers might refuse to honor this command.

Restrictions: When the security mechanism is TLS, the following restrictions apply:

- The CCc subcommand is not supported when the connection is implicitly secured with a connection to the port that is configured with the TLSPORT statement.
- The CCc subcommand is supported only when the TLSRFCLEVEL is RFC4217 or CCCNONOTIFY.

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

Parameters

directory
Specifies the name of a file directory, a fully qualified data set, or a prefix on the remote host.

Examples

Usage

You can also use the CWD and CW subcommands to change the current working directory. These subcommands are synonyms of the CD subcommand.

Changing the directory of a z/OS FTP server

If the remote server is z/OS FTP, the *directory* value can specify either a z/OS UNIX file system name, a common prefix for a group of MVS data sets, or the qualifiers of a partitioned data set (PDS).

Procedure

- 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 subcommand

```
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 subcommand

  ```
  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 172 for more details.

Example

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 a z/OS UNIX 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 command:

- jones 191
- jones.191

Testing throughput with *DEV.NULL

If you have a z/OS FTP server, you can use the PUt or MVSPut subcommand to copy many files (or one large file) without storing the files 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.

Procedure

1. Change the working directory to *DEV.NULL by using one of the following commands:
   - `CD *DEV.NULL`
   - `CWD *DEV.NULL`

   This affects the working directory for only the PUt or MVSPut subcommand.
2. Use the PUt or MVSPut subcommand 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.
3. To end the use of the *dev.null directory for the PUt commands or MVSPut subcommand, issue another change directory command.

Example

```
 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.
```

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

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 a z/OS UNIX 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: 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

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 267 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

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 263 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 268 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 251 for more information.

Format

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

Parameters

The valid protection levels are:

protection-level
Can have the following values:

clear
Unprotected commands

safe
Commands integrity-protected by cryptographic checksum

private
Commands confidentiality and integrity-protected by encryption

Result: 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.

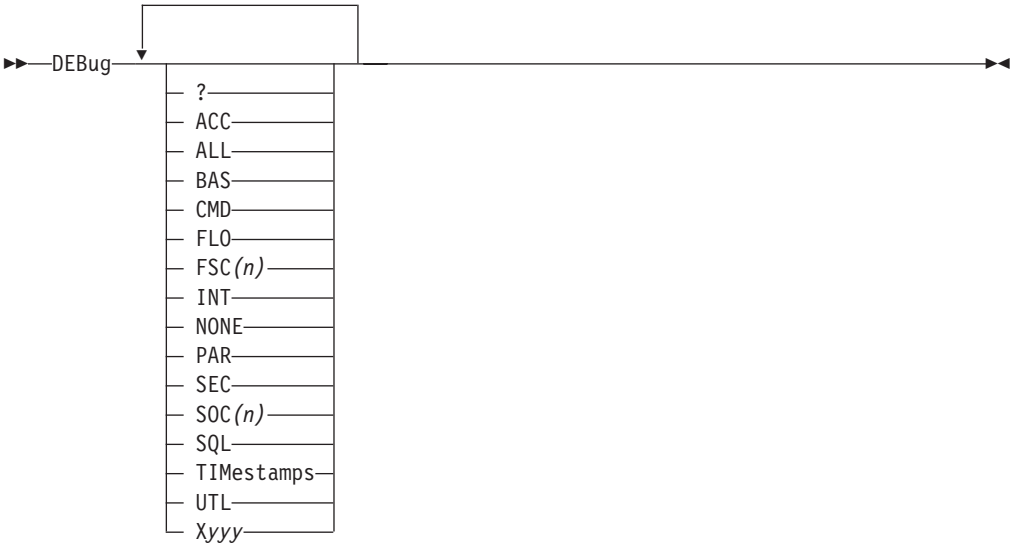
Tip: `CProtect CLEar` is equivalent to the `CCc` subcommand.

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

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.

X*yyy*
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
```

```
1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890
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 O 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: O=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
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:
```

Tip: The DEBug FSC command accepts level values 6–8, but provides only level 5 trace data. Likewise, DEBug SOC accepts level values 4–8, but provides only level 3 trace data.

See Diagnosing FTP client problems with tracing in z/OS Communications Server: IP Diagnosis Guide for more information about FTP client tracing.

DELEte subcommand—Delete files

Purpose

Use the DELEte subcommand to delete a file on the remote host.

Format

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 431 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

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.

DIr subcommand—Obtain a list of directory entries

Purpose

Use the DIr 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

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 DIr 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 a z/OS UNIX 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:

```
EZA1460I Command:
dir
EZA1701I >>> PORT 9,42,105,36,4,70
200 Port request OK.
EZA1701I >>> LIST
125 List started OK
EZA2284I Volume Referred      Ext      Used Recfm Lrecl BlkSz Dsorg Dsname
EZA2284I CPDLB4 2008/10/31      1         1  VB     256  6233  PS  FIFO.DEMO
EZA2284I CPDLB1 2008/11/11      1         2  FB      80  3120  PO  ISPF.ISPPROF
EZA2284I CPDLB3 2000/08/23      1         1  VB     255  3120  PS  LOG.MISC
EZA2284I CPDLB1 1997/01/20      2         2  FB      80  3120  PO  SPF.ISPPROF
EZA2284I CPDLB3 2008/11/11      9         9  VBS   4000  2000  PS  TEST.ABC
EZA2284I CPDLB3 2008/11/11      1         1  VBS   4000  2000  PS  TEST.ABC1
250 List completed successfully.
EZA1460I Command:
```

  Note: The DIr 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 a z/OS UNIX file system directory:

```
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
DELUSER   03DBD8 031506 IRRENV00 01 FO             RN RU             31    24
DG        03DBD8 031506 IRRENV00 01 FO             RN RU             31    24
DMOCI001  000710 03370C          00 FO                               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                               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 DIr subcommand provides a complete list of directory entries and gives additional information about the files.

  When using this subcommand to list MVS data sets that have a common high-level qualifier as the current working directory on a remote host, the volume names are displayed. However, when displaying a multivolume data set used in an SMS environment, only the first volume name is displayed. To list all volume names for a multivolume data set, issue the following TSO command on the remote host:

  ```
  LISTC  ENT('dataset_name')  ALL
  ```

- 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 * can 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` *`only`*

`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`

`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`

Entry	Returns
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 431 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 237).
- To make a file group the current working directory, see "CD subcommand—Change the directory on the remote host" on page 170.
- To change the local directory, see "LCd subcommand—Change the local working directory" on page 198.

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.

X*yyy*
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 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.

See 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

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 13 on page 52.

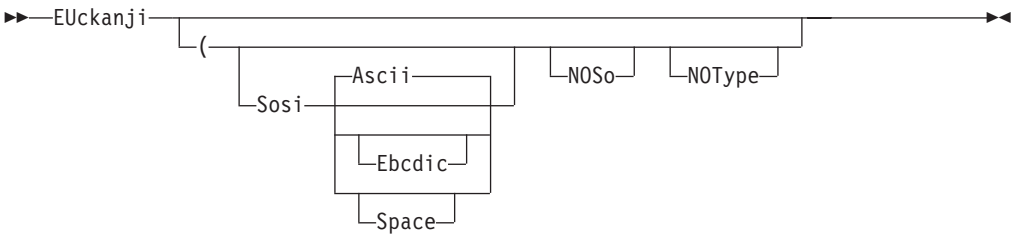
EUckanji subcommand—Change the data transfer type to EUCKANJI

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 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'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 TYpe 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 90 and “Support for MBCS languages” on page 93 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

Parameters

There are no parameters for this subcommand.

Usage

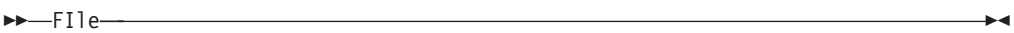
The minimum abbreviation for the feature subcommand is fe.

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 325 for more information.

Format



Parameters

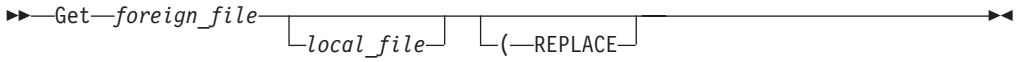
There are no parameters for this subcommand.

Get subcommand—Copy files

Purpose

Use the Get subcommand to copy a file from the remote host to your local host.

Format



Parameters

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.

If the current local working directory is a PDS, *local_file* is the name of the member in the PDS. If the current local working directory is a data set prefix, the local file is a sequential data set with the *local_file* name appended to the current local working directory. If the current local working directory is a z/OS UNIX file system directory, the local file is a z/OS UNIX file in that directory.

You can override the use of the current local working directory in the local file name by specifying the *local_file* value 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.

The following apply when the *local_file* value specifies a new file in a z/OS UNIX directory:

- The UNIXFILETYPE configuration option specifies whether the FTP client creates a regular file or a named pipe.
- The UMASK configuration option specifies the file permissions of the new file or named pipe.

Rule: When the *local_file* value specifies an existing named pipe in a z/OS UNIX directory, you must configure UNIXFILETYPE FIFO before you start the file transfer.

(REPLACE
Causes the *local_file* value on your local host to be overwritten if the value is an existing MVS data set or z/OS UNIX regular file. If the MVS data set or z/OS UNIX regular file 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 *local_file* value is an existing MVS data set and you specify the (REPLACE option, the data in the file is overwritten, but not reallocated; the local data set retains its existing characteristics.

If the *local_file* value is an existing z/OS UNIX named pipe, the (REPLACE option is not allowed.

Results:

- FTP uses either the characteristics of the local file, if it exists, or uses the values specified with the LOCSIte subcommand. Characteristics of the transmitted (foreign file) data set are unknown.

  When you use the Get subcommand, FTP might truncate data records and you might lose data, if one of the following occurs:

  – 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, then FTP truncates the received 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.

    You could also encounter truncated data records or lost data when you use the Get subcommand with the REPLACE option.

    A Get subcommand that the system issues for the following foreign files erases the contents of the existing local data set:

    - An empty foreign file
    - A foreign file that does not exist
    - A foreign file that another process holds
  - 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 is replaced regardless of the replace option.
- When the local file is a named pipe on your local host, the following apply:
  - FTP cannot open the file until you start a process to read from the named pipe. If FTP is the first process to open the named pipe, it blocks until another process opens the named pipe for reading, or until the FIFOOPENTIME timer expires.
  - The remote file is appended to the local file.
- 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.
- When a PDS or PDSE member is transmitted, the user data associated with the PDS member is also transferred to the directory on the target host if the following conditions are true;
  - Data is in block or compressed data transfer mode
  - Data has a representation type of EBCDIC
  - Transfer is from one MVS directory to another

  No PDS directory information is transferred if the member is null (empty).

Related topics:

- See Appendix A, “Specifying data sets and files,” on page 431 for more information about naming conventions.
- See “CD subcommand—Change the directory on the remote host” on page 170 and “ACCt subcommand—Supply account information” on page 164 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 268 for more information.
- See “Using z/OS UNIX System Services named pipes” on page 119 for more information about storing data into named pipes.
- See “LOCSIte subcommand—Specify site information to the local host” on page 203 and the UNIXFILETYPE (FTP client and server) statement information in z/OS Communications Server: IP Configuration Reference for more details about the UNIXFILETYPE configuration option.

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

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, see the z/OS UNIX System Services User's Guide.

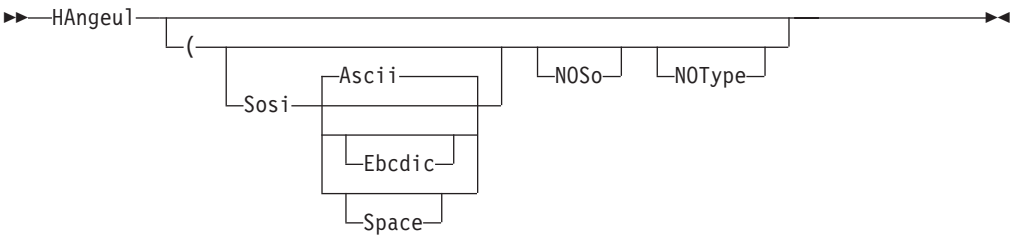
HAngeul subcommand—Change the data transfer type to HANGEUL

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 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'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 HAngeul client subcommand is equivalent to the TYPE B 5 server command.

Context

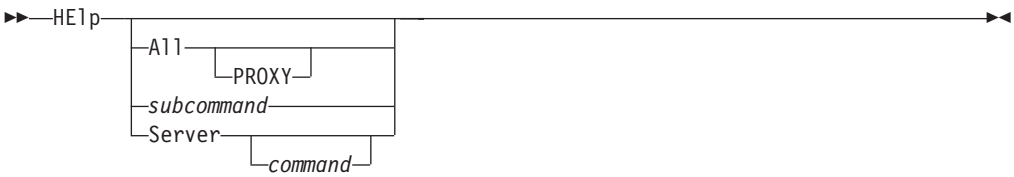
See “FTP with traditional DBCS support” on page 90 for more information.

HElp and ? subcommands—Display help information

Purpose

Use the HElp subcommand 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 command.

If you do not specify a command, 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.

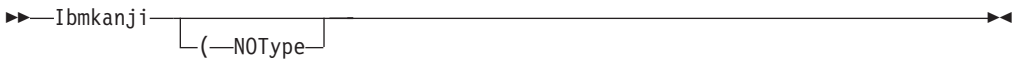
Note: To receive help from a server on a secondary control connection, enter PROXy HElp SERVER. See "PROXy subcommand—Execute FTP subcommand on secondary control connections" on page 268 for more information.

Ibmkanji subcommand—Change the data transfer type to IBMKANJI

Purpose

Use the Ibmkanji subcommand to change the data transfer type to IBM kanji.

Format



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 90 for more information.

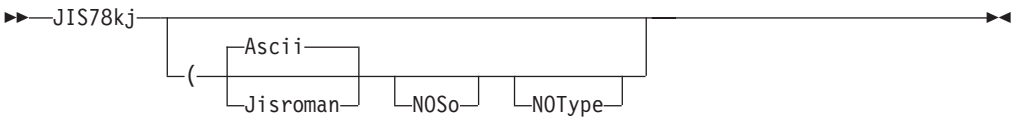
JIS78kj subcommand—Change the data transfer type to JIS78KJ

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 SIte/LOCSIte SBDataconn or SIte 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.

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 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 90 and “Support for MBCS languages” on page 93 for more information.

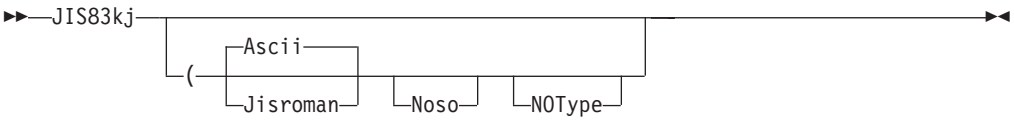
JIS83kj subcommand—Change the data transfer type to JIS83KJ

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 SIte/LOCSIte SBDataconn or SIte 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.

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 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 90 and “Support for MBCS languages” on page 93 for more information.

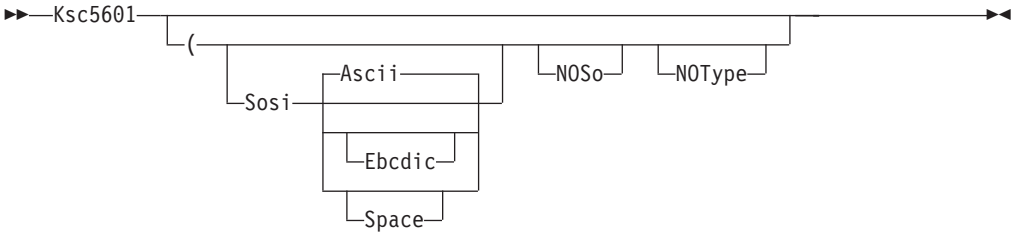
Ksc5601 subcommand—Change the data transfer type to KSC-5601

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 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'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 Ksc5601 client subcommand is equivalent to the TYPE B 6 server command. See “FTP with traditional DBCS support” on page 90 for more information.

Context

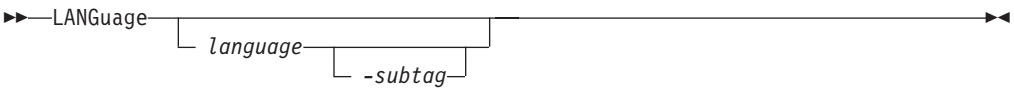
See “Support for MBCS languages” on page 93 for more information.

LANGuage subcommand—Set the language used for FTP replies from the server

Purpose

Ask the server to use a certain language 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 D, "Related protocol specifications," on page 451 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 D, "Related protocol specifications," on page 451 for information about accessing RFCs.

Results

- The LANGuage *language -subtag* 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 path names on the control connection.

Rules:

- 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.

Guideline: 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 188 for information about using the FEature subcommand.

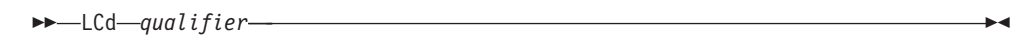
LCd subcommand—Change the local working directory

Purpose

Use the LCd subcommand to change the current working directory on the local host.

Format

- **In a TSO Environment**:



- **In a z/OS UNIX System Services Environment**:

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 '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 subcommand `LCD ..` makes `jones.` the working directory.

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.

Testing throughput with *DEV.NULL

You can use the Get or MVSGet subcommand to copy many files (or one large file) without storing the files 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.

Procedure

1. Change the working directory to *DEV.NULL by entering the following subcommand:

   ```
   LCD *DEV.NULL
   ```

   This affects the working directory for only the Get or MVSGet subcommand.
2. Use the Get or MVSGet subcommand to copy the file to the client system. The input data set must be valid, and the output file can be a new or an existing file. 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:
   ```

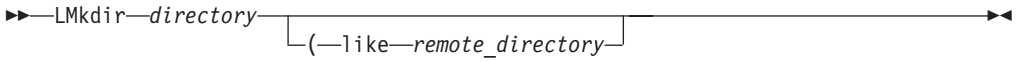
3. To end the use of the *dev.null directory for the Get or MVSGet subcommand, issue another change local working directory subcommand.

LMkdir subcommand—Create a directory on the local host

Purpose

Use the LMkdir subcommand to create a PDS, PDSE, or z/OS UNIX file system 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



Parameters

directory
Specifies the name of the PDS, PDSE, or z/OS UNIX file system 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 the same result directly with the `LMKDIR 'MVSUSER.FTP.EXAMPLE'` command.

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 ! subcommand to check the status of z/OS UNIX file system directories.
- The *directory* value is appended to the local current working directory to form the name of the created PDS, PDSE, or z/OS UNIX file system directory. To override the local current working directory, specify an absolute z/OS UNIX file system path name:

  ```
  /directory
  ```

  or a fully qualifed 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 approximate only 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.

Related Topics:

- See “Dynamic allocation of new data sets” on page 94 for information about FTP configuration options that determine data set characteristics when creating a PDS or PDSE directory.
- See “LOCSIte subcommand—Specify site information to the local host” on page 203 and “LOCSTat subcommand—Display local status information” on page 229 for information about setting and displaying FTP configuration options.
- See “SIte subcommand—Send site-specific information to a host” on page 281 for information about setting the AUTOMOUNT and AUTORECALL values.

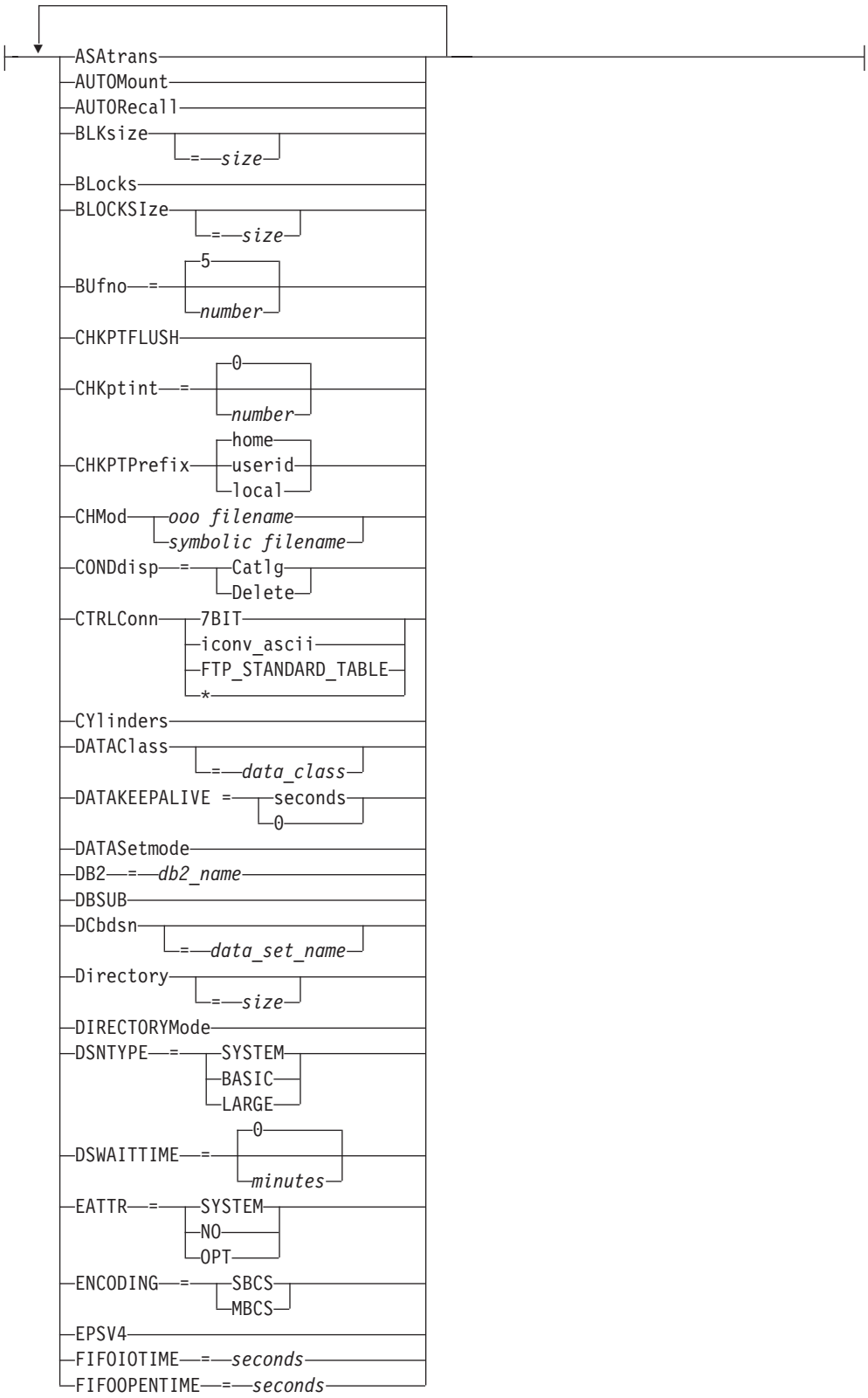
LOCSIte subcommand—Specify site information to the local host

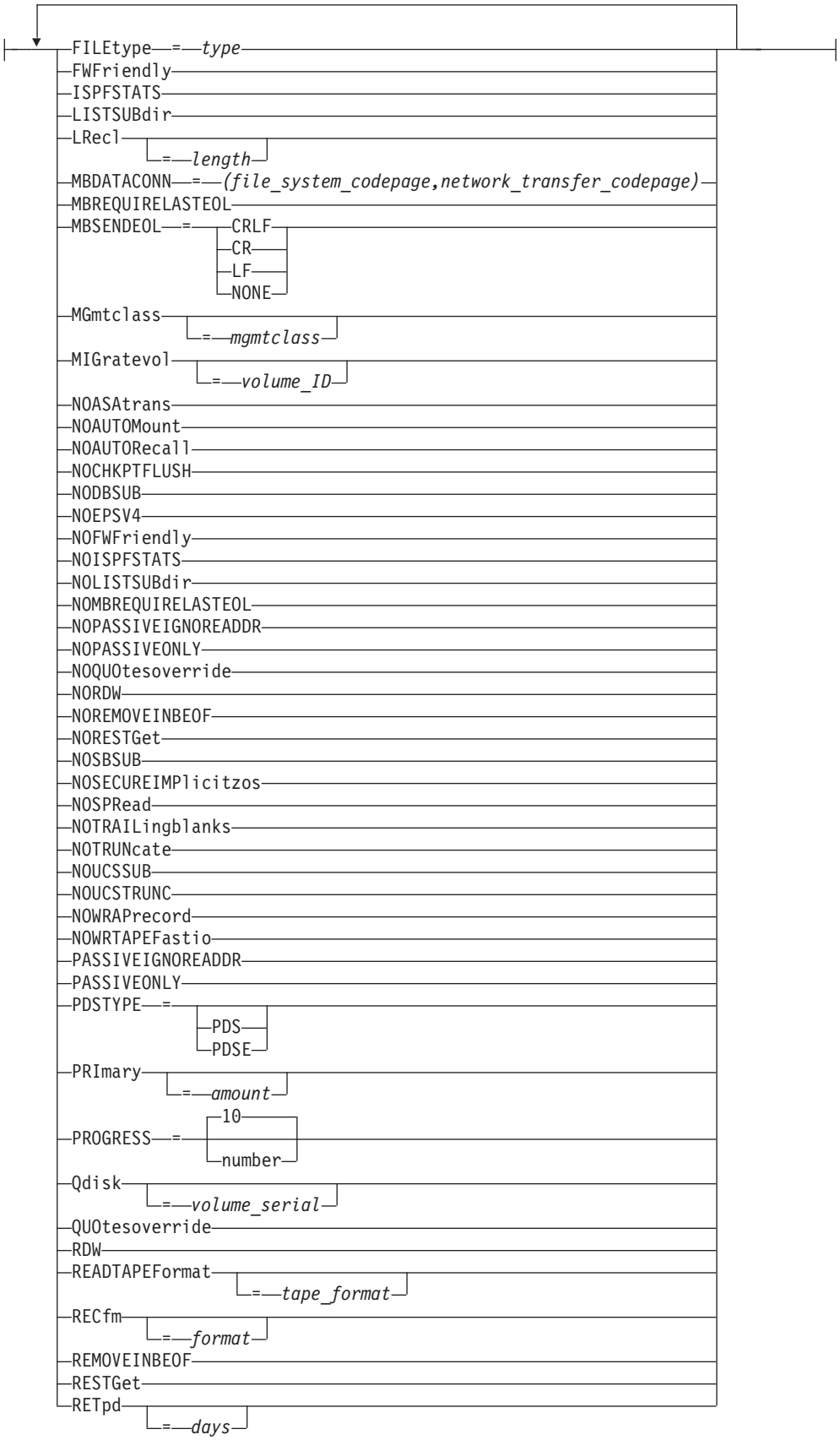
Purpose

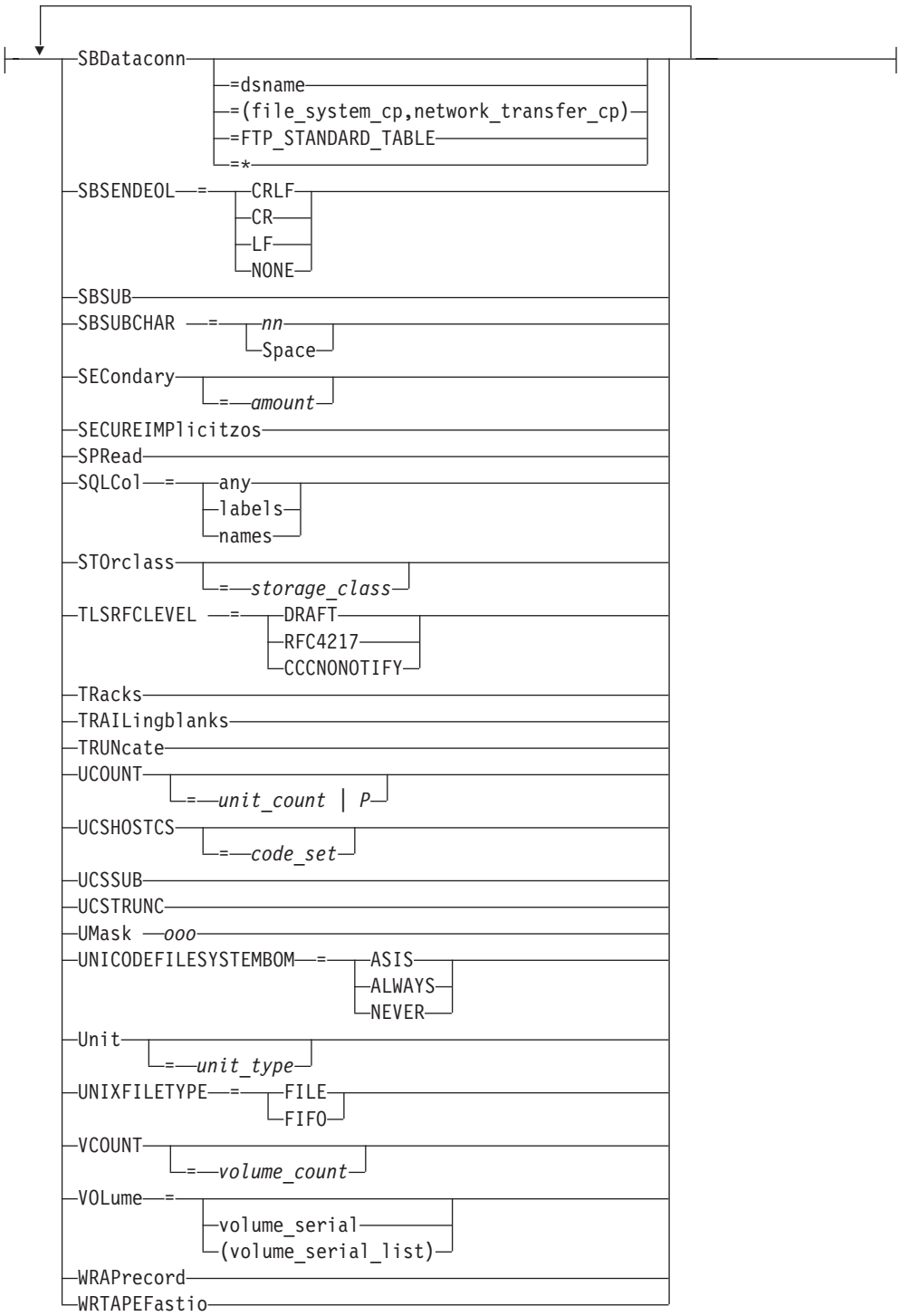
Use the LOCSIte subcommand to specify information that is used by the local host to provide services specific to that host system.

Format

options:


ASAtrans
AUTOMount
AUTORecall
BLKsize
=
size
BLocks
BLOCKSIze
=
size
BUfno
=
5
number
CHKPTFLUSH
CHKptint
=
0
number
CHKPTPrefix
home
userid
local
CHMod
ooo filename
symbolic filename
CONDdisp
=
Catlg
Delete
CTRLConn
7BIT
iconv_ascii
FTP_STANDARD_TABLE
*
CYlinders
DATAClass
=
data_class
DATAKEEPALIVE =
seconds
0
DATASetmode
DB2
=
db2_name
DBSUB
DCbdsn
=
data_set_name
Directory
=
size
DIRECTORYMode
DSNTYPE
=
SYSTEM
BASIC
LARGE
DSWAITTIME
=
0
minutes
EATTR
=
SYSTEM
NO
OPT
ENCODING
=
SBCS
MBCS
EPSV4
FIFOIOTIME
=
seconds
FIFOOPENTIME
=
seconds


FILEtype =type
FWFriendly
ISPFSTATS
LISTSUBdir
LRecl =length
MBDATACONN =(file_system_codepage,network_transfer_codepage)
MBREQUIRELASTEOL
MBSENDEOL = CRLF CR LF NONE
MGmtclass =mgmtclass
MIGratevol =volume_ID
NOASAtrans
NOAUTOMount
NOAUTORecall
NOCHKPTFLUSH
NODBSUB
NOEPSV4
NOFWFriendly
NOISPFSTATS
NOLISTSUBdir
NOMBREQUIRELASTEOL
NOPASSIVEIGNOREADDR
NOPASSIVEONLY
NOQUOtesoverride
NORDW
NOREMOVEINBEOF
NORESTGet
NOSBSUB
NOSECUREIMPlicitzos
NOSPRead
NOTRAILingblanks
NOTRUNcate
NOUCSSUB
NOUCSTRUNC
NOWRAPrecord
NOWRTAPEFastio
PASSIVEIGNOREADDR
PASSIVEONLY
PDSTYPE = PDS PDSE
PRImary =amount
PROGRESS = 10 number
Qdisk =volume_serial
QUOtesoverride
RDW
READTAPEFormat =tape_format
RECfm =format
REMOVEINBEOF
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.

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.

CHKPTFLUSH
Specifies that z/OS flushes each checkpoint record from the buffer to the storage media after this record is written into the buffer.

CHKptint
Specifies the checkpoint interval that the FTP client uses when you issue the

APPEnd, Put, and MPUt subcommands. When RESTGET is TRUE, the CHKptint parameter also specifies the checkpoint interval that the FTP client uses when you issue the Get and MGet subcommands. For details about the RESTGET value, see RESTGet or the RESTGET statement (FTP client) information in z/OS Communications Server: IP Configuration Reference.

The checkpoint interval is the number of records that are sent between restart markers when transferring files in EBCDIC block mode or EBCDIC compress mode. If the checkpoint interval is 0, no checkpointing occurs and no restart markers are transmitted. The default value is 0.

Do not set CHKptint to a value greater than 0 at the FTP client unless the server supports the RESTart command and can process checkpoint markers in the file transfer data stream.

Results: A CHKptint value greater than 0 enables checkpointing for file transfers that meet the following conditions:

- Type is EBCDIC
- Mode is Block or Compressed
- Filetype is SEQ
- The subcommand that was entered was APpend, MPut, or Put, and RESTGET is FALSE
- The subcommand that was entered was APpend, MPut, Put, Get, or MGet, and RESTGET is TRUE.

Checkpointing never occurs when the local file is a z/OS UNIX named pipe.

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 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 that 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 corresponding marker for the server.

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 use a CHKptint more often than once every 200 KB of data sent. For example, if the file you are transferring has 80-byte records, the checkpoint interval is 2560:

CHKPTINT = 200KB / 80 bytes
= 200 * 1024 bytes / 80 bytes
= 2560

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

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

See 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 a z/OS UNIX 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 89 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, see code set converters information in the z/OS XL C/C++ Programming Guide.

FTP_STANDARD_TABLE
Specifies 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.

***** Specifies 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 94 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
- 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 can override the retention period value of the dataclass.

DATAKEEPALIVE
Specifies the data connection keepalive timer value for the FTP client.

seconds
The number of seconds that elapse before a keepalive packet is sent on the FTP data connection. Valid values are in the range 60-86400 or 0. If you specify the value 0, the DATAKEEPALIVE timer is disabled. For passive mode data connections, the keepalive timer that you configured in

PROFILE.TCPIP controls how often keepalive packets flow on the data connection. For active mode data connections, FTP suppresses the PROFILE.TCPIP keepalive timer.

Result: Specifying a DATAKEEPALIVE value prevents a network device from closing the data connection during periods of inactivity on the data connection.

DATASetmode
Specifies that all the data set qualifiers located 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.

DBSUB
Specifies that substitution is allowed for data bytes that cannot be translated in a double-byte character translation. The substitution character is selected by the C/C++ iconv() function; see information about Locales and Character Sets in z/OS XL C/C++ Programming Guide for more details.

DCbdsn
Specifies the name of the MVS data set that is 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. z/OS UNIX 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 can 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 96 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 1–16777215. The *size* 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 a z/OS UNIX file system.

DSNTYPE
Specifies the data set name type for new physical sequential data sets.

SYSTEM
Physical sequential data sets are allocated with the SMS data class value. If no data class is defined, or if the DSNTYPE attribute is not defined, new physical sequential data sets will be allocated with the system default value.

BASIC
Allocates physical sequential data sets as physical sequential basic format data sets.

LARGE
Allocates physical sequential data sets as physical sequential large format data sets.

DSWAITTIME
Specifies the number of minutes that FTP waits when trying to access a local MVS data set.

minutes
The number of minutes to wait for a local MVS data set to become available. Valid values are in the range 0-14400. The value 0 (the default) specifies that FTP does not wait to obtain a data set when the data set is being held by another job.

EATTR
Specifies whether newly allocated data sets can have extended attributes and whether new data sets can reside in the EAS of an EAV.

SYSTEM
The data set uses the SMS data class EATTR value. If no SMS data class is defined, or if the data class contains no EATTR specification, the data set is allocated with the system default.

NO The data set cannot reside in the EAS, and its VTOC entry cannot contain extended attributes.

OPT
The data set can reside in the EAS, and its VTOC entry can have extended attributes if the volume supports them.

ENCODING
Specifies the kind of encoding that is used for conversions between codepages for data transfers. See “Support for SBCS languages” on page 89and “Support for MBCS languages” on page 93 for more information.

SBCS
Single Byte encoding. Code pages are specified using the SBDATACONN configuration option. This is the default value.

MBCS
Multibyte encoding. Code pages are specified using the MBDATACONN configuration option.

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.

FIFOIOTIME
Specifies the maximum length of time that the FTP client waits for an I/O operation to a named pipe in its z/OS UNIX file system to complete.

Rules:

- When you send a file that is a named pipe to the server, the FTP client reads from the named pipe one or more times. Each read from the named pipe must complete within the length of time that is specified by the FIFOIOTIME value.
- When you store a file that was received from the server as a UNIX named pipe, the FTP client writes to the named pipe one or more times. Each write to the named pipe must complete within the length of time that is specified by the FIFOIOTIME value.

seconds
The number of seconds that FTP waits for an I/O operation to a UNIX named pipe to complete. Valid values are in the range 1-86400. The default value is 20.

FIFOOPENTIME
Specifies the length of time that the FTP client waits for an open of a named pipe in its z/OS UNIX file system to complete.

seconds
The number of seconds that FTP waits for an open of a named pipe to complete. Valid values are in the range 1-86400. The default value is 60.

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.

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.

LISTSUBdir
Use the LISTSUBdir option to indicate that wildcard searches should apply to the current working directory and should also span one level of its subdirectories. For the FTP client, this setting applies when issuing an MPut * subcommand.

Restriction: The LISTSUBdir option applies to z/OS UNIX file operations only; MVS data set operations are not affected.

Result: If the LISTSUBdir option is not specified on the LOCSITE subcommand and the LISTSUBDIR statement is not specified in the client FTP.DATA file, the default is as if the LISTSUBdir option was specified on the LOCSITE subcommand.

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 - 32760. A special value of x (LRecl=x) is also supported to indicate that a logical record length can be 32768 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 93 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.

MBREQUIRELASTEOL
Specifies that the FTP client will report an error when a multibyte file or data set is received from the server with no EOL sequence in the last record received. FTP will abort the file transfer.

MBSENDEOL
Specifies which end-of-line sequence to use when ENCODING is MBCS, the data transfer type is ASCII, MODE is Stream, and data is being sent to the server. The following are possible values:

CRLF
Append both carriage return (X'0D') and line feed (X'0A') end-of-line sequences to each line of translated text. This is the default and the standard sequence defined by RFC 959. The z/OS server can receive ASCII data in this format only.

CR Append only a carriage return (X'0D') end-of-line sequence to each line of translated text.

LF Append only a line feed (X'0A') end-of-line sequence to each line of translated text.

NONE
Do not append an end-of-line sequence to the line of translated text.

Rules:

- Most servers support only the CRLF value for incoming ASCII data. Do not specify another value for MBSENDEOL unless you have verified that the server is expecting the end-of-line sequence that you specify.
- Do not use an end-of-line sequence other than CRLF if the server is a z/OS FTP server. The z/OS FTP server supports only the CRLF value for incoming ASCII data.
- If you send a file to a server when MBSENDEOL has a value other than CRLF, a subsequent SIZE command to that server targeting the file you sent could yield unpredictable results. Any size indicated in the server reply for such a file might not be reliable.

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 can 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 94 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.

NOCHKPTFLUSH
Specifies that z/OS can save the checkpoint records in the buffer and determine when to flush these records to the storage media.

NODBSUB
Specifies that substitution is not allowed for data bytes that cannot be translated in a double-byte character translation. This causes a data transfer failure if a character cannot be translated during the transfer. This is the default.

NOEPSV4
Prevents the client from using the EPSV command to establish a data connection on an IPv4 session. See RFC 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.

NOLISTSUBdir
Use the NOLISTSUBdir option to indicate that wildcard searches should apply only to the current working directory and should not span its subdirectories. For the FTP client, this setting applies when issuing an MPut * subcommand.

Restriction: The NOLISTSUBdir option applies to z/OS UNIX file operations only; MVS data set operations are not affected.

Result: If the NOLISTSUBdir option is not specified on the LOCSITE subcommand and the LISTSUBDIR statement is not specified in the client FTP.DATA file, the default is as if the LISTSUBdir option was specified on the LOCSITE subcommand.

NOMBREQUIRELASTEOL
Specifies that the FTP client does not report an error when a multibyte file or

data set is received from the network with no EOL sequence in the last record received. FTP will report the file transfer as completed.

NOPASSIVEIGNOREADDR
For passive mode FTP, specifies that the FTP client uses the IP address and port number from the PASV command reply that is returned by the FTP server for the data connection.

NOPASSIVEONLY
Specifies that the data connections for the client are not passive mode only. When passive mode attempt fails, the client tries active mode. This is the default.

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.

NOREMOVEINBEOF
Specifies that the UNIX end-of-file (EOF) byte (X'1A') is not removed on inbound ASCII transfers before the data is stored. See z/OS Communications Server: IP Configuration Reference for more information.

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.

NOSECUREIMPlicitzos
When the client connects to the server's TLSPORT, the security handshake and negotiation are done immediately after the connect and before the 220 reply is received.

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 UCS-2-to-EBCDIC conversion, the data transfer is terminated if any UCS-2 character cannot be converted into the EBCDIC code set.

NOUCSTRUNC
In UCS-2-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
Specifies that ASCII stream data that is being written to tape must be written using the Language Environment® run time library.

PASSIVEIGNOREADDR
For passive mode FTP, specifies that the FTP client uses the port number from the PASV command reply and the IP address that was used to log in to the FTP server, for the data connection.

Requirement: See the PASSIVEIGNOREADDR (FTP client) information in z/OS Communications Server: IP Configuration Reference for more details about the requirements.

PASSIVEONLY
Specifies that the data connections for the client are passive mode only.

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).

number
Specifies the interval (in seconds) between progress report messages that are generated in the FTP client during an inbound or outbound file transfer. Valid values are in the range 10-86400, or 0. The value 0 turns off progress reporting 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 version V1R6.

Beginning in version 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 the FTP.DATA file.

PRImary
Used to specify the number 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 a PRImary allocation of 0 when you are also specifying DATAClass=*data_class* and when 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 allocations 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 number of tracks, blocks, or cylinders for primary allocation. For allocating partitioned data sets, this is the amount of space that is allocated for the primary extent.

For allocating sequential data sets this is the maximum amount of space that is allocated for the primary extent. If a lesser amount of space is needed to hold the data being transferred, only the amount of space actually needed to hold the data is allocated. The valid range is 1–16777215.

Qdisk
Used to display statistics about the amount of space available 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 that a 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 this is the default. Any single quotation mark inside the beginning and ending quotation marks are treated as part of the file name.

QUOtesoverride indicates the usage of single quotation marks 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 are 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 format. Transfer files in binary mode to avoid the translation problems that can occur if you transfer this binary field in EBCDIC or ASCII mode.

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 does not take advantage of the record format information prior to open. The equal sign (=) is optional in this case.

The READTAPEFormat parameter 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 (displayed as U in messages and reply)

These formats are mutually exclusive. Spanned implies variable, and Lrecl X implies spanned. If specified, the *tape_format* value must be the most inclusive identifier in the list that matches the tape. If it is not the most inclusive identifier, an error message is issued. For example, if the *tape_format* value is **S** (spanned) and the tape contains records with undefined length (Lrecl X), the request will fail. An unspecified format avoids this type of error. However, the following should be considered:

- Specify a value for the READTAPEFormat parameter 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 the READTAPEFormat parameter for all input tapes that have 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 the RECfm parameter 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

REMOVEINBEOF
Specifies that the UNIX end-of-file (EOF) byte (X'1A') is removed on inbound ASCII transfers before the data is stored. See z/OS Communications Server: IP Configuration Reference for more information.

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 can 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.

SBDataconn
Specifies the conversions between file system and network code pages to be used for data transfers.

```
LOCSITE SBDataconn=dsname
LOCSITE SBDataconn=(file_system_cp,network_transfer_cp)
LOCSITE SBDataconn=FTP_STANDARD_TABLE
LOCSITE SBDataconn=*
LOCSITE SBDataconn=
LOCSITE SBDataconn
```

See “Support for SBCS languages” on page 89 for more information.

The following forms of specifying SBDataconn are equivalent to specifying SBDataconn=*:

- SBDataconn
- SBDataconn=

dsname
Specifies the fully qualified name of an MVS data set or z/OS UNIX 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 z/OS UNIX file system name is case sensitive. The MVS name is not case sensitive.
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, see code set converters information in the z/OS XL 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, see code set converters information in the z/OS XL C/C++ Programming Guide.

FTP_STANDARD_TABLE
Specifies 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.

***** Specifies the translate tables set up at initialization for the data connection must be used.

SBSENDEOL
Specifies which end-of-line sequence to use when ENCODING is SBCS, the data transfer type is ASCII, and data is being sent to the server. The following are possible values:

CRLF
Append both carriage return (X'0D') and line feed (X'0A') end-of-line sequences to each line of translated text. This is the default and the standard sequence defined by RFC 959. The z/OS server can receive ASCII data in this format only.

CR Append only a carriage return (X'0D') end-of-line sequence to each line of translated text.

LF Append only a line feed (X'0A') end-of-line sequence to each line of translated text.

NONE
Do not append an end-of-line sequence to the line of translated text.

Tip: The **srestart** subcommand is disabled if you configure an SBSENDEOL value other than CRLF.

Rules:

- Most servers support only the CRLF value for incoming ASCII data. Do not specify another value for SBSENDEOL unless you have verified that the server is expecting the end-of-line sequence that you specify.
- Do not use an end-of-line sequence other than CRLF if the server is a z/OS FTP server. The z/OS FTP server supports only the CRLF value for incoming data.
- If you send a file to a server while SBSENDEOL has a value other than CRLF, a subsequent SIZE command to that server targeting the file you sent could yield unpredictable results. Any size indicated in the server reply for such a file might not be reliable.

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 code set is ASCII, replace untranslatable characters with X'20' during SBCS data transfers. When the target code set 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 in the range 00-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 number of tracks, blocks, or cylinders for secondary allocation. The valid range is 0–16777215. If you specify the *amount* value 0, FTP allocates without specifying secondary space.

SECUREIMPlicitzos
When the client connects using the TLSPORT implicit connection, the client waits for the 220 *good morning* reply before initiating the security handshake and negotiation. This is the default.

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 94 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 wanted value with the appropriate keyword.

TLSRFCLEVEL
Specifies the level of RFC 4217 that the client supports for TLS-protected sessions. See "Using security mechanisms" on page 45 for more information.

DRAFT
The Internet draft revision level of RFC 4217 is supported. This is the level of RFC 4217 support the z/OS FTP client has offered since CSV1R2. This is the default value.

RFC4217
The FTP client complies with RFC 4217.

CCCNONOTIFY
The FTP client does not issue the TLSshutdown command after sending the CCC command. RFC 4217 did not mandate this flow until Internet revision 14.

Result: The SECUREIMPLICITZOS configuration option is not affected by this setting.

Note: FTP supports the TLSPORT statement regardless of the TLSRFCLEVEL setting. FTP connections to the TLSPORT port are implicitly secured with TLS as described in the Internet draft.

Restrictions:

- You cannot set the TLSRFCLEVEL setting to DRAFT during a TLS-secured session when the control connection is not secured.
- When you set the TLSRFCLEVEL option to RFC4217 or CCCNONOTIFY, the FTP server must use the same setting. If the server setting does not match, the connection might be reset or the session might hang and eventually time out.

- The CCCNONOTIFY option is not valid with the TLSMECHANISM ATTLS option. If both options are specified, using the CCC command causes the FTP session to fail. If CCCNONOTIFY is required for the partner system, configure TLSMECHANISM FTP with associated statements and exemption in the TTLSRules.

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.

P Parallel mount request.

Guideline: The UCOUNT statement is not meant to be used with an SMS storage class. Any UCOUNT value you specify overrides whatever is specified for the SMS managed dataclass being used.

UCSHOSTCS
Specifies the EBCDIC code set to be used when converting to and from UCS-2. If you do not specify a *code_set* value, the current code set is used.

code_set
Name of the EBCDIC code set to be used when converting to and from UCS-2.

UCSSUB
In UCS-2-to-EBCDIC conversion, the EBCDIC substitution character is used to replace any UCS-2 character that cannot successfully be converted. Data transfer continues.

UCSTRUNC
In UCS-2-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 z/OS UNIX files with execute permissions. If you require execute permissions, use the LOCSIte CHMod command to change permissions after the file has been created.

UNICODEFILESYSTEMBOM

Specifies whether the FTP client stores incoming Unicode files with a byte order mark (BOM).

Restriction: The only Unicode encoding formats supported for file storage by z/OS FTP are UTF-8 and UTF-16. Files are always stored in big endian format.

Result: The byte order mark (BOM) stored with the file is determined by the encoding used to store the file rather than by the format of the BOM sent with the file.

ASIS

Store incoming Unicode files with a byte order mark only if the file was sent with a byte order mark

ALWAYS

Store incoming Unicode files with a byte order mark regardless of whether the file was sent with a byte order mark.

NEVER

Store incoming Unicode files without a byte order mark regardless of whether the file was sent with a byte order mark.

Results:

- The Unicode byte order mark, U+FEFF, can also be interpreted as a zero-width nonbreaking space character. z/OS FTP considers only the first character of the data received from the server as a possible byte order mark (BOM). No other instance of the BOM sequence in the inbound data is affected by this setting.
- When the local file is a z/OS UNIX named pipe, incoming data is always appended to any existing data that is in the named pipe. If you code UNICODEFILESYSTEMBOM = ASIS or ALWAYS and the named pipe contains data, the client appends a BOM byte sequence to existing data in cases in which it would add a BOM at the beginning of a regular file. The BOM byte sequence is interpreted as a zero-width nonbreaking space character when it does not start the file or data stream. You must take this into consideration when you configure the UNICODEFILESYSTEMBOM parameter.

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.

UNIXFILETYPE
Specifies whether to treat files in the z/OS UNIX file system as regular files or as UNIX named pipes.

FILE
Treat files in the z/OS UNIX file system as regular files. This is the default.

FIFO
Treat files in the z/OS UNIX file system as UNIX named pipes.

For information about transferring data into and from z/OS UNIX named pipes, see "Using z/OS UNIX System Services named pipes" on page 119.

VCOUNT
Specifies the number of tape data set volumes that an allocated data set can span. When this parameter is specified without a *volume_count* value, the FTP server uses the volume count 50 when it allocates tape data sets.

volume_count
Valid values are in the range 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
Specifies 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
Specifies that ASCII Stream data that is being written to tape is allowed to be written using BSAM I/O.

Tips:

- You can specify more than one parameter with the LOCSIte subcommand. Delimit each parameter with a blank space.
- Issue the HElp LOCSIte subcommand to display a list of configuration options available on the local host.

Results:

- 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.

Related topics:

- See "HElp and ? subcommands—Display help information" on page 193 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."

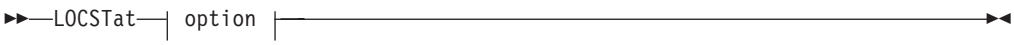
LOCSTat subcommand—Display local status information

Purpose

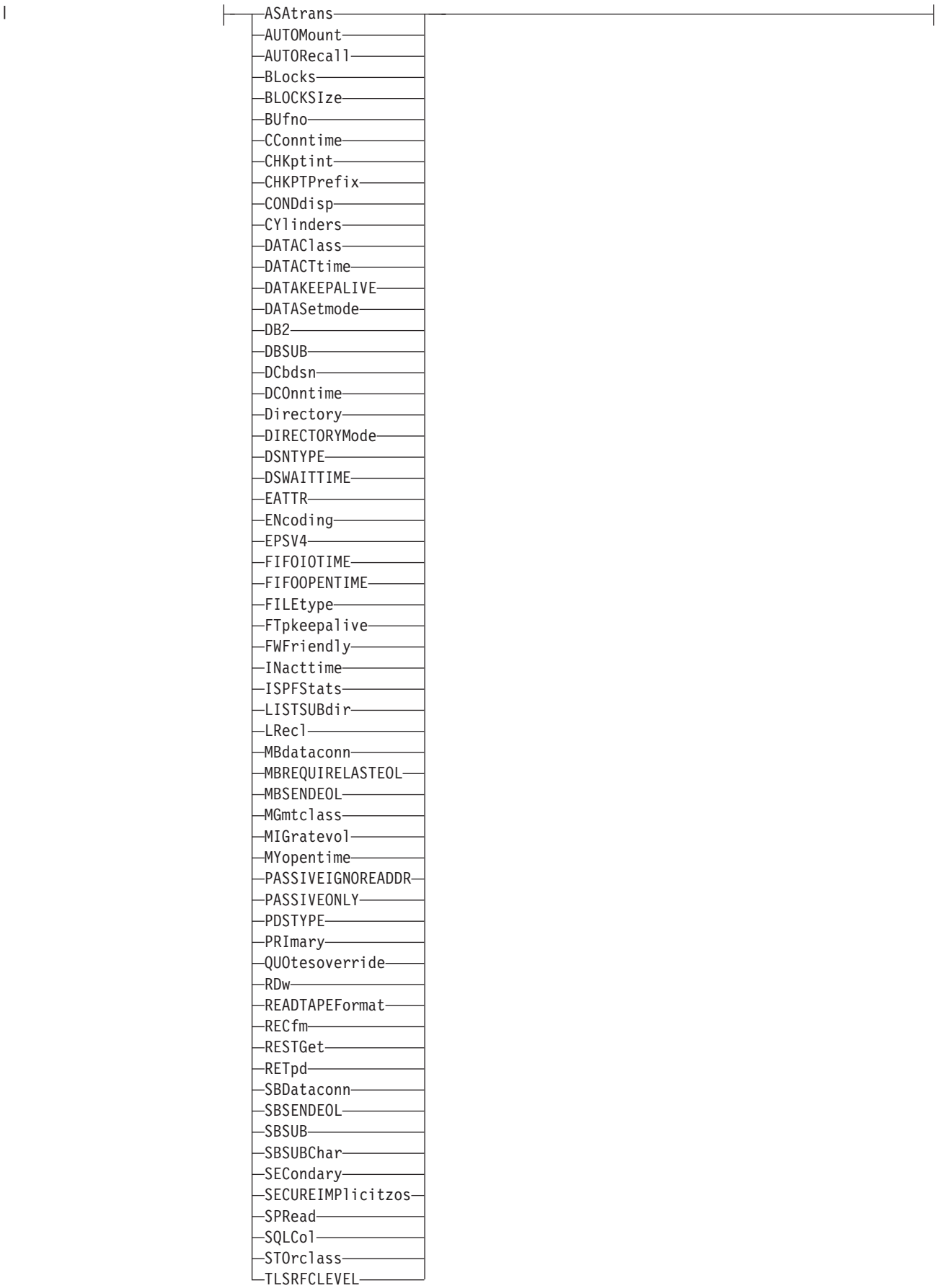
Use the LOCSTat subcommand to display local status information.

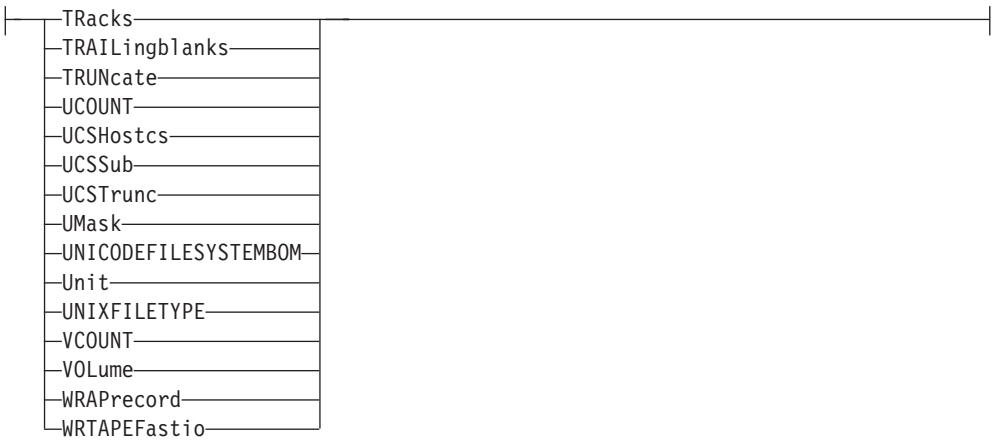
Tip: Issuing the LOCSTat subcommand with no parameters causes all local status to be displayed. To display local status for a single configuration option, issue the LOCSTat subcommand with at least one parameter.

Format



options:


ASAtrans
AUTOMount
AUTORecall
BLocks
BLOCKSIze
BUfno
CConntime
CHKptint
CHKPTPrefix
CONDdisp
CYlinders
DATAClass
DATACTtime
DATAKEEPALIVE
DATASetmode
DB2
DBSUB
DCbdsn
DCOnntime
Directory
DIRECTORYMode
DSNTYPE
DSWAITTIME
EATTR
ENcoding
EPSV4
FIFOIOTIME
FIFOOPENTIME
FILEtype
FTpkeepalive
FWFriendly
INacttime
ISPFStats
LISTSUBdir
LRecl
MBdataconn
MBREQUIRELASTEOL
MBSENDEOL
MGmtclass
MIGratevol
MYopentime
PASSIVEIGNOREADDR
PASSIVEONLY
PDSTYPE
PRImary
QUOtesoverride
RDw
READTAPEFormat
RECfm
RESTGet
RETpd
SBDataconn
SBSENDEOL
SBSUB
SBSUBChar
SECondary
SECUREIMPlicitzos
SPRead
SQLCol
STOrclass
TLSRFCLEVEL



Parameters

ASAtrans
Indicates that the FTP client interprets characters in the first column of ASA files that are being transferred as print control characters.

AUTOMount
Indicates automatic mounting of volumes for data sets that are on unmounted volumes.

AUTORecall
Indicates automatic recall of migrated data sets.

BLocks
Indicates that primary and secondary space allocations are in blocks.

BLOCKSIze
Indicates the block size of a newly allocated data set.

BUfno
Indicates the number of access method buffers that is used when data is read from or written to a data set.

CConntime
Indicates the length of time that the FTP client waits after attempting to close a control connection before terminating it and reporting an error.

CHKptint
Indicates the checkpoint interval for the sending site in a file transfer request.

CHKPTPrefix
Indicates a key that is used to determine the high-level qualifier of the checkpoint data set.

CONDdisp
Indicates the disposition of the data set if a retrieve operation for a new data set ends before all of the data is written.

CYlinders
Indicates that primary and secondary space allocations are in cylinders.

DATAClass
Indicates the SMS data class.

DATAKEEPALIVE
Indicates the number of seconds that TCP/IP waits before sending a keepalive packet while the data connection is inactive.

The value 0 indicates that the DATAKEEPALIVE timer is disabled. For passive mode data connections, the keepalive timer that you configured in PROFILE.TCPIP controls how often keepalive packets flow on the data connection. For active mode data connections, FTP suppresses the PROFILE.TCPIP keepalive timer.

DATACTtime
Indicates the length of time that the FTP client waits after attempting to send or receive data before terminating the connection and reporting an error to the user.

DATASetmode
Indicates whether DATASetmode or DIRECTORYMode is in effect.

DB2
Indicates the name of the DB2 subsystem.

DBSUB
Indicates that substitution is allowed for data bytes that cannot be translated in a double-byte character translation.

DCbdsn
Indicates the name of the MVS data set to be used as a model for allocating new data sets.

DCOnntime
Indicates the amount of time that FTP waits attempting to close a data transfer before terminating the connection and reporting an error.

Directory
Indicates the number of directory blocks to be allocated for the directory of a partitioned data set (PDS).

DIRECTORYMode
Indicates whether DATASetmode or DIRECTORYMode is in effect.

DSNTYPE
Indicates the data set name type for new physical sequential data sets.

SYSTEM
Physical sequential data sets are allocated with the SMS data class value. If no data class is defined, or if the DSNTYPE attribute is not defined, new physical sequential data sets will be allocated with the system default value.

BASIC
Allocates physical sequential data sets as physical sequential basic format data sets.

LARGE
Allocates physical sequential data sets as physical sequential large format data sets.

DSWAITTIME
Indicates the number of minutes the FTP client waits for an MVS data set to become available when a local data set is held by another job or process. The value 0 indicates that the FTP client does not wait to obtain a data set when the data set is held by another job or process.

EATTR
Indicates whether newly allocated data sets can have extended attributes and whether new data sets can reside in the EAS of an EAV. The value of EATTR is one of the following values:

SYSTEM
The data set uses the SMS data class EATTR value. If no SMS data class is defined, or if the data class contains no EATTR specification, the data set is allocated with the system default.

NO The data set cannot reside in the EAS, and its VTOC entry cannot contain extended attributes.

OPT
The data set can reside in the EAS, and its VTOC entry can have extended attributes if the volume supports them.

ENCODING
Indicates the kind of encoding that is used for conversions between code pages for data transfers.

EPSV4
Indicates that the client will attempt to use the EPSV command to establish a data connection on an IPv4 session instead of referring to the FWFRIENDLY setting.

FIFOIOTIME
Indicates the length of time that the FTP client waits for a read from a z/OS UNIX named pipe or for a write to a z/OS UNIX named pipe to complete.

FIFOOPENTIME
Indicates the length of time that the FTP client waits for an open of a z/OS UNIX named pipe to complete.

FILEtype
Indicates the file type of the data set.

FTpkeepalive
Indicates the control connection keepalive timer value in seconds.

FWFriendly
Indicates that the FTP client is firewall-friendly.

INacttime
Indicates the length of time that the FTP client waits for an expected response from the server, on either the control or the data connection, before closing the session.

ISPFSTATS
Indicates whether FTP will create or update ISPF Member statistics when Get or MGet subcommands are issued.

LISTSUBdir
Indicates that wildcard searches should apply to the current working directory and should also span its subdirectories.

LRecl
Indicates the logical record length (LRecl) of a newly allocated data set.

MBDATACONN
Indicates the code pages for the file system and for the network transfer that are used when the client does data conversion during a data transfer.

MBREQUIRELASTEOL
Indicates whether the last record of an incoming multibyte transfer is required to have an EOL sequence.

TRUE
A missing EOL on the last record received is treated as an error.

FALSE
A missing EOL on the last record received is ignored.

MBSENDEOL
Indicates which end-of-line sequence to use when the ENCODING value is SBCS, the data is ASCII, and data is being sent to the server.

MGmtclass
Indicates the SMS management class.

MIGratevol
Indicates the volume ID for migrated data sets if they do not use IBM storage management systems.

MYopentime
Indicates the length of time that the FTP client waits for a session to open before terminating the attempt and reporting an error.

PASSIVEIGNOREADDR
Indicates whether the FTP client should ignore the IP address in the FTP server PASV reply for the data connection and use the IP address that was used to log in to the FTP server.

| **PASSIVEONLY**
| Indicates whether the data connections for the client are passive mode only.

PDSTYPE
Indicates whether the FTP client creates local MVS directories as partitioned data sets or as partitioned data sets extended.

PRImary
Indicates the number of tracks, blocks, or cylinders for the primary allocation.

QUOtesoverride
Indicates that a 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.

RDW
Indicates that variable record descriptor words (RDWs) are treated as if they are part of the record and are not discarded during FTP transmission of variable format data sets.

READTAPEFormat
Indicates information about an input data set on tape.

RECfm
Indicates the data set record format.

RESTGet
Indicates that opening the checkpoint data set for the Get request is allowed.

RETpd
Indicates the number of days that a newly allocated data set should be retained.

SBDataconn
Indicates the conversions between file system and network code pages to be used for data transfers.

SBSENDEOL
Indicates which end-of-line sequence to use when ENCODING is SBCS, the data is ASCII, and data is being sent to the client.

SBSUB
Indicates that substitution is allowed for data bytes that cannot be translated in a single byte character translation.

SBSUBCHAR
Indicates the value that is used for substitution when SBSUB is also specified.

SECondary
Indicates the number of tracks, blocks, or cylinders for a secondary allocation.

SECUREIMPlicitzos
Indicates that when the client connects using the TLSPORT implicit connection, the client waits for the `220 good morning` reply before initiating the security handshake and negotiation.

SPRead
Indicates that the output is in spreadsheet format when the file type is SQL.

SQLCol
Indicates the SQL output file column headings.

STOrclass
Indicates the SMS storage class.

TLSRFCLEVEL
Indicates the level of RFC 4217, *On Securing FTP with TLS*, that is supported by the client.

TRacks
Indicates that primary and secondary space allocations are in tracks.

TRAILingblanks
Indicates that the FTP client preserves the trailing blanks in a fixed-format data set when the data is sent to a foreign host.

TRUNcate
Indicates that truncation is permitted.

UCOUNT
Indicates how many devices to allocate concurrently to support the allocation request.

UCSHOSTCS
Indicates the EBCDIC code set to be used when converting to and from Unicode.

UCSSUB
Indicates that in Unicode-to-EBCDIC conversion, the EBCDIC substitution character is used to replace any Unicode character that cannot be successfully converted.

UCSTRUNC
Indicates that in Unicode-to-EBCDIC conversion, EBCDIC data truncation is allowed.

UMask
Indicates the file mode creation mask.

UNICODEFILESYSTEMBOM
Indicates whether the FTP client stores incoming Unicode files with a byte order mark.

UNIXFILETYPE
Indicates whether the FTP client treats files in its z/OS UNIX file system as regular files or as z/OS UNIX named pipes.

Unit
Indicates the unit type for allocation of new data sets.

VCOUNT
Indicates the number of tape data set volumes that an allocated data set can span.

VOLume
Indicates the volume serial number for allocation of new data sets.

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 can be written using BSAM I/O.

Examples

The following is an example of the output from the LOCSTat subcommand, issued with a single parameter:

```
Command: locstat dconntime
DCONNTIME is 120
Command:
```

The following example shows part of the output from a LOCSTat subcommand.

```
Command: locstat
Trace: FALSE, Send Port: TRUE
Send Site with Put command: TRUE
Connected to:9.42.104.38, Port: FTP control (21), logged in
local site variable DSWAITTIME is set to 0
VCOUNT is 59
Prompting: ON, Globbing: ON
ASA control characters transferred as ASA control characters
New data sets catalogued if a store operation terminates abnormally
Single quotes will override the current working directory
UMASK value is 027
Data connections for the client are not firewall friendly.
local site variable EPSV4 is set to TRUE
local site variable SECUREIMPLICITZOS is set to TRUE
local site variable PASSIVEIGNOREADDR is set to FALSE
local site variable TLSRFCLEVEL is set to RFC4217
local site variable READVB is set to LE
local site variable EXTDBSCHINESE is set to TRUE
local site variable LISTSUBdir is set to TRUE
local site variable PROGRESS is set to 10
local site variable SEQNUMSUPPORT is set to FALSE
local site variable UNIXFILETYPE is set to FILE
local site variable FIFOIOTIME is set to 20
local site variable FIFOOPENTIME is set to 60
local site variable EATTR is set to SYSTEM
local site variable DSNTYPE is set to BASIC
Authentication mechanism: None  Local Port: 1118
Tape write is not allowed to use BSAM I/O
Using /etc/ftp.data for local site configuration parameters.
Command:
```

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

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

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 a z/OS UNIX file system directory, the results are stored in a file named LSOUTPUT.

Restriction: The LISTSUBdir option applies to z/OS UNIX file operations only; MVS data set operations are not affected.

Results:

- If the LISTSUBdir option is not specified on the SITE subcommand and the LISTSUBDIR statement is not specified in the server FTP.DATA file, the default is as if the LISTSUBdir option was specified on the SITE subcommand.
- If the z/OS FTP server has the NOLISTSUBdir option specified on the SITE subcommand or has LISTSUBDIR FALSE specified in the server FTP.DATA file, an ls * command will list only the files in the current directory.

Examples

Example 1: The following is a sample response that displays after using 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 the response that displays after using the LS subcommand listing z/OS UNIX 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:
```

Example 2: ls * with SITE LISTSUBdir

Following is an example of ls * with SITE LISTSUBdir. This setting affects processing of the NLST command. The z/OS FTP client sends an NLST command to the server as part of ls * subcommand processing. The LISTSUBdir option specifies that not only the current subdirectory, but also the next subdirectory should be listed as a result of processing an ls * subcommand. In this example, the current directory has a file x and a subdirectory y and subdirectory y has a file x.

```
site listsubdir
>>> SITE listsubdir
200 SITE command was accepted
ls *
>>> PORT 127,0,0,1,4,17
200 Port request OK.
>>> NLST *
125 List started OK
x
y/x
250 List completed successfully.
Command:
```

Example 3: ls * with SITE NOLISTSUBdir

Following is an example of ls * with SITE NOLISTSUBdir. This setting affects processing of the NLST command. The z/OS FTP client sends an NLST command to the server as part of ls * subcommand processing. The NOLISTSUBdir option specifies that only the current directory should be listed as a result of processing an ls * subcommand. In this example, the current directory has a file x and a subdirectory y and subdirectory y has a file x.

```
site Nolistsubdir
>>> SITE Nolistsubdir
200 SITE command was accepted
ls *
>>> PORT 127,0,0,1,4,18
200 Port request OK.
>>> NLST
125 List started OK
x
y
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 "DIr subcommand—Obtain a list of directory entries" on page 180 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 a z/OS UNIX file system 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 431 for a list). GDG base, VSAM, and ATL library entries are among the types not included in the LS output. See "DIr subcommand—Obtain a list of directory entries" on page 180 to list entries for all types of data sets or files.

Context

- See Appendix A, "Specifying data sets and files," on page 431 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 170.
- To a list of complete directory entries with auxiliary information about the files, see "DIr subcommand—Obtain a list of directory entries" on page 180.
- To change the local directory, see "LCd subcommand—Change the local working directory" on page 198.

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.

Results:

- If the LISTSUBdir option is not specified on the SITE subcommand and the LISTSUBDIR statement is not specified in the server FTP.DATA file, the default is as if LISTSUBdir option was specified on the SITE subcommand.

- If the z/OS FTP server has the NOLISTSUBdir option on the SITE subcommand or LISTSUBDIR FALSE in the server FTP.DATA file, an MDelete * deletes only the files in the current directory.

Restriction: The LISTSUBdir option applies to z/OS UNIX file operations only; MVS data set operations are not affected.

Examples

Example 1: Following is a sample entry and the response that displays after using the MDelete subcommand for multiple z/OS UNIX 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:
```

Example 2: MDelete * with SITE LISTSUBdir

Following is an example of MDelete * with the SITE LISTSUBdir option. This setting affects processing of the NLST command. The z/OS FTP client sends an NLST command to the server as part of MDelete * subcommand processing. The LISTSUBdir option specifies that both the current and the next subdirectory should be deleted as a result of processing an MDelete * subcommand. In this example, the current directory has a file x and a subdirectory y and subdirectory y has a file x.

```
site listsubdir
>>> SITE listsubdir
200 SITE command was accepted
prompt
Interactive mode is off
Command:
mdelete *
>>> PORT 127,0,0,1,4,15
200 Port request OK.
>>> NLST *
125 List started OK
250 List completed successfully.
>>> DELE x
250 /tmp/mgetmput/x deleted.
>>> DELE y/x
250 /tmp/mgetmput/y/x deleted.
Command:
```

Example 3: MDelete * with SITE NOLISTSUBdir

Following is an example of MDelete * with the SITE NOLISTSUBdir option. This setting affects processing of the NLST command. The z/OS FTP client sends an NLST command to the server as part of MDelete * subcommand processing. The NOLISTSUBdir option specifies that only the current directory should be deleted as a result of processing an MDelete * subcommand. In this example, the current directory has a file x and a subdirectory y and subdirectory y has a file x.

```
site Nolistsubdir
>>> SITE Nolistsubdir
200 SITE command was accepted
prompt
Interactive mode is off
Command:
mdelete *
>>> PORT 127,0,0,1,4,15
200 Port request OK.
>>> NLST *
125 List started OK
250 List completed successfully.
>>> DELE x
250 /tmp/mgetmput/x 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.
- z/OS UNIX 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 431 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 the REPLACE parameter, the data in the file is overwritten, but the file is not reallocated; the local data set retains its existing characteristics.

Restriction: If you have configured UNIXFILETYPE=FIFO, the REPLACE parameter is not allowed.

Examples

The following is a sample entry and response that displays after using the MGet subcommand for multiple z/OS UNIX files.

```
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 displays after using 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:
```

Results:

- When you use the MGet subcommand, FTP might 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 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.
- z/OS UNIX 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 subcommand is not applicable to generation data groups (GDGs).
- The MGet subcommand 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 268 for more information.
- If the data set is migrated, it is replaced regardless of the replace option.

- The MGet subcommand removes all directory information from remote file names. This causes all the files to be saved in the same z/OS UNIX file system directory when transferring into a z/OS UNIX file system. The directory structure of the remote host will not be preserved.
- If the LISTSUBdir option is not specified on the SITE subcommand and the LISTSUBDIR statement is not specified in the server FTP.DATA file, the default is as if LISTSUBdir option was specified on the SITE subcommand.
- If the z/OS FTP server has the NOLISTSUBdir option specified on the SITE subcommand or has LISTSUBDIR FALSE specified in the server FTP.DATA file, an mget * command gets only the files in the current directory.
- The LISTSUBdir option applies to z/OS UNIX file operations only; MVS data set operations are not affected.
- When UNIXFILETYPE=FIFO is configured and the local directory is a z/OS UNIX directory, the following apply:
  - New files are created as named pipes.
  - Transfers into existing z/OS UNIX regular files will fail.
  - Whether the named pipe is new or existing, FTP cannot write to the named pipe until another process on the z/OS client host opens the named pipe for reading. The z/OS FTP client waits up to the number of seconds specified by the FIFOOPENTIME value for another process to open the named pipe.
  - FTP waits up to the number of seconds specified by the FIFOIOTIME value for each write to the named pipe to complete. The client does not block during writes unless it writes to the named pipe much faster than the named pipe reader reads from the pipe. If the client cannot write any data to the named pipe for the number of seconds specified by the FIFOIOTIME value, it fails the file transfer.
  - Data that is transferred into an existing named pipe is appended to the contents of the named pipe.

Guideline: When you transfer files into a z/OS UNIX directory, the configured UMASK value determines the new file permissions. Code the UMASK statement in the FTP.DATA file or issue the LOCSIte UMASK subcommand to configure the UMASK value.

Related topics:

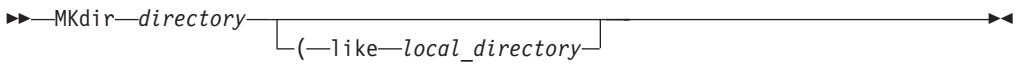
- See "CD subcommand—Change the directory on the remote host" on page 170 for more information about working directories.
- See Appendix A, "Specifying data sets and files," on page 431 for more information about naming conventions.
- See "Using z/OS UNIX System Services named pipes" on page 119 for more details about named pipes.

MKdir subcommand—Create a directory on the remote host

Purpose

Use the MKdir subcommand to create a PDS, PDSE, or z/OS UNIX directory on the remote host.

Format



Parameters

directory
Specifies the name of the remote directory to be created.

local_directory
Specifies the name of a local directory that is to be a model for the remote directory.

Requirements:

- *local_directory* and *directory* must be MVS directories.
- The server must be a Communication Server for z/OS FTP server.

Guidelines:

- Use this parameter only when you have called the FTP client interactively.
- You can use this parameter to specify a local MVS directory that has characteristics you want for the remote directory. For example, use the (like parameter when allocating the target of a load module transfer to ensure that the source and target directories are compatible for load module transfer.

Restrictions:

- Only the 3390 device architecture is supported. Unpredictable results will occur if the source or target directory is on devices that use a different architecture.
- FTP can only approximate the following characteristics of *local_directory*: SPACETYPE, DIRECTORY, PRIMARY, and SECONDARY. Thus, the corresponding characteristics of *directory* might not match the original allocation of *local_directory*. For complete control over these characteristics, do not use the (like parameter.

Results:

- FTP must read *local_directory* to determine its characteristics. Do not use the (like parameter if this is not acceptable.
- FTP sends a SIte command to the server for you to configure the FTP server to allocate *directory* with the same characteristics as *local_directory*. A SIte command changes the server configuration for the rest of the session; consequently, the server configuration changes for the rest of the session when you specify the (like parameter. Do not use the (like parameter if you do not want the server configuration to change.
- If *local_directory* is a migrated data set, FTP checks the local AUTORECALL setting to determine whether to recall the data set or fail the request.
  - If AUTORECALL is true, FTP tries to recall the migrated data set.
  - If AUTORECALL is false, FTP fails the MKdir request.

  You can change the local AUTORECALL setting with the LOCSIte subcommand. Choosing AUTORECALL might result in a long delay when the FTP client waits for the data set to become available.
- If *local_directory* is a data set that is not mounted, FTP checks the local AUTOMOUNT setting to determine whether to mount the data set or fail the request.

– If AUTOMOUNT is true, FTP tries to mount the data set.
– If AUTOMOUNT is false, FTP fails the MKdir request.

You can change the local AUTOMOUNT setting with the LOCSIte subcommand. Choosing AUTOMOUNT might result in a long delay when the client waits for the data set to become available.

Results

The MKdir subcommand directs the FTP client to send an MKD command to the remote host FTP server to create a directory with name *directory*.

- If the server is a Communications Server for z/OS FTP server, and *directory* is a fully qualified MVS data set name, the server allocates a PDS or PDSE named *directory*. For example, MKdir 'USER33.TEST.PDS' causes the server to create a PDS or PDSE named 'USER33.TEST.PDS'.
- If the server is a Communications Server for z/OS FTP server, and *directory* is an absolute path name, the server creates a z/OS UNIX directory named *directory*. For example, mkdir/tmp/logs directs the server to create a z/OS UNIX directory named /tmp/logs.

Otherwise, the current working directory at the remote host determines whether the FTP server interprets directory as an MVS low level qualifier (LLQ) or as a z/OS UNIX relative path name.

- If the current working directory is an MVS directory, the server allocates a PDS or PDSE in the current working directory whose LLQ is *directory*. For example, suppose the current working directory is 'USER33.TEST'. The subcommand MKdir PDS directs the server to create a PDS or PDSE called 'USER33.TEST.PDS'.
- If the current working directory is a z/OS UNIX directory, the server creates a subdirectory within the current working directory. For example, suppose the current working directory is /tmp. The subcommand MKdir logs direct the server to create the directory /tmp/logs.

For a z/OS FTP server, the characteristics of the z/OS UNIX directory or MVS directory are determined by the server's configuration. For example, when the server is allocating an MVS directory, the server PDSTYPE configuration option specifies whether the server allocates a PDS or PDSE. You can use the STAtus subcommand to display the server configuration and the SIte subcommand to change the server configuration.

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:
```

```
  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:
```

Related topics:

- See "Dynamic allocation of new data sets" on page 94 for information about FTP configuration options that determine data set characteristics when creating an MVS directory.
- See "SIte subcommand—Send site-specific information to a host" on page 281 for information about setting the SIte configuration options.
- See "STAtus subcommand—Retrieve status information from a remote host" on page 316 for information about displaying the SIte configuration options.
- See "SENDSite subcommand—Toggle the sending of site information" on page 280 for information about SENDSite subcommand.
- See "LOCSIte subcommand—Specify site information to the local host" on page 203 for information about changing the AUTORECALL and AUTOMOUNT settings.

MKFifo subcommand—Create a named pipe at the FTP server host

Purpose

Use the MKFifo subcommand to create a z/OS UNIX named pipe on the remote host.

Requirement: The FTP server on the remote host must be z/OS V1R11 or later.

Format

Parameters

pathname
Specifies the path name of the z/OS UNIX named pipe that is to be created. You can specify a relative path name or an absolute path name.

Examples

In this example, the named pipe, /tmp/named.pipe, is created by specifying an absolute path name:

```
Command:
cd 'USER1'
>>> CWD 'USER1'
250 "USER1." is the working directory name prefix.
Command:
mkfifo /tmp/named.pipe
>>> XFIF /tmp/named.pipe
257 named pipe /tmp/named.pipe created
Command:
```

In this example, the named pipe, my named pipe, is created by specifying a relative path name:

```
cd /tmp
>>> CWD /tmp
250 HFS directory /tmp is the current working directory.
Command:
mkfifo my named pipe
>>> XFIF my named pipe
257 named pipe /tmp/my named pipe created
Command:
```

This directory listing shows the named pipes that are created by these examples.

```
Command:
dir /tmp/*pipe
>>> PORT 9,42,105,36,4,29
200 Port request OK.
>>> LIST /tmp/*pipe
125 List started OK
prwxr-x---   1 OMVSKERN OMVSGRP        0 Jun 10 02:28 /tmp/my named pipe
prwxr-x---   1 OMVSKERN OMVSGRP        0 Jun 10 02:33 /tmp/named.pipe
250 List completed successfully.
Command:
```

MOde subcommand—Set the data transfer mode

Purpose

Use the MOde subcommand to define how bits of data are to be transmitted.

Format

Parameters

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 MOde is set to B, the data transfer type must be EBCDIC.

Specifying MOde 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 MOde 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 MOde 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 MOde S is equivalent to specifying the STREam subcommand.

Usage

- To use MOde 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.

Context

- For the syntax of the BLock, COMpress, and STREam subcommands, see "BLock subcommand—Set the block data transfer mode" on page 169, "COMpress subcommand—Set the compressed data transfer mode" on page 175, or "STREam subcommand—Set the stream data transfer mode" on page 325.
- For more information about transfer methods, see Table 13 on page 52.

Tip: Use MODE B or MODE C in conjunction with a CHKConfidence value of `TRUE` in FTP.DATA to improve detection of incomplete file transfers.

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.

When the wildcard symbol (*) is used in the filename parameter, and the GLOB subcommand is set to expand metacharacters in file names, the LISTSUBdir option affects the result of MPut. For more information about the

LISTSUBdir option, see "LOCSIte subcommand—Specify site information to the local host" on page 203, or the LISTSUBDIR statement (FTP client and server) details in z/OS Communications Server: IP Configuration Reference.

Examples

The following is a sample entry and response that displays after using 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:
```

Results:

- 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 might 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.
- 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.

- When UNIXFILETYPE=FIFO is configured at the FTP client, and the local directory is a z/OS UNIX directory, the following apply:
  - Named pipes are transferred; transfers from existing z/OS UNIX regular files will fail.
  - FTP is unable to read from the named pipe until another process on the z/OS client host opens the named pipe for writing. The z/OS FTP client waits up to the number of seconds specified by the FIFOOPENTIME value for another process to open the named pipe.
  - FTP waits up to the number of seconds specified by the FIFOIOTIME value for each read from the named pipe to complete. If the client cannot read any data from the named pipe for the number of seconds specified by the FIFOIOTIME value, the file transfer fails.
  - Sending the named pipe permanently removes data from the named pipe.
- If the FTP server is a z/OS FTP server, the server UNIXFILETYPE configuration option is set to FIFO, and the remote file directory is a z/OS UNIX file system directory, the server creates the remote files as named pipes rather than as regular files.

  The FTP server creates named pipes using the same names as those specified in the local file and appends to existing named pipes with those names. The FTP server rejects transfers into z/OS UNIX regular files with the same names as those specified in the local file.

  For more information about using z/OS UNIX named pipes, see "Using z/OS UNIX System Services named pipes" on page 119.

Requirement: 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.

Restriction: The MPut subcommand is not applicable to generation data groups (GDGs).

Related topics:

- See "SUnique subcommand—Changes the storage method" on page 325 for information about changing the storage method on the remote host.
- See Appendix A, "Specifying data sets and files," on page 431 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 268 for more information.

MVSGet subcommand – Copy a remote data set into a local data set with the remote data set attributes

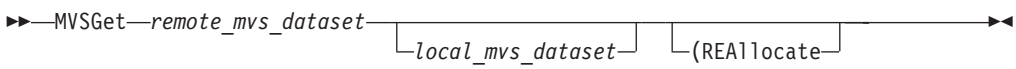
Purpose

Use the MVSGet subcommand to transfer MVS data sets from a z/OS FTP server to a z/OS FTP client without knowing the details of the server data set allocation. The MVS data set can be one of the following data set types:

- z/OS physical sequential data set
- z/OS PDS or library
- z/OS generation data set reference

For a physical sequential data set, MVSGet works like a combination of the LOCSite and Get subcommands. For a partitioned data set, MVSGet works like a combination of the LOCSite, LMkir (like <remote directory>, and MGet * subcommands. All the data set members are transferred. Regardless of the type of data set that is transferred, FTP reconfigures the client to allocate the local data set with the same attributes as the remote data set.

Format



Parameters

remote_mvs_dataset
Specifies the name of the data set to be retrieved from the remote MVS host. If the server working directory is a data set prefix, the remote file is a data set with the *remote_mvs_dataset* name appended to the server working directory. You can override the server working directory in the remote file name by specifying the *remote_mvs_dataset* value as a complete data set name that is enclosed in single quotation marks.

local_mvs_dataset
Specifies the name of the local MVS data set that is created as a result of the MVSGet subcommand. If the local working directory is a data set prefix, the local file is a data set with the*local_mvs_dataset* name appended to the local working directory. You can override the local working directory in the local file name by specifying the *local_mvs_dataset* value as a complete data set name that is enclosed in single quotation marks. If the *local_mvs_dataset* parameter is not specified, the value is the same as the *remote_mvs_dataset* value.

REAllocate
Causes the MVS data set on your local MVS host to be deleted and reallocated with the attributes of the remote MVSdata set, if the local MVS data set is an existing data set. If the MVS data set already exists and you do not use the **REAllocate** parameter, the existing data set is not deleted and reallocated, the MVSGet subcommand fails, and a message is displayed.

The following example shows using the MVSGet subcommand to retrieve a PDS data set.

```
mvsget 'user1.remote.pds' 'user1.local.pds' (REAllocate
EZA1701I >>> XDSS 'user1.remote.pds'
200-LASTREF=2011/12/16 DSEMPTY=FALSE
200 SITE PDSTYPE=PDS RECFM=VB BLKSIZE=6233 DIRECTORY=27 LRECL=256 PRIMARY=1 SECO
NDARY=1 TRACKS EATTR=SYSTEM
EZZ9815I local site variables have changed
EZA2245I "USER1.LOCAL.PDS" created.
EZA2081I Local directory name set to partitioned data set USER1.LOCAL.PDS
EZA1701I >>> PWD
257 "'USER1.'" is working directory.
EZA1701I >>> CWD 'user1.remote.pds'
250 The working directory "USER1.REMOTE.PDS" is a partitioned data set
EZA1701I >>> PORT 127,0,0,1,4,5
200 Port request OK.
EZA1701I >>> NLST *
125 List started OK.
250 List completed successfully.
EZA1701I >>> PORT 127,0,0,1,4,6
200 Port request OK.
```

```
EZA1701I >>> RETR NEW1
125 Sending data set USER1.REMOTE.PDS(NEW1)
250 Transfer completed successfully.
EZA1617I 134 bytes transferred in 0.010 seconds.
Transfer rate 13.40 Kbytes/sec.
EZA1701I >>> PORT 127,0,0,1,4,7
200 Port request OK.
EZA1701I >>> RETR NEW2
125 Sending data set USER1.REMOTE.PDS(NEW2)
250 Transfer completed successfully.
EZA1617I 134 bytes transferred in 0.010 seconds.
Transfer rate 13.40 Kbytes/sec.
EZA2581I Local HFS directory is /u/user1.
EZA1701I >>> CWD 'USER1.'
250 "USER1." is working directory name prefix
EZA2108I Confidence=High for MVSGET of USER1.LOCAL.PDS
```

The following example shows using the proxy MVSGet subcommand to transfer a library between two servers.

```
proxy mvsget 'user.linklibe' 'user1.local.pdse' (REAllocate
EZA1701I >>> PWD
257 "'USER2.'" is working directory.
EZA1701I >>> XDSS 'user.linklibe'
200-LASTREF=2011/12/16 DSEMPTY=FALSE
200 SITE PDSTYPE=PDSE RECFM=U BLKSIZE=32760 DIRECTORY=3 LRECL=256 PRIMARY=20 SEC
ONDARY=1 CYLINDERS EATTR=SYSTEM
EZA1701I >>> XDSS 'user1.local.pdse'
200-LASTREF=2011/12/16 DSEMPTY=FALSE
200 SITE PDSTYPE=PDSE RECFM=U BLKSIZE=32760 DIRECTORY=3 LRECL=256 PRIMARY=20 SEC
ONDARY=1 CYLINDERS EATTR=SYSTEM
EZA1701I >>> DELE 'user1.local.pdse'
250 USER1.LOCAL.PDSE deleted.
EZA1701I >>> SITE PDSTYPE=PDSE RECFM=U BLKSIZE=32760 DIRECTORY=3 LRECL=256 PRIMA
RY=20 SECONDARY=1 CYLINDERS EATTR=SYSTEM
200 SITE command was accepted
EZA1701I >>> MKD 'user1.local.pdse'
257 "'USER1.LOCAL.PDSE'" created.
EZA1701I >>> CWD 'user1.local.pdse'
250-The working directory may be a load library
250 The working directory "USER1.LOCAL.PDSE" is a partitioned data set
EZA1701I >>> PWD
257 "'USER1.'" is working directory.
EZA1701I >>> CWD 'user.linklibe'
250-The working directory may be a load library
250 The working directory "USER.LINKLIBE" is a partitioned data set
EZA1701I >>> XLMT QUERY 0 *
250 PDSE 12787712 - send next command for load module transfer
EZA1701I >>> XLMT PDSE 12787712
250 PDSE 12787712 - send next command for load module transfer
EZA1701I >>> PASV
227 Entering Passive Mode (127,0,0,1,4,19)
EZA1701I >>> PORT 127,0,0,1,4,19
200 Port request OK.
EZA1701I >>> RETR load module
125-Transferring load module
125 DCB 32768 32760
EZA1701I >>> XLMT DCB 32768 32760

250 DCB saved, send next command for load module transfer
EZA1701I >>> STOR load module
125 Transferring load module
250 Transfer completed successfully.
250 Transfer completed successfully.
EZA1701I >>> CWD 'USER2.'
```

```
250 "USER1." is working directory name prefix
EZA1701I >>> CWD 'USER1.'
250 "USER1." is working directory name prefix
```

Restrictions:

- The MVSGet subcommand supports only these data set types.
  - z/OS physical sequential data set
  - z/OS PDS or library data set
  - z/OS generation data set reference
- The MVSGet subcommand does not support transfer of an empty PDS or library. You can use the LMkdir subcommand with the (like parameter for that purpose.
- The MVSGet subcommand supports checkpointing for block mode restart of an interrupted file transfer. However, if you transfer a PDS or library data set, the target data set is deleted if the transfer fails. You cannot use the REStart subcommand to restart these transfers.
- The target generation data set must be a positive reference and cannot be a library data set.
- If the source data set is a PDS, the target generation data set must be referenced with its absolute name.
- The MVSGet subcommand does not support specifying the local data set as a ddname.
- If the source data set is in physical sequential extended format, the target data set is allocated as if the DSNTYPE parameter with SYSTEM value was configured. If the system default DSNTYPE value is not EXTREQ or EXTPREF, the source data set might exceed the architecture size limitation of the system default DSNTYPE value and the transfer fails.
- FTP can determine only approximate values for the primary allocation, secondary allocation, and space type, but it uses an allocation that is large enough to contain the data. For complete control over the initial allocation, use the LOCSIte subcommand with the Get subcommand instead of the MVSGet subcommand.
- If the target tape data set does not exist on the tape volume, the transfer sometimes succeeds with the MVSGet subcommand. However, the MVSGet subcommand does not support reallocating an existing tape data set.
- For PDS and library data sets, FTP must read the directory of the source data set at least twice when using the MVSGet subcommand.

Results:

- If the target local data set already exists on the FTP client without REALLOCATE specified, the MVSGet subcommand fails.
- FTP ignores the GLob subcommand toggle when using the MVSGet subcommand. MVSGet works as if the GLob subcommand is always toggled on.
- The MVSGet subcommand of a PDS or library data set gets the data set as a whole data set and gets all the members of it to the local PDS or library data set. The MVSGet subcommand is not prompted before transferring each member, regardless of whether the PROMpt subcommand toggle is set to interactive mode.
- If an FTP file transfer ends prematurely for a physical sequential data set, the new data set that is created on the local host is disposed according to the CONDDISP configuration on the local host. See “LOCSIte subcommand—Specify site information to the local host” on page 203 or CONDDISP (FTP client and server) statement in z/OS Communications Server: IP Configuration Reference

for more information about the CONDDISP configuration option. However, if you transfer a PDS or library data set, the new data set that is created on the local host is deleted regardless of the CONDDISP configuration if the transfer ends prematurely.

- The MVSGet subcommand changes the FTP client configuration so that the subcommand can allocate the local data set as the remote data set.
- The MVSGet subcommand can determine only an approximate size of the source data set when allocating the target data set, but the target data set is large enough to complete the transfer. For complete control over the initial allocation, use the LOCSIte subcommand with the Get subcommand.
- If the remote source data set is migrated, the server inspects the AUTORECALL setting to decide whether to recall the data set or to fail the request. If AUTORECALL is set to true, FTP attempts to recall the data set; otherwise, it fails the request. Similarly, if the remote data set is not mounted, the server inspects the AUTOMOUNT setting to decide whether to mount the data set or to fail the request. If AUTOMOUNT is set to true, the server attempts to mount the data set; otherwise, it fails the request. You can change the AUTOMOUNT and AUTORECALL settings of the server with the SITE subcommand. Choosing AUTOMOUNT or AUTORECALL can cause a long delay because the server waits for the data set to become available.

Requirements:

- The local and remote data sets must be MVS data sets.
- The remote FTP server must be z/OS V2R1 Communications Server or later releases.
- Users must have READ access to the source data set and ALTER access to the target data set to use the MVSGet subcommand.

Guidelines:

- An FTP client can specify one or more of the Storage Management Subsystem (SMS) classes to manage characteristics that are associated with or assigned to data sets. See “Specifying values for new data sets - Storage Management System(SMS)” in z/OS Communications Server: IP Configuration Guide for more information about SMS classes.
- The MVSGet subcommand can determine only an approximate size of the source data set when allocating the target data set. For complete control over the initial allocation, use the LOCSIte subcommand with the Get subcommand.
- The MVSGet subcommand changes the FTP client configuration as if the user issued the LOCSIte and LCd subcommands. Restart the FTP client to reinstate the initial configuration or use the LOCSIte and LCd subcommands to configure the client.

Related topics:

- See Appendix A, “Specifying data sets and files,” on page 431 for more information about naming conventions.
- You can use the MVSGet subcommand 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 268 for more information.
- See “LOCSIte subcommand—Specify site information to the local host” on page 203 or FTP configuration statements in FTP.DATA in z/OS Communications Server: IP Configuration Reference for more information about the BLKSIZE,

DIRECTORY, DSNTYPE, EATTR, LRECL, PDSTYPE, PRIMARY, RECFM, SECONDARY and SPACETYPE configuration options.

MVSPut subcommand – Copy a local data set into a remote data set name with the local data set attributes

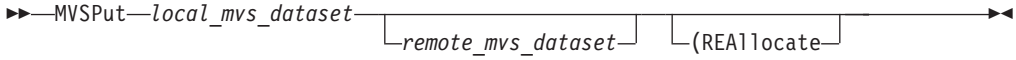
Purpose

Use the MVSPut subcommand to transfer MVS data sets from a z/OS FTP client to a z/OS FTP server without knowing the details of the client data set allocation. The MVS data set can be one of the following data set types:

- z/OS physical sequential data set
- z/OS PDS or library data set
- z/OS generation data set reference

For a physical sequential data set, MVSPut works like a combination of the Site and PUt subcommands. For a partitioned data set, MVSPut works like a combination of the SIte, MKdir (like <local directory>, and MPut *. subcommands. Regardless of the type of data set that is transferred, FTP reconfigures the server to allocate the remote data set with the same attributes as the local data set.

Format



Parameters

local_mvs_dataset
Specifies the name of the data set to be sent from the local MVS host to the remote MVS host. If the server working directory is a data set prefix, the local file is a data set with the *local_mvs_dataset* name appended to the local working directory. You can override the local working directory in the local file name by specifying the *local_mvs_dataset* value as a complete data set name that is enclosed in single quotation marks.

remote_mvs_dataset
Specifies the name of the remote MVS data set that is created by using the MVSPut subcommand. If the current server working directory is a data set prefix, the remote file is a data set with the *remote_mvs_dataset* name appended to the current server working directory. You can override the server working directory in the remote file name by specifying the *remote_mvs_dataset* value as a complete data set name enclosed in single quotation marks. If the *remote_mvs_dataset* parameter is not specified, the name of the remote MVS data set is the same as the *local_mvs_dataset* value.

REAllocate
Causes the MVS data set on your remote MVS host to be deleted and reallocated with the attributes of the local MVS data set, if the value is an existing MVS data set. If the MVS data set already exists and you do not use the **REAllocate** parameter, the existing data set is not deleted and reallocated, the MVSPut subcommand fails, and a message is displayed.

The following example shows using the MVSPut subcommand with the REAllocate parameter specified to transfer a physical sequential data set to the server.

```
mvsput 'user1.ps.source' 'user1.ps.target' (REAllocate
EZA1701I >>> XDSS 'user1.ps.target'
200-LASTREF=2011/12/07 DSEMPTY=FALSE
200 SITE DSNTYPE=BASIC RECFM=VB BLKSIZE=6233 LRECL=256 PRIMARY=1 SECONDARY=1 TRA
CKS EATTR=SYSTEM
EZA1701I >>> DELE 'user1.ps.target'
250 USER1.PS.TARGET deleted.
EZA1701I >>> SITE DSNTYPE=BASIC RECFM=VB BLKSIZE=6233 LRECL=256 PRIMARY=1 SECOND
ARY=1 TRACKS EATTR=SYSTEM
200 SITE command was accepted
EZA1701I >>> PORT 127,0,0,1,4,4
200 Port request OK.
EZA1701I >>> STOR 'user1.ps.target'
125 Storing data set USER1.PS.TARGET
250 Transfer completed successfully.
EZA1617I 2331 bytes transferred in 0.005 seconds.
Transfer rate 466.20 Kbytes/sec.
```

The following example shows a sample entry and response that is displayed after the MVSPut subcommand is used to transfer a PDS.

```
mvsput 'user1.local.pds' 'user1.remote.pds' (REAllocate
EZA1701I >>> PWD
257 "'USER1.'" is working directory.
EZA1701I >>> XDSS 'user1.remote.pds'
200-LASTREF=2011/12/16 DSEMPTY=FALSE
200 SITE PDSTYPE=PDS RECFM=VB BLKSIZE=6233 DIRECTORY=27 LRECL=256 PRIMARY=1 SECO
NDARY=1 TRACKS EATTR=SYSTEM
EZA1701I >>> DELE 'user1.remote.pds'
250 USER1.REMOTE.PDS deleted.
EZA1701I >>> SITE PDSTYPE=PDS RECFM=VB BLKSIZE=6233 DIRECTORY=27 LRECL=256 PRIMA
RY=1 SECONDARY=1 TRACKS EATTR=SYSTEM
200 SITE command was accepted
EZA2081I Local directory name set to partitioned data set USER1.LOCAL.PDS
EZA1701I >>> MKD 'user1.remote.pds'
257 "'USER1.REMOTE.PDS'" created.
EZA1701I >>> CWD 'user1.remote.pds'
250 The working directory "USER1.REMOTE.PDS" is a partitioned data set
EZA1701I >>> PORT 127,0,0,1,4,11
200 Port request OK.
EZA1701I >>> STOR NEW1
125 Storing data set USER1.REMOTE.PDS(NEW1)
250 Transfer completed successfully.
EZA1617I 134 bytes transferred in 0.005 seconds.
Transfer rate 26.80 Kbytes/sec.
EZA1701I >>> PORT 127,0,0,1,4,12
200 Port request OK.
EZA1701I >>> STOR NEW2
125 Storing data set USER1.REMOTE.PDS(NEW2)
250 Transfer completed successfully.
EZA1617I 134 bytes transferred in 0.005 seconds.
Transfer rate 26.80 Kbytes/sec.
EZA2581I Local HFS directory is /u/user1.
EZA1701I >>> CWD 'USER1.'
250 "USER1." is working directory name prefix
EZA2108I Confidence=High for MVSPUT of USER1.LOCAL.PDS
```

Restrictions:

- The MVSPut subcommand supports only the following data set types:
  - z/OS physical sequential data set
  - z/OS PDS or library data set
  - z/OS generation data set reference
- The MVSPut subcommand does not support transfer of an empty PDS or library. You can use the MKdir subcommand with the (like parameter for that purpose.

- The MVSPut subcommand supports checkpointing for block mode restart of an interrupted file transfer. However, if you transfer a PDS or library data set, the target data set is deleted when the transfer fails. You cannot use the REStart subcommand to restart these transfers.
- The target generation data set must be a positive reference and cannot be a library data set.
- If the source data set is a PDS, the target generation data set must be referenced with its absolute name.
- If the source data set is in physical sequential extended format, the target data set is allocated as if the DSNTYPE parameter with SYSTEM value was configured. If the system default DSNTYPE value is not EXTREQ or EXTPREF, the source data set might exceed the architecture size limitation of the system default DSNTYPE value and the transfer fails.
- FTP can determine only approximate values for the primary allocation, secondary allocation, and space type, but it uses an allocation that is large enough to contain the data. For complete control over the initial allocation, use the SIte subcommand with the PUt subcommand instead of the MVSPut subcommand.
- If the target tape data set does not exist on the tape volume, the transfer sometimes succeeds with the MVSPut subcommand. However, the MVSPut subcommand does not support reallocating an existing tape data set.
- For PDS and library data sets, FTP must read the directory of the source data set at least twice when using the MVSGet subcommand.

Results:

- FTP ignores the SendSite subcommand toggle when using the MVSPut subcommand. A SITE command is always triggered and sent to the FTP server.
- FTP ignores the SUnique subcommand setting when using the MVSPut subcommand. If the target remote data set exists on the FTP server without the REAllocate parameter specified, the MVSPut subcommand fails no matter SUnique is turned on or off.
- FTP ignores the GLob subcommand toggle when using the MVSPut subcommand. MVSPut works as if the GLob command is always toggled on.
- The MVSPut subcommand of a PDS or library data set sends the data set as a whole data set and transfers all the members of it to the remote PDS or library data set.
- If an FTP file transfer ends prematurely for a physical sequential data set, the new data set that is created on the remote host is disposed according to the CONDDISP configuration on the remote host. See “SIte subcommand—Send site-specific information to a host” on page 281 or CONDDISP (FTP client and server) statement in z/OS Communications Server: IP Configuration Reference for more information about the CONDDISP configuration option. However, if you transfer a PDS or library data set, the new data set that is created on the remote host is deleted regardless of the CONDDISP configuration if the transfer ends prematurely.
- The MVSPut subcommand changes the FTP server configuration so that the subcommand can allocate the remote data set as the local data set.
- The MVSPut subcommand can determine only an approximate size of the source data set when allocating the target data set, but the target data set is large enough to complete the transfer. For complete control over the initial allocation, use the SIte subcommand with the PUt subcommand.

- If the local source data set is migrated, the FTP client inspects the AUTORECALL setting to determine whether to recall the data set or to fail the request. If AUTORECALL is set to true, FTP attempts to recall the data set; otherwise, it fails the request. Similarly, if the local source data set is not mounted, the FTP client inspects the AUTOMOUNT setting to determine whether to mount the data set or to fail the request. If AUTOMOUNT is set to true, the FTP client attempts to mount the data set; otherwise, it fails the request. You can change the AUTOMOUNT and AUTORECALL settings of the FTP client with the LOCSIte subcommand. Choosing AUTOMOUNT or AUTORECALL could can a long delay because the FTP client waits for the data set to become available.

Requirements:

- The local and remote data sets must be MVS data sets.
- The remote FTP server must be z/OS V2R1 Communications Server or later releases.
- Users must have READ access to the source data set and ALTER access to the target data set to use the MVSPut subcommand.

Guidelines:

- An FTP server can specify one or more of the Storage Management Subsystem (SMS) classes to manage characteristics that are associated with or assigned to data sets. See "Specifying values for new data sets - Storage Management System(SMS)" in z/OS Communications Server: IP Configuration Guide for more information about SMS classes.
- The MVSPut subcommand can determine only an approximate size of the source data set when allocating the target data set. For complete control over the initial allocation, use the SIte subcommand with the PUt subcommand instead of the MVSPut subcommand.

Related topics:

- See Appendix A, "Specifying data sets and files," on page 431 for more information about naming conventions.
- You can use the MVSPut subcommand 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 268 for more information.
- See "SIte subcommand—Send site-specific information to a host" on page 281 or FTP configuration statements in FTP.DATA in z/OS Communications Server: IP Configuration Reference for more information about the BLKSIZE, DIRECTORY, DSNTYPE, EATTR, LRECL, PDSTYPE, PRIMARY, RECFM, SECONDARY and SPACETYPE configuration options.

NOop subcommand—Test the connection

Purpose

Use the NOop subcommand to determine whether the foreign host is still responding.

Format

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* value with the FTP command.

Format

Parameters

host_name
: Specifies the host name or IP address of the foreign host. When using IPv6 link-local addresses, you can provide scope information along with the host name or IP address, as described in the support for scope information in the z/OS Communications Server: IPv6 Network and Application Design Guide.

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 268 for more information.

Context

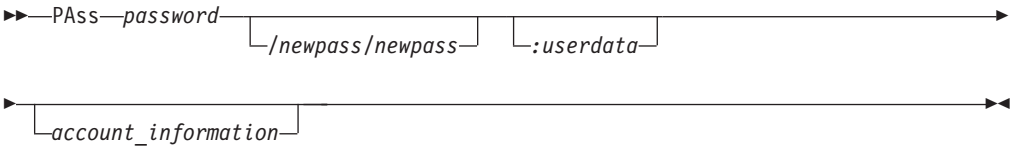
See "CLose subcommand—Disconnect from a remote host" on page 174 for more information about closing a connection.

PAss subcommand—Supply a password

Purpose

Use the PAss subcommand to supply a password or password phrase to a remote host.

Format



Parameters

password
Specifies your password or password phrase on the remote host used to log in to the FTP server.

/newpass/newpass
An optional parameter that resets a password or password phrase to *newpass*.

Requirement: If the security product of your FTP server host is RACF or another SAF-compliant security product, *password* and *newpass* must both be passwords, or both be password phrases.

:userdata
The optional user data must be separated from the password information by a colon (:). It can be any combination of up to 200 characters except the colon and the space (blank). Beware using the back slash 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 *password*.

Result: Not all FTP servers support the *:userdata* parameter. 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. See configuring the optional FTP user exits in the z/OS Communications Server: IP Configuration Guide for more information.

Rules:

- 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.

- Do not place any spaces between the passwords and the slashes (/), and the *:userdata* parameter.
- If the *password* or *newpass* parameter contains blanks, enclose the entire *password/newpass/newpass:userdata* sequence with quotation marks. If the password, newpass, or user data parameter itself contains a quotation mark, use the other style of quotation marks to enclose the parameters.

  Examples:

  pass *"What's up, Doc?"*

  pass *"What's up, Doc?/Not much; you?/Not much; you?"*

  pass *"What's up, Doc?/Not much; you?/Not much; you?:I-coded-userdata-today"*

  but not:

  pass *'What's up, Doc?'*

  pass *"What's up, Doc?"/"Not much; you?"/"Not much; you?"*

  pass *"What's up, Doc?"/Not-much;-you?/Not-much;-you?*

  pass *"What's up, Doc?/Not much; you?/Not much; you?":I-coded-userdata-today*
- Enter the account information that contains blanks by enclosing the entire account information parameter in quotation marks. You can use single or double quotation marks. If the account information itself contains a quotation mark, use the other style of quotation marks to enclose the password phrase.

  Example: Enter the account information *What's up, Doc?* as *"What's up, Doc?"*, but not as *'What's up, Doc?'*.
- Do not use quotation marks to enclose a *password/newpass/newpass:userdata* parameter sequence that is comprised only of any of the following characters:
  - Uppercase or lowercase letters
  - Numerals from 0 to 9
  - The following special characters:
    - @
    - #
    - $
    - -
    - {
    - .
    - (
    -)
    - *
    - %
    - +

  This rule applies also to *account_information*.

  Example: Enter the password phrase *JoeIBMer@ibm.com* as *JoeIBMer@ibm.com*, but not as *'JoeIBMer@ibm.com'*, nor as *"JoeIBMer@ibm.com"*.

Restrictions:

- A password, password phrase, or the account information that you enter at the z/OS FTP client must not contain both single quotation mark and double

quotation mark characters. You can use either style of quotation marks in the password, password phrase, or account information, but not both.

Example: The password phrase *What's up, Doc?* is valid because it contains only single quotation marks. You enter it at the z/OS FTP client as *"What's up, Doc?"*. The password phrase *"What's up, Doc?"* with the double quotation marks as part of the password phrase cannot be entered at the z/OS FTP client because it contains both styles of quotation marks.

- When entering this subcommand in a USS environment, you can enter only up to 510 characters including the subcommand name. When entering the arguments *password/newpass/newpass:userdata account_information*, such that *password* and *newpass* are password phrases, you must take this into account.

Related Topic: See "User subcommand—Identify yourself to a host or change your TSO user ID password" on page 333 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

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

Parameters

There are no parameters for this subcommand.

Example

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 23 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

Parameters

subcommand
The name of any FTP subcommands except those listed in the first note in "Usage" on page 270. 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.
- CLose 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 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.

```
 Command:
proxy  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 2001:0DB8:c2d4::9:67:115:12 port: 21.
   220-Welcome to my test system.
   220-You are logged on from 2001:0DB8: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|2001:0DB8: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. See 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 might 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. See 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

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.

Restriction: If FTP does not support directory content transfers in partitioned data sets, it is not possible to FTP load modules.

Results:

- 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 might 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.
- 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 280 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.
- When a PDS or PDSE member is transmitted, the user data associated with the PDS member is also transferred to the directory on the target host if the following are true:
  - Data is in block or compressed data transfer mode
  - Data has a representation type of EBCDIC
  - Transfer is from one MVS directory to another

  No PDS directory information is transferred if the member is null (empty).

- If the remote FTP server is a z/OS FTP server that is V1R8 or later, UNIXFILETYPE=FIFO is configured at the remote host, and the foreign file directory is in the z/OS UNIX file system, the following apply:
  - The remote host creates a new named pipe if a file with that name does not already exist.
  - The remote host appends the local file to the foreign file if the foreign file exists as a named pipe.
  - The remote host rejects the transfer if the foreign file exists as a regular z/OS UNIX file.
  - The remote host rejects the transfer if the storage method is store-unique. Use the SUnique subcommand to change the storage method.

  For more information about using z/OS UNIX named pipes, see "Using z/OS UNIX System Services named pipes" on page 119.
- If the local file is a z/OS UNIX named pipe, the following apply:
  - You must configure UNIXFILETYPE FIFO to send data from the named pipe.
  - Sending a named pipe permanently removes the data from the named pipe.
  - FTP cannot read from the named pipe until another process on the client host opens the named pipe for writing. The z/OS FTP client waits up to the number of seconds specified by the FIFOOPENTIME value for another process to open the named pipe. If a process does not open the named pipe, the client fails the file transfer.
  - FTP waits up to the number of seconds specified by the FIFOIOTIME value for each read from the named pipe to complete. If the client cannot read any data from the named pipe for the number of seconds specified by the FIFOIOTIME value, it fails the file transfer.

Requirements:

- 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 validates 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.

Related topics:

- See "SUnique subcommand—Changes the storage method" on page 325 for information about changing the storage method on the remote host.
- See Appendix A, "Specifying data sets and files," on page 431 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 268 for more information.

- See UNIXFILETYPE, FIFOIOTIME, and FIFOOPENTIME statements in the using z/OS UNIX named pipes details in z/OS Communications Server: IP Configuration Reference 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

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 z/OS UNIX file system 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

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 23 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

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

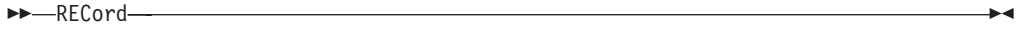
- No parsing or validity checking is performed on the character string you enter by FTP on your local host. If the character string you send to the FTP server is part of a required sequence of commands, you are required to provide this sequence correctly, or the results are unpredictable.
- The QUOte 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 325 for more information.

Format



Parameters

There are no parameters for this subcommand.

RENname subcommand—Rename files

Purpose

Use the RENname subcommand to rename a file, data set, or z/OS UNIX named pipe on the remote host.

Format

Parameters

original_name
Specifies the current name of the file.

new_name
Specifies the new name of the file.

Results:

- For MVS data sets, if the data set that is specified by the *new_name* value already exists, the server rejects the rename request.
- For z/OS UNIX files and named pipes, if the file that is specified by the *new_name* value already exists, the existing file is replaced.

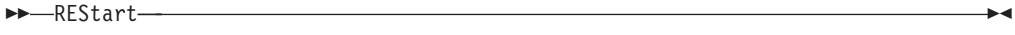
Restriction: When you use the FTP RENAME subcommand with a generation data group (GDG), for example, `RENAME SOURCE.FILE MY.GDG(+1)`, serialization of the GDG data set is not assured. To avoid this, instead use the FTP PUT subcommand. For more information about GDG processing, see Information APAR II08285.

REStart subcommand - Restart a checkpointed data transfer

Purpose

Use the REStart subcommand to restart a check pointed file or data set transfer that has been interrupted.

Format



Parameters

There are no parameters for this subcommand.

Requirements:

- To restart a file transfer with the REStart subcommand, you must have had check pointing enabled during the file transfer you want to restart.
- Before you issue the REStart subcommand, set up the same file transfer environment (such as file transfer mode, type, and CHPTPREFIX file or data set) that you had configured during the file transfer that you want to restart.

Guidelines:

- Use the REStart subcommand to resume file transfer when a check pointed file transfer request fails because of a temporary condition such as the loss of the connection between the client and the server.
- Enable check pointing by the following steps:
  - Configure a check point data set or file, and a check point interval greater than zero. FTP uses the check point data set or file to store the information that it needs to resume the data transfer. The check point interval determines how often the client and server exchange information needed to restart the file transfer.
  - Transfer files and data sets with type EBCDIC and mode block or compressed. Check pointing is available only for type EBCDIC file transfers in block or compressed mode.

  Rule: Do not enable check pointing if the server you are logged into does not support the REST command.

  By default, check pointing is enabled in both directions of file transfer when you enable file transfer. You can control whether check pointing is enabled for Get subcommand processing by configuring RESTGET at the FTP client. You can use the LOCSIte subcommand, or code the RESTGET statement in FTP.DATA, to configure RESTGET.

  If you are logged into the z/OS FTP server, you can control check pointing at the server with the server CHKPTINT and RESTPUT configuration options.
- Every time when you start a new file transfer while check pointing is enabled, FTP reuses the check point file or data set. To prevent losing restart information after a failed or interrupted file transfer, do one of the following steps before transferring another file or data set:
  - Issue the REStart subcommand.
  - Save the check point file or data set. You will have to restore the check point file or data set before issuing the REStart subcommand.

    Restriction: Do not edit the check point file or data set.
- If you transfer two or more data sets simultaneously with check pointing enabled, assign each session a different check point data set to prevent two users from contending for the same check point file or data set.

Results

- The REStart subcommand restarts the last checkpoint file transfer request at the point of the last valid checkpoint stored in the checkpoint data set.
- After a successful file transfer with check pointing enabled, FTP deletes the check point file or data set.
- The LOCSIte NORESTGet subcommand prevents opening the checkpoint data set for a Get request.
- The MVSGet or MVSPut subcommand supports checkpointing for block mode restart of an interrupted file transfer only for physical sequential data sets. The MVSGet and MVSPut subcommands do not support checkpointing for block mode restart of PDS or library data sets.

Related topics:

For information about configuring the check point file or data set, see CHKPTPrefix in "LOCSIte subcommand—Specify site information to the local host" on page 203 or the CHKPTPREFIX (FTP client) statement information in z/OS Communications Server: IP Configuration Reference.

For more information about configuring the check point interval, see CHKptint (SIte subcommand), CHKptint (LOCSIte subcommand), or CHKPTINT (FTP client and server) statement in z/OS Communications Server: IP Configuration Reference.

For more information about the RESTPUT configuration option, see "SIte subcommand—Send site-specific information to a host" on page 281 or the RESTPUT (FTP server) information in z/OS Communications Server: IP Configuration Reference.

RMdir subcommand—Remove a directory on the remote host

Purpose

Use the RMdir subcommand to remove a directory on the remote host.

Format

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

Parameters

There are no parameters for this subcommand.

SChinese subcommand—Change the data transfer type to SCHINESE

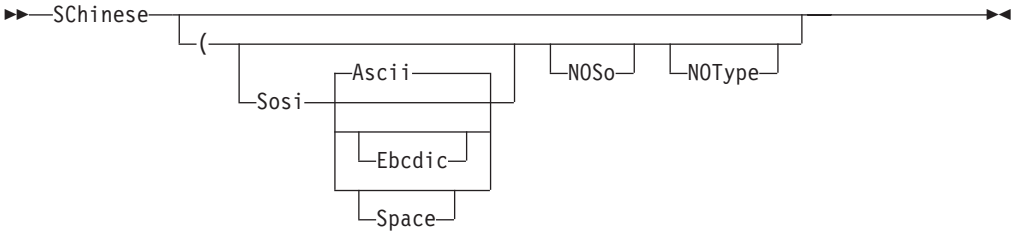
Purpose

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 TYpe command to the server. Use this parameter when translation is to be done by the FTP client only.

Usage

The SChinese client subcommand is equivalent to the TYPE B 9 server command.

Context

See “FTP with traditional DBCS support” on page 90 and “Support for MBCS languages” on page 93 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

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 229 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 commands when sending a data set to a foreign host.

Format

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 command that contains 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

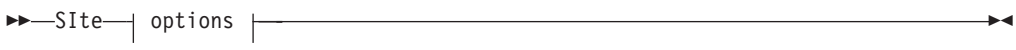
- See "LOCSTat subcommand—Display local status information" on page 229 for information about the LOCSTat subcommand.
- See "MKdir subcommand—Create a directory on the remote host" on page 246 for information about the MKdir subcommand.

SIte subcommand—Send site-specific information to a host

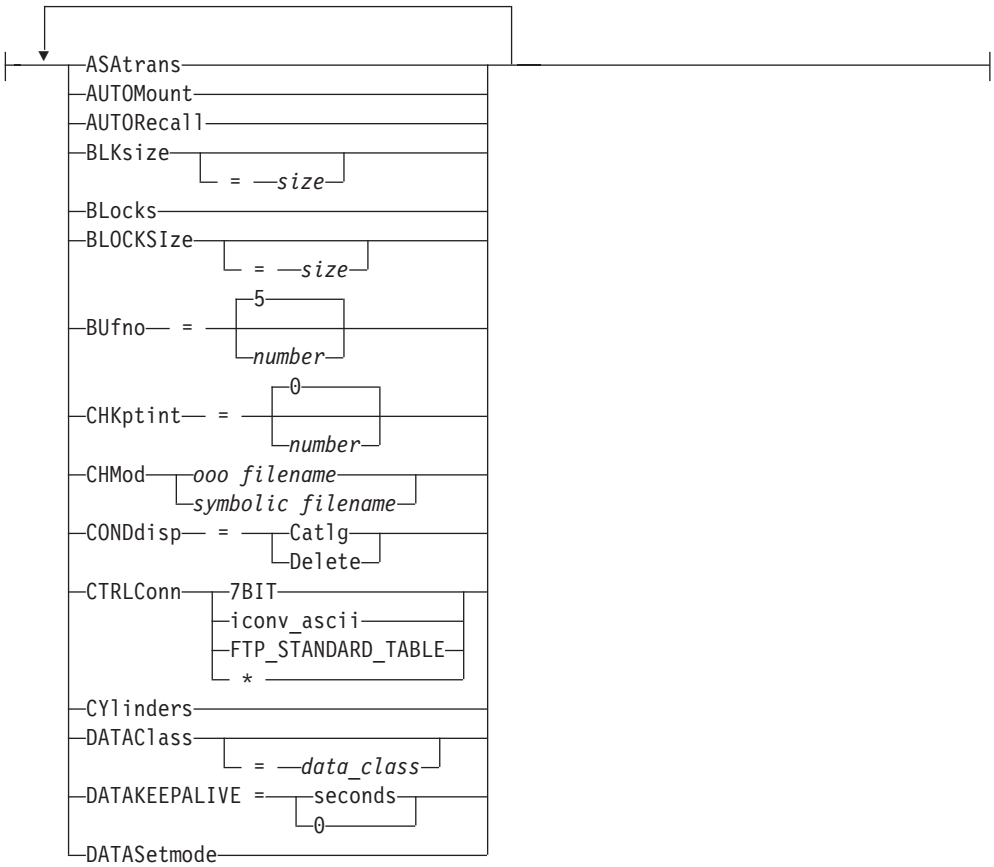
Purpose

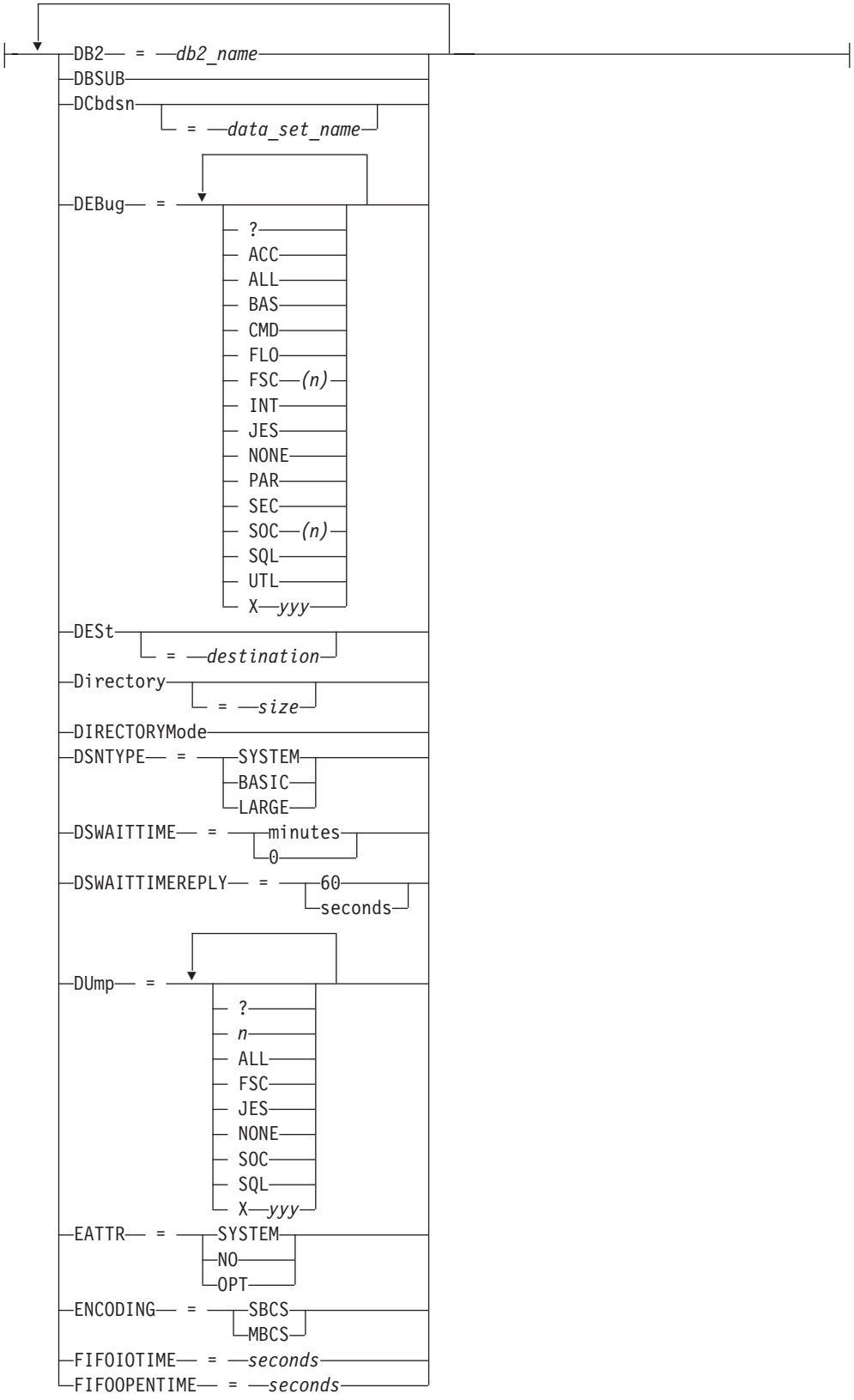
Use the SIte subcommand to send information that is used by the remote host to provide services specific to that host system.

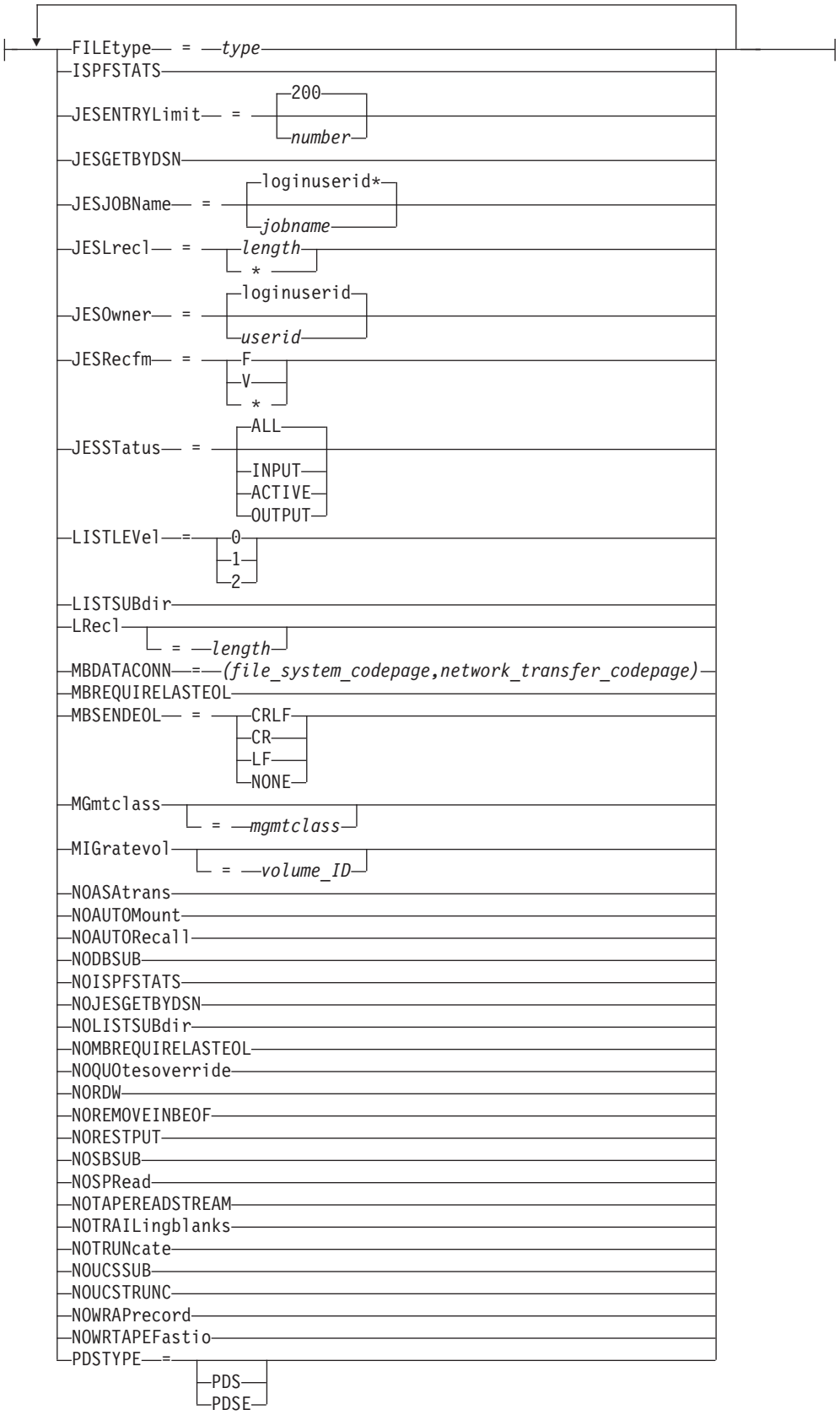
Format

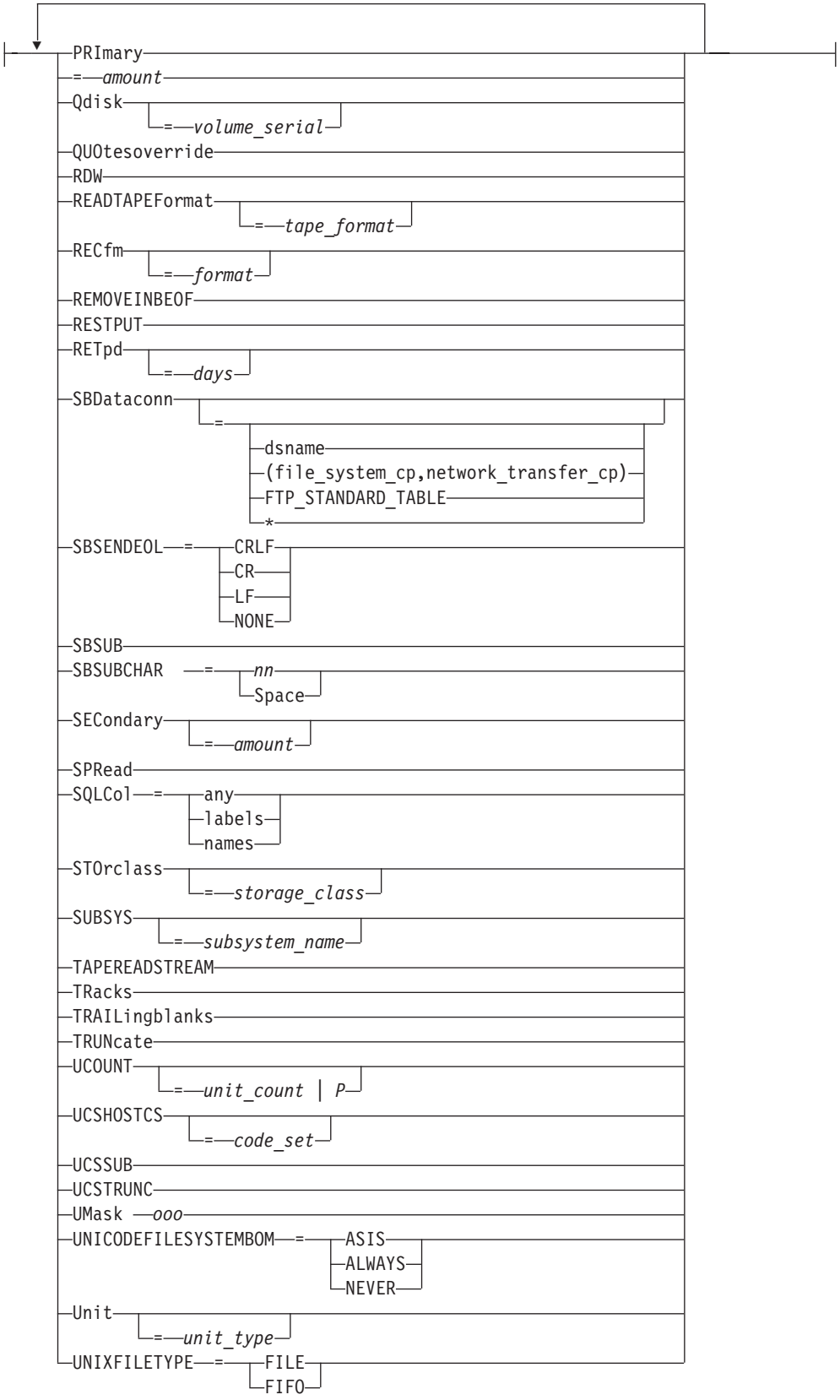


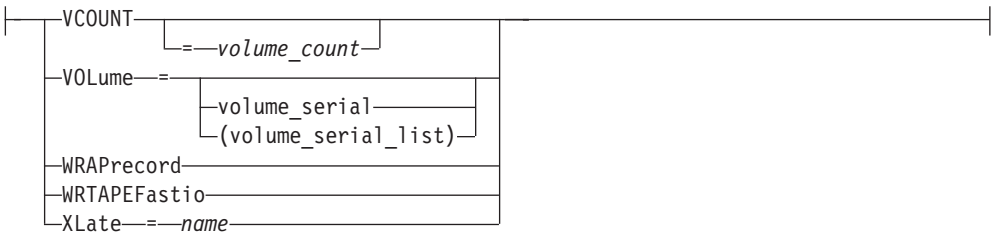
options:


ASAtrans
AUTOMount
AUTORecall
BLKsize
= size
BLocks
BLOCKSIze
= size
BUfno = 5 number
CHKptint = 0 number
CHMod ooo filename symbolic filename
CONDdisp = Catlg Delete
CTRLConn 7BIT iconv_ascii FTP_STANDARD_TABLE *
CYlinders
DATAClass
= data_class
DATAKEEPALIVE = seconds 0
DATASetmode


DB2 = db2_name
DBSUB
DCbdsn
= data_set_name
DEBug = ?
ACC
ALL
BAS
CMD
FLO
FSC (n)
INT
JES
NONE
PAR
SEC
SOC (n)
SQL
UTL
X yyy
DESt
= destination
Directory
= size
DIRECTORYMode
DSNTYPE = SYSTEM
BASIC
LARGE
DSWAITTIME = minutes
0
DSWAITTIMEREPLY = 60
seconds
DUmp = ?
n
ALL
FSC
JES
NONE
SOC
SQL
X yyy
EATTR = SYSTEM
NO
OPT
ENCODING = SBCS
MBCS
FIFOIOTIME = seconds
FIFOOPENTIME = seconds


FILEtype = type
ISPFSTATS
JESENTRYLimit = 200 number
JESGETBYDSN
JESJOBName = loginuserid* jobname
JESLrecl = length *
JESOwner = loginuserid userid
JESRecfm = F V *
JESSTatus = ALL INPUT ACTIVE OUTPUT
LISTLEVel = 0 1 2
LISTSUBdir
LRecl = length
MBDATACONN = (file_system_codepage,network_transfer_codepage)
MBREQUIRELASTEOL
MBSENDEOL = CRLF CR LF NONE
MGmtclass = mgmtclass
MIGratevol = volume_ID
NOASAtrans
NOAUTOMount
NOAUTORecall
NODBSUB
NOISPFSTATS
NOJESGETBYDSN
NOLISTSUBdir
NOMBREQUIRELASTEOL
NOQUOtesoverride
NORDW
NOREMOVEINBEOF
NORESTPUT
NOSBSUB
NOSPRead
NOTAPEREADSTREAM
NOTRAILingblanks
NOTRUNcate
NOUCSSUB
NOUCSTRUNC
NOWRAPrecord
NOWRTAPEFastio
PDSTYPE = PDS PDSE


PRImary
=amount
Qdisk
=volume_serial
QUOtesoverride
RDW
READTAPEFormat
=tape_format
RECfm
=format
REMOVEINBEOF
RESTPUT
RETpd
=days
SBDataconn
=
dsname
(file_system_cp,network_transfer_cp)
FTP_STANDARD_TABLE
*
SBSENDEOL=
CRLF
CR
LF
NONE
SBSUB
SBSUBCHAR =
nn
Space
SECondary
=amount
SPRead
SQLCol=
any
labels
names
STOrclass
=storage_class
SUBSYS
=subsystem_name
TAPEREADSTREAM
TRacks
TRAILingblanks
TRUNcate
UCOUNT
=unit_count | P
UCSHOSTCS
=code_set
UCSSUB
UCSTRUNC
UMask ooo
UNICODEFILESYSTEMBOM=
ASIS
ALWAYS
NEVER
Unit
=unit_type
UNIXFILETYPE=
FILE
FIFO



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 FTP server. The checkpoint interval applies when the server processes the RETR command.

The checkpoint interval is the number of records that are sent between restart markers when you transfer files in EBCDIC block mode or EBCDIC compress mode. If the checkpoint interval is 0, no checkpointing occurs and no restart markers are transmitted. The default value is 0.

Results: A CHKptint value that is greater than 0 enables checkpointing for outbound file transfers from the server that meet the following conditions:

- Type must be EBCDIC
- Mode must be block or compressed
- Filetype must be SEQ

Checkpointing never occurs when the server file is a z/OS UNIX named pipe.

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 few markers are sent. A smaller checkpoint interval means that less data is sent between markers and more markers are sent.

The cost involved with using a nonzero checkpoint interval is the markers themselves are transmitted, which means that 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 use a CHKptint more often than once every 200 KB of data transferred. The following is an example of a file that you are transferring with 80-byte records in which the checkpoint interval is 2560:

CHKPTINT = 200KB / 80 bytes
= 200 * 1024 bytes / 80 bytes
= 2560

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

See 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 a z/OS UNIX 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 keyword 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 89 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, see code set converters information in the z/OS XL C/C++ Programming Guide.

FTP_STANDARD_TABLE
Specifies 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.

***** Specifies that the ASCII used at initialization is to be used.

Note: Setting the control connection code page with SIte 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 94 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 SIte parameters, the values specified by the SIte parameter override the value specified in the SMS data class:

- BLKsize
- Directory
- LRecl
- PRImary
- RECfm
- RETpd
- SECondary

If the DCbdsn SIte 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 can override the retention period value of the data class.

A SIte 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).

DATAKEEPALIVE
Specifies the data connection keepalive timer value for the FTP server.

seconds
The number of seconds that elapse before a keepalive packet is sent on the FTP data connection. Valid values are in the range 60-86400 or 0. If you specify the value 0, the DATAKEEPALIVE timer is disabled. For active mode data connections, the keepalive timer that is configured in the PROFILE.TCPIP controls how often keepalive packets flow on the data connection. For passive mode data connections, FTP suppresses the PROFILE.TCPIP keepalive timer.

Result: Specifying a DATAKEEPALIVE value prevents a network device from closing the data connection during periods of inactivity on the data connection.

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.

DBSUB
Specifies that substitution is allowed for data bytes that cannot be translated in

a double-byte character translation. The substitution character is selected by the C/C++ iconv() function; see the information about Locales and Character Sets in z/OS XL C/C++ Programming Guide for more details.

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. z/OS UNIX 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 can 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 96 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 RNTO.

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.

X*yyy*
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 accepts level values 6–8, but provides only level 5 trace data. Likewise, the SOC trace option accepts level values 4–8, but provides only level 3 trace data.

- See the Diagnosing FTP server problems with traces section in z/OS Communications Server: IP Diagnosis Guide for more information about FTP server tracing.

DESt

Specifies the Network Job Entry (NJE) destination to which the files are routed when you enter a PUt command. If specified without a *destination* parameter, 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

Specifies 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
- 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 SIte 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 DIr subcommands.

DIRECTORYMode has no effect on files residing in a z/OS UNIX file system.

DSNTYPE
Specifies the data set name type for new physical sequential data sets.

SYSTEM
Physical sequential data sets are allocated with the SMS data class value. If no data class is defined, or if the DSNTYPE attribute is not defined, new physical sequential data sets will be allocated with the system default value.

BASIC
Allocates physical sequential data sets as physical sequential basic format data sets.

LARGE
Allocates physical sequential data sets as physical sequential large format data sets.

DSWAITTIME
Specifies the number of minutes FTP waits when trying to access an MVS data set on the FTP server.

minutes
The number of minutes to wait for a local MVS data set to become available. Valid values are in the range 0-14400. If you specify the value 0, the FTP server does not wait to obtain a data set when the data set is being held by another job or process.

Restriction: The FTP server ignores the DSWAITTIME value when processing RENAME FROM (RNFR), RENAME TO (RNTO), DELETE (DELE), and APPEND (for things that are not supported) commands.

DSWAITTIMEREPLY
Specifies the interval for sending a line of the reply `125-Data set access will be retried in 1 minute intervals -- <number> attempts remaining` to the client when the FTP server is waiting for access to a data set.

seconds
The number of seconds between reply lines `125-Data set access will be retried in 1 minute intervals -- <number> attempts remaining` that the

server sends to the client when the FTP server is waiting for access to an MVS data set. The valid range is 15 to 60. The default is 60 seconds.

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.

X*yyy*
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 DUMPONSITE 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.

- See Diagnosing FTP server problems with traces in z/OS Communications Server: IP Diagnosis Guide for more information about FTP server tracing.

EATTR
Specifies whether newly allocated data sets can have extended attributes and whether new data sets can reside in the EAS of an EAV.

SYSTEM
The data set uses the SMS data class EATTR value. If no SMS data class is defined, or if the data class contains no EATTR specification, the data set is allocated with the system default.

NO The data set cannot reside in the EAS, and its VTOC entry cannot contain extended attributes.

OPT
The data set can reside in the EAS, and its VTOC entry can have extended attributes if the volume supports them.

ENCODING
Specifies the kind of encoding that is used for conversions between codepages for data transfers.

See "Support for SBCS languages" on page 89 and "Support for MBCS languages" on page 93 for more information.

SBCS
Single Byte encoding. Code pages are specified using the SBDATACONN statement. This is the default value.

MBCS
Multibyte encoding. Code pages are specified using the MBDATACONN statement.

FIFOIOTIME
Specifies the maximum length of time that the FTP server waits for an I/O operation to a z/OS UNIX named pipe in its z/OS UNIX file system to complete.

Rules:

- When the server sends the contents of a z/OS UNIX named pipe to the client, the FTP server reads from the named pipe one or more times. Each read from the named pipe must complete within the length of time that is specified by the FIFOIOTIME value.
- When you store a file that is received from the client as a z/OS UNIX named pipe, the server writes to the named pipe one or more times. Each write to the named pipe must complete within the length of time that is specified by the FIFOIOTIME value.

seconds
The number of seconds that the FTP server waits for an I/O operation to a z/OS UNIX named pipe to complete. Valid values are in the range 1-86400. The default value is 20.

FIFOOPENTIME
Specifies the length of time that the FTP server waits for an open of a z/OS UNIX named pipe in its z/OS UNIX file system to complete.

seconds
The number of seconds that the FTP server waits for an open of a z/OS UNIX named pipe to complete. Valid values are in the range 1-86400. The default value is 60.

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 PUt, 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.

JESGETBYDSN
Specifies that the foreign file that is specified when retrieving a file with FILETYPE JES and JESINTERFACELEVEL 2 is a JES spool data set name to be retrieved for the client.

JESJOBName
Specifies that any command (Get, LIST, DIr, 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, DIr 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 be modified only if JESINTERFACELEVEL=2.

LISTLEVEL
Specifies the format of the LIST reply.

0 Specifies that PDS, PDSE, and HFS data sets are displayed with a DSORG value of PO.

1 Specifies that PDS data sets are displayed with a DSORG value of PO, PDSE data sets are displayed with a DSORG value of PO-E, and HFS data sets are displayed with a DSORG value of HFS.

2 Specifies the LISTLEVEL 1 options, and also that fewer but wider columns of output are displayed to accommodate larger physical sequential data sets.

LISTSUBdir
Use the LISTSUBdir option to indicate that wildcard searches should apply to the current working directory and should also span one level of its subdirectories. This setting affects processing of the NLST command. The z/OS FTP client sends an NLST command to the server as part of LS*, MDelete *, and MGet * subcommand processing.

Restrictions:

1. The LISTSUBdir option applies to z/OS UNIX file operations only; MVS data set operations are not affected.
2. The FTP client must be communicating with a z/OS V1R7 or later FTP server or an `unrecognized parameter` response will be received.

Result: If the LISTSUBdir option is not specified on the SITE subcommand and the LISTSUBDIR statement is not specified in the client FTP.DATA file, the default is as if the LISTSUBdir option was specified on the SITE subcommand.

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 DATAC&=*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 SIte 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 93 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.

MBREQUIRELASTEOL
Specifies that the FTP server will report an error when a multibyte file or data set is received from the network with no EOL sequence in the last record received. FTP will abort the file transfer.

MBSENDEOL
Specifies which end-of-line sequence to use when ENCODING is MBCS and data is being sent to the client and translated to ASCII.

CRLF
Append both carriage return (X'0D') and line feed (X'0A') end-of-line sequences to each line of translated text. This is the default and the standard sequence defined by RFC 959.

CR Append only a carriage return (X'0D') end-of-line sequence to each line of translated text.

LF Append only a line feed (X'0A') end-of-line sequence to each line of translated text.

NONE
Do not append an end-of-line sequence to the line of translated text.

Requirements:

- Most FTP clients support only the CRLF value for incoming ASCII data. Do not specify another value for MBSENDEOL unless you have verified that the client is expecting the end-of-line sequence that you specify.
- Do not use an end-of-line sequence other than CRLF if the client is a z/OS FTP client. The z/OS FTP client supports only the CRLF value for incoming type ASCII data.
- Do not attempt to stream mode restart a multibyte file retrieve that originated while the FTP server MBSENDEOL value was not `CRLF`.

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 can 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 94 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.

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.

NODBSUB
Specifies that substitution is not allowed for data bytes that cannot be translated in a double-byte character translation. This causes a data transfer failure if a character cannot be translated during the transfer. This is the default.

NOISPFSTATS
Does not allow FTP to create or update ISPF member statistics when PUt, MPut, or APpend subcommands are issued.

NOJESGETBYDSN
Specifies that the foreign file that is specified when retrieving a file with FILETYPE=JES is a file on the MVS system that is to be submitted to JES as a batch job.

NOLISTSUBdir

Use the NOLISTSUBdir option to indicate that wildcard searches should apply only to the current working directory. This setting affects processing of the NLST command. The z/OS FTP client sends an NLST command to the server as part of LS*, MDelete *, and MGet * subcommand processing.

Restrictions:

1. The NOLISTSUBdir option applies to z/OS UNIX file operations only; MVS data set operations are not affected.
2. The FTP client must be communicating with a z/OS V1R7 or later FTP server or an *unrecognized parameter* response will be received.

Result: If the NOLISTSUBdir option is not specified on the SITE subcommand and the LISTSUBDIR statement is not specified in the client FTP.DATA file, the default is as if the LISTSUBdir option was specified on the SITE subcommand.

NOMBREQUIRELASTEOL

Specifies that the FTP server will not report an error when a multibyte file or data set is received from the network with no EOL sequence in the last record received. FTP will report the file transfer as completed.

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.

NOREMOVEINBEOF

Specifies that the UNIX end-of-file (EOF) byte (X'1A') is not removed on inbound ASCII transfers before the data is stored. See z/OS Communications Server: IP Configuration Reference for more information.

NORESTPUT

Specifies that the FTP server does not support checkpoint or restart processing when it is receiving data.

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.

NOTAPEREADSTREAM

Specifies that a common read path is used for retrieving tape data sets from the server. This is the default value.

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 UCS-2-to-EBCDIC conversion, the data transfer is terminated if any UCS-2 character cannot be converted into the EBCDIC code set.

NOUCSTRUNC
In UCS-2-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
Specifies 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
Specifies that ASCII Stream data that is being written to tape must be written using the Language Environment runtime 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 number 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 number of tracks, blocks, or cylinders for primary allocation. For allocating partitioned data sets, this is the amount of space that is allocated for the primary extent.

For allocating sequential data sets this is the maximum amount of space that is allocated for the primary extent. If a smaller amount of space 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 the Qdisk parameter 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 that single quotation marks 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 marks is 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 SIte subcommand.

RDW
Specifies that Record Descriptor Words (RDWs) are treated as if they were part of the record and are not discarded during FTP transmission of variable format data sets in stream mode.

Note: RDW information is stored in binary format. Transfer files in binary mode to avoid translation problems that can occur if you transfer this binary field in EBCDIC or ASCII mode.

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 does 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 (displayed as *U* in messages and reply)

The formats are mutually exclusive. Spanned implies variable and Lrecl X implies spanned. If specified, the *tape_format* value must be the most inclusive identifier in the list that matches the tape. If it is not the most inclusive identifier, an error message is issued. For example, if the *tape_format* value is **S** (spanned) and the tape contains records with undefined length (Lrecl X), the request fails. An unspecified format avoids 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

REMOVEINBEOF

Specifies that the UNIX end-of-file (EOF) byte (X'1A') is removed before the data is stored on inbound ASCII transfers. See z/OS Communications Server: IP Configuration Reference for more information.

RESTPUT

Specifies that the FTP server supports checkpoint or restart processing when it is receiving data.

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 can 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.

SBDataconn
: Specifies the conversions between file system and network code pages to be used for data transfers. Valid subcommands are:

```
SITE SBDataconn=dsname
SITE SBDataconn=(file_system_cp,network_transfer_cp)
SITE SBDataconn=FTP_STANDARD_TABLE
SITE SBDataconn=*
SITE SBDATACONN=
SITE SBDATACONN
```

  The following forms of specifying SBDATACONN are equivalent to specifying SBDATACONN=*:

  - SBDATACONN
  - SBDATACONN=

  See “Support for SBCS languages” on page 89 for more information.

  dsname
  : Specifies the fully qualified name of an MVS data set or z/OS UNIX 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 z/OS UNIX file system name is case sensitive. The MVS name is not case sensitive.

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, see code set converters information in the z/OS XL 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, see code set converters information in the z/OS XL C/C++ Programming Guide.

FTP_STANDARD_TABLE
Specifies 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.

***** Specifies the translate tables set up at initialization for the data connection must be used.

SBSENDEOL
Specifies which end-of-line sequence to use when ENCODING is SBCS, the data type is ASCII, and data is being sent to the client.

CRLF
Append both carriage return (X'0D') and line feed (X'0A') end-of-line sequences to each line of translated text. This is the default and the standard sequence defined by RFC 959. The z/OS server can receive ASCII data in this format only.

CR Append only a carriage return (X'0D') end-of-line sequence to each line of translated text.

LF Append only a line feed (X'0A') end-of-line sequence to each line of translated text.

NONE
Do not append an end-of-line sequence to the line of translated text.

Tips:

1. The SIZE command is disabled if you configure a SBSENDEOL value other than CRLF.
2. The REST command in Mode Stream is disabled if you configure a SBSENDEOL value other than CRLF. A mode block REST command is not affected by the SBSENDEOL setting.
3. SIZE and REST commands are sent by clients as part of a stream mode restart of an interrupted file transfer. Because these commands are disabled by changing the SBSENDEOL value from the RFC 959 standard, stream mode restarts are effectively disabled. Block mode restart is not affected by the SBSENDEOL setting.

Rules:

1. Most clients support only the CRLF value for incoming type ASCII data. Do not specify another value for SBSENDEOL unless you have verified that the client is expecting the EOL sequence that you specify.
2. Do not use an EOL sequence value other than CRLF if the client is a z/OS FTP client. The z/OS FTP client supports only the CRLF value for incoming ASCII data.

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 code set is ASCII, replace untranslatable characters with X'20' during SBCS data transfers. When the target code set 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 number 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 for the target host, as defined by your organization. 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 94 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 bye the user by a different specification. 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 wanted value with the appropriate keyword.

SUBSYS
Specifies the name of the subsystem that is to be used when allocating data sets. If you specify the SUBSYS parameter without a subsystem name, the subsystem support is disabled.

Tip: You can use the SUBSYS parameter to transfer files to BatchPipes. See "SUBSYS: Writing to BatchPipes" on page 154.

Restrictions: The following restrictions apply when a SUBSYS value is specified:

- APPE and REST commands are not supported.
- Only binary (type I) file transfer is supported.
- Only FILETYPE SEQ is supported.
- Checkpointing and file transfer restart are not supported. Checkpointing is described in "Restarting a failed data transfer" on page 117.
- Do not use with SMS-managed data sets (data sets with an assigned storage class).
- Only RECFM values F, FB, V, and VB are supported.

TAPEREADSTREAM
Specifies that a more efficient read path (read as stream) is used for retrieving tape data sets from the server.

Restriction: If a SITE TAPEREADSTREAM subcommand is issued:

- You cannot retrieve American Standards Association (ASA) tape data sets. The server responds with an error reply if you attempt to retrieve an ASA tape data set.
- You cannot retrieve fixed format tape data sets when TRAILINGBLANKS TRUE is configured. The server responds with an error reply if you attempt to retrieve a fixed format tape data set when TRAILINGBLANKS TRUE is configured.
- If the tape data set contains <NL> characters that require translation, the data set format is incorrect.

TRacks
Specifies that primary and secondary space allocations are in tracks. If both

PRImary and SECondary values are unspecified, and an SMS data class value has been specified, the space allocation is determined by the SMS data class value and the TRacks parameter value 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 values are in the range 1-59. When specified without a value, the FTP server does not specify a unit count when allocating data sets.

P Parallel mount request.

Guideline: The UCOUNT statement is not meant to be used with an SMS storage class. Any UCOUNT value you specify overrides whatever is specified for the SMS managed dataclass that being used.

UCSHOSTCS
Specifies the EBCDIC code set to be used when converting to and from UCS-2. If you do not specify a *code_set* value, the current code set is used.

code_set
Name of the EBCDIC code set to be used when converting to and from UCS-2.

UCSSUB
In UCS-2 to EBCDIC conversion, the EBCDIC substitution character is used to replace any UCS-2 character that cannot successfully be converted. Data transfer continues.

UCSTRUNC
In UCS-2 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 might not honor character boundaries and EBCDIC records might 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 z/OS UNIX files with execute permissions. If you require execute permissions, use the SITE CHMod command to change permissions after the file has been created.

UNICODEFILESYSTEMBOM
Specifies whether the FTP server stores incoming Unicode files with a byte order mark (BOM).

Restriction: The only Unicode encoding formats supported for file storage by z/OS FTP are UTF-8 and UTF-16. Files are always stored in big endian format.

Result: The byte order mark (BOM) stored with the file is determined by the encoding used to store the file rather than by the format of the BOM sent with the file.

ASIS
Store incoming Unicode files with a byte order mark only if the file was sent with a byte order mark.

ALWAYS
Store incoming Unicode files with a byte order mark regardless of whether the file was sent with a byte order mark.

NEVER
Store incoming Unicode files without a byte order mark regardless of whether the file was sent with a byte order mark.

Results:

- The Unicode byte order mark, U+FEFF, can also be interpreted as a zero-width nonbreaking space character. z/OS FTP considers only the first character of the data that is received from the client as a possible byte order mark (BOM). No other instance of the BOM sequence in the inbound data is affected by this setting.
- When you are appending to a nonexistent file, the FTP server respects the UNICODEFILESYTEMBOM setting. However, when you are appending to an existing file, the FTP server always strips a leading BOM from the incoming file. This prevents a superfluous BOM from being inserted in the server file.
- When the server file is a z/OS UNIX named pipe, incoming data is always appended to any existing data that is in the named pipe. If you code UNICODEFILESYSTEMBOM = ASIS or ALWAYS and the named pipe contains data, the server appends a BOM byte sequence to existing data in cases in which it would add a BOM at the beginning of a regular file. The BOM byte sequence is interpreted as a zero-width nonbreaking space character when it does not start the file or data stream. You must take this into consideration when you configure UNICODEFILESYSTEMBOM. See "Using z/OS UNIX System Services named pipes" on page 119 for more information.

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 a *unit_type* value is not specified, the unit type used for allocation is restored to the system default.

UNIXFILETYPE
Specifies whether the server treats files in its z/OS UNIX file system as regular files or as named pipes.

FILE
Treat files in the z/OS UNIX file system as regular files. This is the default.

FIFO
Treat files in the z/OS UNIX file system as named pipes.

See "Using z/OS UNIX System Services named pipes" on page 119 for information about transferring data into and from UNIX named pipes.

VCOUNT
Specifies the number of tape data set volumes that an allocated data set can span. When this parameter is specified without a *volume_count* value, the FTP server uses the volume count 50 when it allocates tape data sets.

volume_count
Valid values are in the range 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 a VOLume value 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
Specifies 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
Specifies that ASCII Stream data that is being written to tape is allowed to be written using BSAM I/O.

XLate
Specifies the wanted 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 wanted 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.

***** Indicates that 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 the SBDataconn parameter.
2. SIte XLate and SIte SBDataconn are mutually exclusive.

Guideline: If you want to store files on the remote host as MVS data sets, use the SIte subcommand to send data set allocation attributes to the host.

Tips:

- Use the HElp subcommand with the SERVER SIte parameters to display information about the SIte parameters that are supported by the server you are logged in to.
- You can specify SIte subcommand parameters that are not described in this topic. The z/OS FTP client sends all parameters to the remote host for processing. This is useful when the server on the remote host is not a z/OS FTP server. Below is an example:

  ```
  site  myUniqueParameter=12
  ```

- You can send the parameters described in this topic to the FTP server using any FTP client. If the FTP client does not support the SIte subcommand, use the QUOte subcommand to send the information to the server. Below is an example:

  ```
  QUOTE SITE EATTR=OPT
  ```

- You can specify more than one parameter with the SIte subcommand. Delimit each parameter with a blank space.
- If you are sending MVS data sets to the remote host, use the SENDSite subcommand to toggle the automatic sending of SITE commands to the FTP server.

Results:

- The FTP server on the remote host might not implement all the parameters described in this section. This happens often when the FTP server is not a z/OS FTP server.
- The site-dependent information you send 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 while you are logged in to the z/OS FTP server, an error message that specifies the incorrect parameter is displayed. The z/OS FTP server sets all correct parameters, regardless of any incorrect parameters that were specified.

Related topics:

- For more information about the HElp subcommand, see "HElp and ? subcommands—Display help information" on page 193.

- 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 316.
- See "SENDSite subcommand—Toggle the sending of site information" on page 280 for more information about the SENDSite subcommand.
- See "QUOte subcommand—Send an uninterpreted string of data" on page 274 for more information about the QUOte subcommand.
- See the z/OS MVS JCL Reference for more information about some of the SIte and LOCSIte parameters.

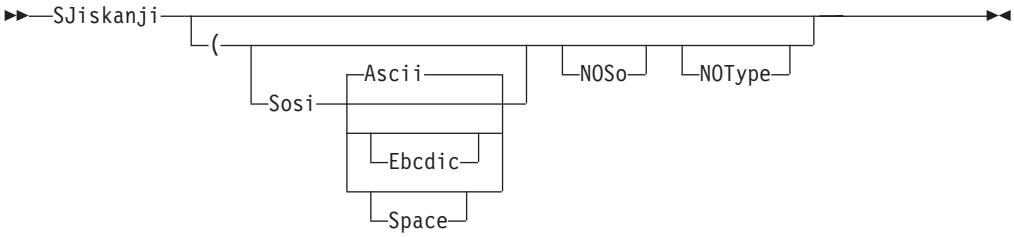
SJiskanji subcommand—Change the data transfer type to SJISKANJI

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 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'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.

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

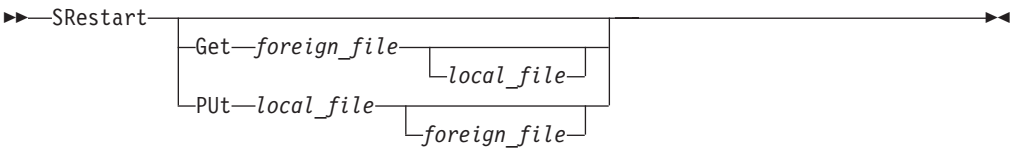
See “FTP with traditional DBCS support” on page 90 and “Support for MBCS languages” on page 93 for more information.

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 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 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 create the start options again, FTP.DATA statements, SIte, and LOCSIte options in effect at the time of the failed file transfer. Unpredictable results can occur if the file transfer environment cannot be created again. If you cannot create the file transfer environment again, 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.
  - Unixfiletype must be FILE.
  - Structure must be FILE.
  - SUnique option must be disabled.
  - Data type must be ASCII, EBCDIC, or Image.
  - SITE and LOCSITE ENcoding must be SBCS (SRestart does not support DBCS or MBCS ENcoding).
  - The session cannot be protected with an active security mechanism (such as TLS or Kerberos).
  - For SRestart PUt, LOCSITE SBSENDEOL=CRLF must be set. If the original transfer used a setting other than CRLF, the transfer cannot be restarted. Using a setting other than CRLF will cause the SRestart to fail. Setting SBSENDEOL to CRLF when the original transfer used a different setting will corrupt the remote file.

- For SRestart Get, SITE SBSENDEOL=CRLF must be set. If the original transfer used a setting other than CRLF, the transfer cannot be restarted. Using a setting other than CRLF will cause the SRestart to fail. Setting SBSENDEOL to CRLF when the original transfer used a different setting will corrupt the local file.
- The local file must reside in the z/OS UNIX file system as a regular file.
- For SRestart PUt, a server that is z/OS Communications Server V1R2 or later rejects the restart if the *foreign_file* value is not a z/OS UNIX file system regular 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 restart the file transfer.

Context

- See "SUnique subcommand—Changes the storage method" on page 325 for information about changing the storage method on the remote host.
- See "STRucture subcommand—Set the file structure" on page 325 for more information.
- See "LOCSIte subcommand—Specify site information to the local host" on page 203 for a description of the SBSENDEOL and ENcoding parameters.

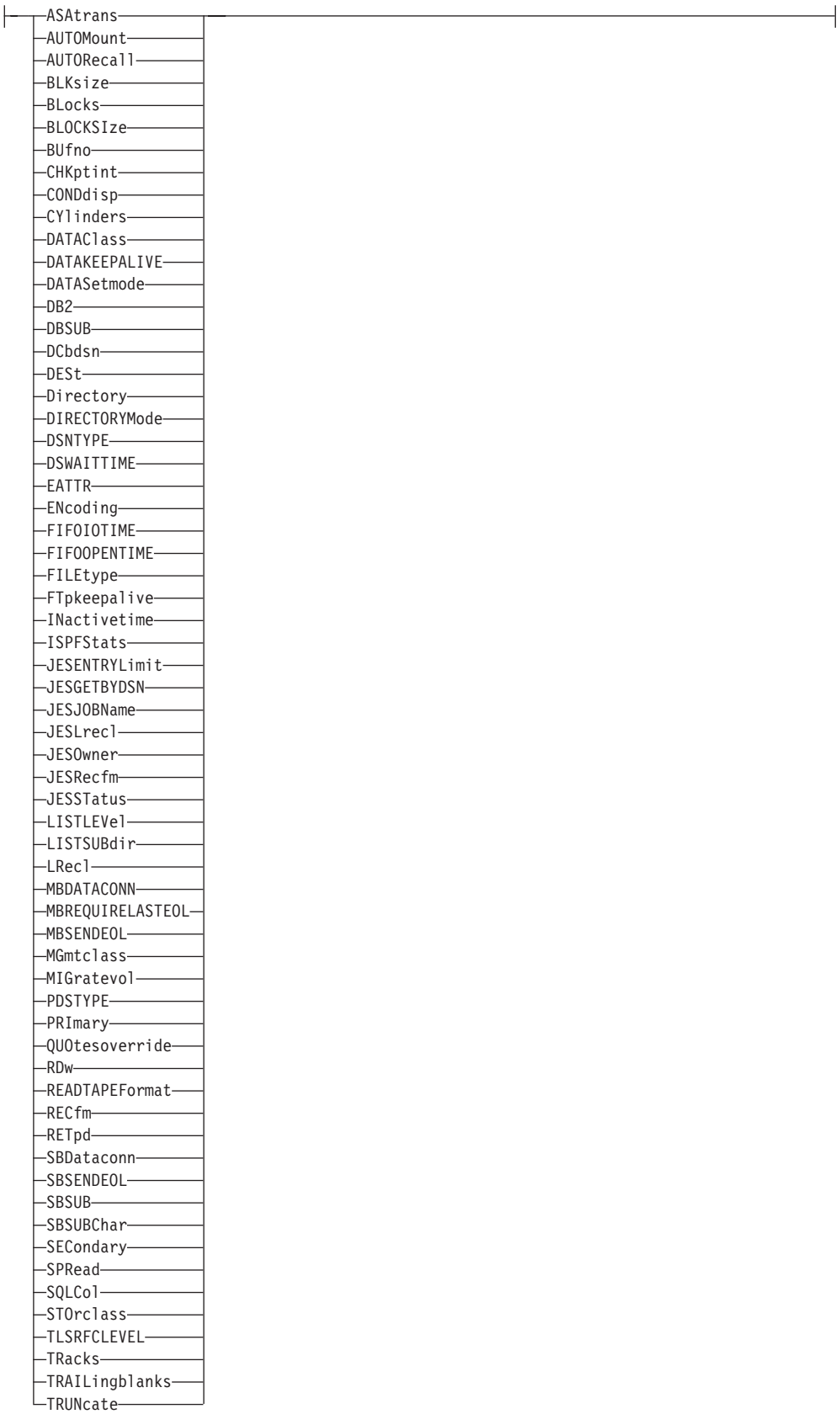
STAtus subcommand—Retrieve status information from a remote host

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, see the z/OS Communications Server: IP Configuration Reference.

Format

options:


ASAtrans
AUTOMount
AUTORecall
BLKsize
BLocks
BLOCKSIze
BUfno
CHKptint
CONDdisp
CYlinders
DATAClass
DATAKEEPALIVE
DATASetmode
DB2
DBSUB
DCbdsn
DESt
Directory
DIRECTORYMode
DSNTYPE
DSWAITTIME
EATTR
ENcoding
FIFOIOTIME
FIFOOPENTIME
FILEtype
FTpkeepalive
INactivetime
ISPFStats
JESENTRYLimit
JESGETBYDSN
JESJOBName
JESLrecl
JESOwner
JESRecfm
JESSTatus
LISTLEVel
LISTSUBdir
LRecl
MBDATACONN
MBREQUIRELASTEOL
MBSENDEOL
MGmtclass
MIGratevol
PDSTYPE
PRImary
QUOtesoverride
RDw
READTAPEFormat
RECfm
RETpd
SBDataconn
SBSENDEOL
SBSUB
SBSUBChar
SECondary
SPRead
SQLCol
STOrclass
TLSRFCLEVEL
TRacks
TRAILingblanks
TRUNcate

Parameters

ASAtrans
Indicates that the FTP server interprets characters in the first column of ASA files being transferred as print control characters.

AUTOMount
Indicates automatic mounting of volumes for data sets that are on unmounted volumes.

AUTORecall
Indicates automatic recall of migrated data sets.

BLocks
Indicates that primary and secondary space allocations are in blocks.

BLOCKSIze
Indicates the block size of a newly allocated data set.

BUfno
Indicates the number of access method buffers that are to be used when data is read from or written to a data set.

CHKptint
Indicates the checkpoint interval for the sending site in a file transfer request.

CONDdisp
Indicates the disposition of the data set if a retrieve operation for a new data set ends before all of the data is written.

CYlinders
Indicates that primary and secondary space allocations are in cylinders.

DATAClass
Indicates the SMS data class.

DATAKEEPALIVE
Indicates the number of seconds that TCP/IP waits while the data connection is inactive before sending a keepalive packet to the FTP client. The value 0 indicates that the DATAKEEPALIVE timer is disabled for this session. For active mode data connections, the keepalive timer that is configured in PROFILE.TCPIP controls how often keepalive packets flow on the data connection. For passive mode data connections, FTP suppresses the PROFILE.TCPIP keepalive timer.

DATASetmode
Indicates whether DATASetmode or DIRECTORYMode is in effect.

DB2
Indicates the DB2 subsystem name.

DBSUB
Indicates whether substitution is allowed for data bytes that cannot be translated in a double-byte character translation.

DCbdsn
Indicates the name of the MVS data set to be used as a model for allocating new data sets.

DESt
Indicates the Network Job Entry (NJE) destination to which the files are routed when you enter a PUt command.

Directory
Indicates the number of directory blocks to be allocated for the directory of a PDS.

DIRECTORYMode
Indicates whether DATASetmode or DIRECTORYMode is in effect.

DSNTYPE
Indicates the data set name type for new physical sequential data sets.

SYSTEM
The DSNTYPE value from the SMS data class is used. If no SMS data class is defined, or if it does not specify the DSNTYPE value, the system DSNTYPE value is used. This is the default value.

BASIC
Allocates physical sequential data sets as physical sequential basic format data sets.

LARGE
Allocates physical sequential data sets as physical sequential large format data sets.

DSWAITTIME
Indicates the number of minutes the FTP server waits for an MVS data set to become available when a local data set is held by another job or process. The value 0 indicates that the FTP server does not wait to obtain a data set when the data set is being held by another job or process.

EATTR
Indicates whether newly allocated data sets can have extended attributes and whether new data sets can reside in the EAS of an EAV.

SYSTEM
The data set uses the SMS data class EATTR value. If no SMS data class is defined, or if the data class contains no EATTR specification, the data set is allocated with the system default.

NO The data set cannot reside in the EAS, and its VTOC entry cannot contain extended attributes.

OPT
The data set can reside in the EAS, and its VTOC entry can have extended attributes if the volume supports them.

ENCODING
Indicates the encoding type that is used for conversions between code pages for data transfers.

FIFOIOTIME
Indicates the length of time the that FTP server waits for a read from a z/OS UNIX named pipe or a write to a z/OS UNIX named pipe to complete.

FIFOOPENTIME
Indicates the length of time that the FTP server waits for an open of a z/OS UNIX named pipe to complete.

FILEtype
Indicates the data set file type.

FTpkeepalive
Indicates the control connection keepalive timer value in seconds.

INactivetime
Indicates the inactivity timer to a specified number of seconds.

ISPFSTATS
Indicates that FTP will create or update ISPF Member statistics when PUt, MPut, or APpend subcommands are issued.

JESENTRYLimit
Indicates the number of entries that can be displayed concurrently using a LIST or NLST command.

JESGETBYDSN
Indicates whether the server should retrieve the file from the MVS system and submit it as a batch job when FILETYPE is JES and JESINTERFACELEVEL is 2, or whether the server should retrieve the JES spool file by the data set name.

JESJOBName
Indicates that any command (Get, LIST, DIr, or MGet) should be limited to those jobs, started tasks, APPC/MVS, or TSO output that match the specified value.

JESLrecl
Indicates the logical record length (LRecl) for the Job Entry System (JES) internal reader at the foreign host.

JESOwner
Indicates that any command (Get, LIST, DIr, or MGet) should be limited to those jobs, started tasks, APPC/MVS, or TSO output which are owned by the user ID specified.

JESRecfm
Indicates the record format for the JES internal reader at the foreign host.

JESSTatus
Indicates what type of information should be returned on LIST and NLST commands.

LISTLEVEL
Indicates which format the FTP server will use when it replies to the LIST command.

LISTSUBdir
Indicates that wildcard searches should apply to the current working directory and should also span its subdirectories.

LRecl
Indicates the logical record length (LRecl) of a newly allocated data set.

MBDATACONN
Indicates the code pages for the file system and for the network transfer that are used when the server does data conversion during a data transfer.

MBREQUIRELASTEOL
Indicates whether the FTP server reports an error when a multibyte file or data set is received from the server with no EOL sequence in the last record received.

MBSENDEOL
Indicates which end-of-line sequence to use when the ENCODING value is SBCS, the data is ASCII, and data is being sent to the server.

MGmtclass
Indicates the SMS management class as defined for the target host by your organization.

MIGratevol
Indicates the volume ID for migrated data sets if they do not use IBM storage management systems.

PDSTYPE
Indicates whether the FTP server creates local MVS directories as partitioned data sets or as partitioned data sets extended.

PRImary
Indicates the number of tracks, blocks, or cylinders for the primary allocation.

QUOtesoverride
Indicates that a 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.

RDW
Indicates that variable record descriptor words (RDWs) are treated as if they are part of the record and are not discarded during FTP transmission of variable format data sets in stream mode.

READTAPEFormat
Displays information about an input data set on tape.

RECfm
Displays the data set record format.

RETpd
Indicates the number of days that a newly allocated data set should be retained.

SBDataconn
Indicates the conversions between file system and network code pages to be used for data transfers.

SBSENDEOL
Indicates which end-of-line sequence to use when ENCODING is SBCS, the data is ASCII, and data is being sent to the client.

SBSUB
Indicates that substitution is allowed for data bytes that cannot be translated in a single-byte-character translation.

SBSUBCHAR
Indicates the value that is used for substitution when SBSUB is also specified.

SECondary
Indicates the number of tracks, blocks, or cylinders for the secondary allocation.

SECUREIMPlicitzos
Indicates that when the client connects using the TLSPORT implicit connection, the client waits for the 220 good morning reply before initiating the security handshake and negotiation.

SPRead
Indicates that the output is in spreadsheet format when the file type is SQL.

SQLCol
Indicates the SQL output file column headings.

STOrclass
Indicates the SMS storage class as defined by your organization for the target host.

TLSRFCLEVEL
Indicates the level of RFC 4217, *On Securing FTP with TLS*, that is supported by the server.

TRacks
Indicates that primary and secondary space allocations are in tracks.

TRAILingblanks
Indicates whether the FTP server preserves the trailing blanks in a fixed-format data set when the data is sent to a foreign host.

TRUNcate
Indicates that truncation is permitted.

UCOUNT
Indicates the number of devices to allocate concurrently to support the allocation request.

UCSHOSTCS
Indicates the EBCDIC code set to be used when converting to and from Unicode.

UCSSUB
Indicates that in Unicode-to-EBCDIC conversion, the EBCDIC substitution character is used to replace any Unicode character that cannot be successfully converted.

UCSTRUNC
Indicates that in Unicode-to-EBCDIC conversion, EBCDIC data truncation is allowed.

UMask
Indicates the file mode creation mask.

UNICODEFILESYSTEMBOM
Indicates whether the FTP server will store incoming Unicode files with a byte order mark.

Unit
Indicates the unit type for allocation of new data sets.

UNIXFILETYPE
Indicates whether the FTP server treats files in its z/OS UNIX file system as regular files or as named pipes.

VCOUNT
Indicates the number of tape data set volumes that an allocated data set can span.

VOLume
Indicates the volume serial number for allocation of new data sets.

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 can be written using BSAM I/O.

XLate
Indicates the translate table to be used for the data connection.

Examples

The following is an example of the STAtus subcommand using a single parameter:

```
status (asatrans
>>> XSTA (asatrans
211-ASA control characters in ASA files opened for text processing
211-will be transferred as ASA control characters.
211 *** end of status ***
```

The following is an example of retrieving the status information from an FTP server:

```
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-Server site variable DSWAITTIME is set to 10
 211-Server site variable DATAKEEPALIVE is set to 120
 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-DBSUB is set to TRUE
 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-Server site variable EATTR is set to OPT
 211-Server site variable DSNTYPE is set to LARGE
 211-Server site variable LISTSUBDIR is set to TRUE
 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, see 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 MOde S subcommand. See "MOde subcommand—Set the data transfer mode" on page 251 for more information.

Format

Parameters

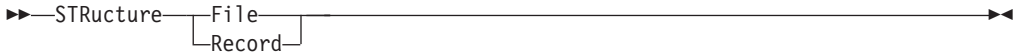
There are no parameters for this subcommand.

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. When the STRucture value is File, the file is sent as a continuous sequence of data bytes.

Record
Sets the file structure to Record. When the STRucture value is Record, the file is sent as a series of records.

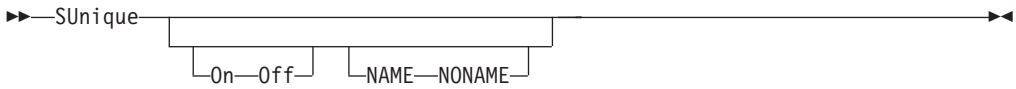
Tip: Use STRucture RECORD in conjunction with a CHKConfidence value of TRUE in FTP.DATA to improve detection of incomplete file transfers.

SUnique subcommand—Changes the storage method

Purpose

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 the *foreign_file* value, 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 is 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 is 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

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 a z/OS UNIX file system 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.
  ```

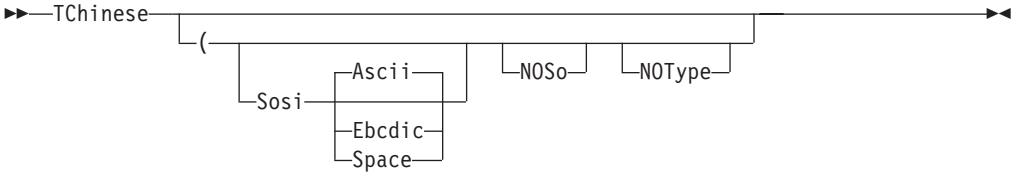
TChinese subcommand—Change the data transfer type to TCHINESE

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, 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 90 and "Support for MBCS languages" on page 93 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

Parameters

command_line
Specifies a TSO command. Do not use synonyms.

Usage

The TSO subcommand is not available from batch.

Restrictions

You cannot use TSO commands that run with POSIX(ON) because of a Language Environment restriction with nested enclaves. See Using nested enclaves in z/OS Language Environment Programming Guide for more information. The following TSO commands run with POSIX(ON):

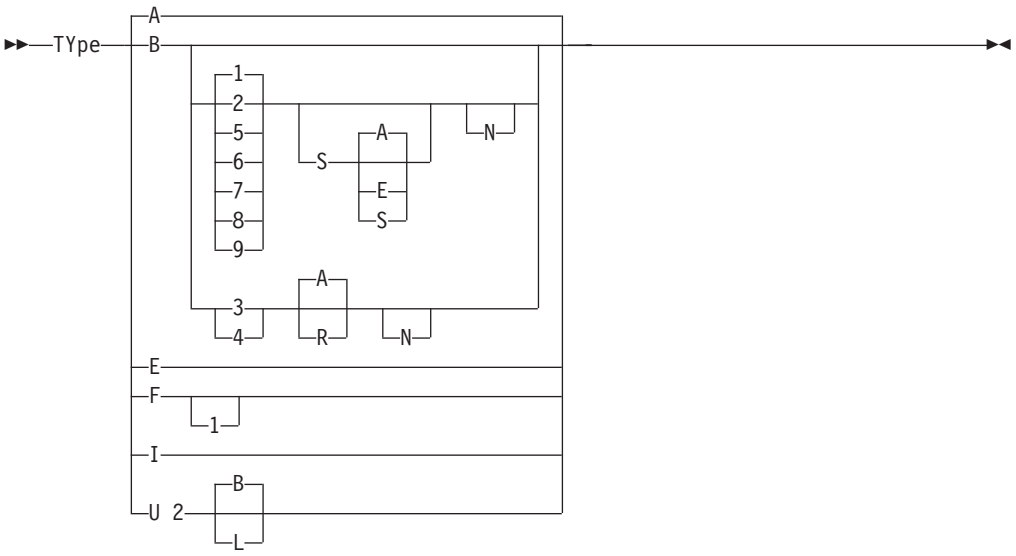
- FTP
- PING
- NETSTAT
- TRACERTE

TYpe subcommand—Set the data transfer type

Purpose

Use the TYpe subcommand to set the data transfer type for the client and server simultaneously with one command. FTP supports the ASCII, EBCDIC, image (binary), UCS-2, 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 translates outgoing files to ASCII before sending them, and translates 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 delimeters.

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 that 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 might change during transfer to and from the EBCDIC host when pure DBCS is specified with any SO/SI option. When pure DBCS is 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. TYpe 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 TYpe 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 might 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) can 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 changes 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

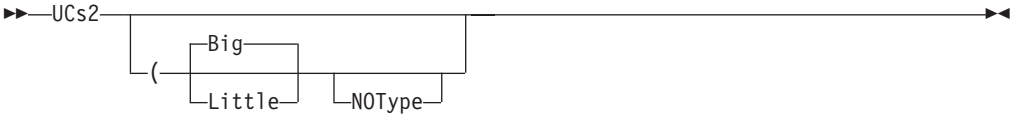
For more information about transfer methods, see Table 13 on page 52.

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.

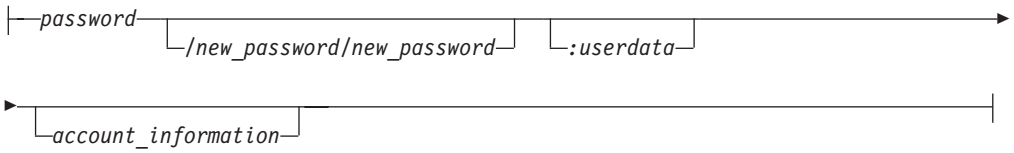
User subcommand—Identify yourself to a host or change your TSO user ID password

Purpose

Use the User subcommand to identify yourself to the remote host after opening a connection. If the remote host is a z/OS FTP server, you can change your TSO user ID, password, or password phrase.

Format

Where Password is:



Parameters

user_id
Specifies your login name on the host.

password
Specifies your current password or password phase on the host. If you do not supply *password* when invoking the User subcommand, you are prompted to enter a password if the host requires a password to log in.

new_password/new_password
An optional parameter that specifies your new password or password phase on the host. You must enter the password twice.

Requirement: SAF-compliant security products such as RACF require that *password* and *new_password* both be passwords, or both be password phrases.

: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 back slash 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.

Results:

- 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 or password phrase incorrectly, the client does not prompt you 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 entering the User subcommand. You can issue the User subcommand to change your TSO *user_id* password at any time during the FTP session.

Tips:

- To avoid having your password print when coding your user ID and password as part of a CLIST or batch job, enter your user ID and password on separate lines.
- You can use the NETRC data set to automatically provide the user ID, password and account information to log in to an FTP server.

Rules:

- Do not place any spaces between the passwords and the slashes (/), and the user data.
- Enter a password phrase that contains blanks by enclosing the entire password phrase in quotation marks. You can use single or double quotation marks. If the password phrase itself contains a quotation mark, use the other style of quotation marks to enclose the password phrase.

  Example: Enter the phrase *What's up, Doc?* as *"What's up, Doc?"*, but not as *'What's up, Doc?'*.

  This rule applies also to the account information and user IDs.
- Do not use quotation marks to enclose a password phrase that is comprised only of any of the following characters:
  - Uppercase or lowercase letters
  - Numerals from 0 to 9
  - The following special characters:
    - @
    - #
    - $
    - -
    - {
    - .
    - (
    -)
    - *
    - %
    - +

  This rule applies also to user IDs and to the account information.

  Example: Enter the password phrase *JoeIBMer@ibm.com* as *JoeIBMer@ibm.com*, but not as *'JoeIBMer@ibm.com'*, nor as *"JoeIBMer@ibm.com"*.

Note: When you use FTP through a proxy that requires two passwords with one for the firewall and the other for the remote system, specify both passwords by enclosing them in quotation marks.

Example: Enter the user IDs NAME1 and NAME2 as *'NAME1 NAME2'*, or as *"NAME1 NAME2"*.

Restrictions:

- A password phrase, user ID, or the account information that you enter at the z/OS FTP client must not contain both single quotation mark and double quotation mark characters. You can use either style of quotation marks in the user ID, password phrase, or account information, but not both.

  Example: The password phrase *What's up, Doc?* is valid because it contains only single quotation marks. You enter it at the z/OS FTP client as *"What's up, Doc?"*. The phrase *"What's up, Doc?"* with the double quotation marks as part of the phrase cannot be entered at the z/OS FTP client because it contains both styles of quotation marks.

  If you enter the *password/new_password/new_password* argument, the sequence *password/new_password* cannot contain both single quotation mark and double quotation mark characters. You can use either style of quotation marks, but not both.

  Example: The password *What's up, Doc?* and new password *Not much; what's up with you?* are valid because the two password phrases contain only single quotation marks. You enter it at the z/OS FTP client as *"What's up, Doc?/Not much; what's up with you?/Not much; what's up with you"*. The password phrases *"What's up, Doc? "* and *He said, "not much; you?"* cannot be entered as a *password/new_password/new_password* sequence at the z/OS FTP client because the password phrases use both styles of quotation marks.
- When entering this subcommand in a USS environment, you can enter only up to 510 characters including the subcommand name. When entering the optional password argument as *password/newpass/newpass:userdata account_information*, such that *password* and *newpass* are password phrases, you must take this into account.

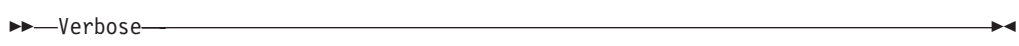
Related Topic: See "NETRC data set" on page 33 for information about using NETRC.

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



Parameters

There are no parameters for this subcommand.

Examples

```
verbose
Message IDs are not displayed when running in z/OS UNIX
Command:
lpw
Local directory name set to hierarchical file /u/user33
Command:
verbose
EZA2859I Message IDs are displayed when running in z/OS 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.

Chapter 6. Sending electronic mail using SMTP commands

This topic describes how to use the SMTPNOTE command, provided with z/OS Communications Server, 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 topic describes information about:

- "Interfaces to the SMTP address space"
- "Using the SMTPNOTE command from your terminal" on page 338
- "Monitoring the status of SMTP using the TSO SMSG command" on page 343
- "SMTP commands" on page 349
- "SMTP responses" on page 359
- "Using batch SMTP command in TSO utilities" on page 361
- "SMTP with DBCS support" on page 362

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 an 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 361. For examples of batch SMTP, see "Batch SMTP examples" on page 360.

  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, see "VERB command—Enable or disable verbose mode" on page 358.
  2. With this interface, you might not be able to use certain SMTP options that require the NETDATA format. For details, see the z/OS Communications Server: IP Configuration Reference.

IBM z/OS Communications Server 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 13 on page 338.

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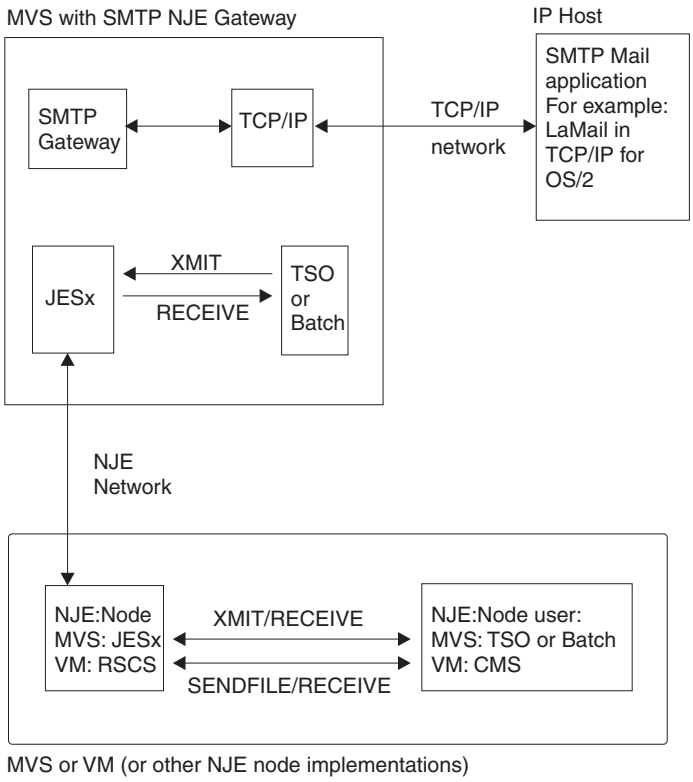


Figure 13. SMTP gateway overview

Using the SMTPNOTE command from your terminal

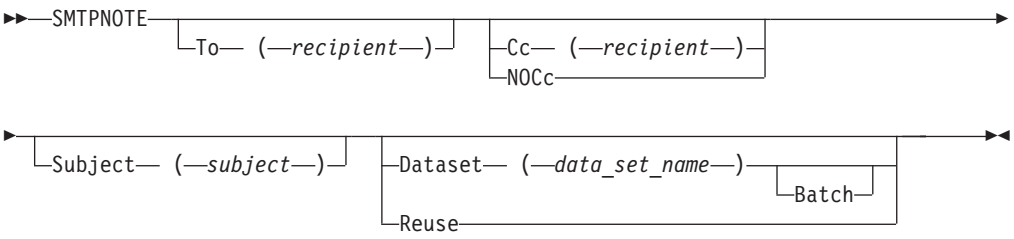
The SMTPNOTE command enables you to prepare the mail using the facilities of the Time Sharing Option (TSO) EDIT command, or to send mail prepared with a system editor of your choice.

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 D, "Related protocol specifications," on page 451 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 348 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.
- Do not use extended attribute data sets (PDSE) with SMTPNOTE.

SMTPNOTE command: 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, see the z/OS TSO/E Command 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 14 on page 341 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 14. Example of preparing and sending mail

SMTPNOTE command: Receiving mail

Use the TSO RECEIVE command to receive SMTP mail, as you would other mail and messages. Figure 15 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%mvsxa3@TREEFROG.ABC.OZ
           Cc:       mmc%mvsxa3@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 15. 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, see the z/OS TSO/E User's Guide, z/OS TSO/E Command Reference, or z/OS TSO/E Customization.

SMTPNOTE command: 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 16. 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 16. 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 17. 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 17. 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 can 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 "`SMSG smtpprocname STOPEXIT`" 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 "`SMSG smtpprocname STARTEXIT`" 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 TSO SMSG command

The TSO SMSG command provides an interactive interface to the SMTP server to do the following:

- 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).

Restriction: SMSG SMTP is not supported in batch mode. SMSG SMTP uses VMCF and the PASCAL interface to queue information and does not print the information to a DD card.

SMSG SMTP command for the general user

Purpose

As a general user or an authorized 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

HElp
Provides a list of valid SMTP SMSG commands.

NUMQueue
Provides the number of mail messages that are currently queued in SMTP.

QUeues
Provides a list of mail that is queued on the various SMTP mail processing queues.

STats
Provides operating statistics about the SMTP server since the SMTP server was started.

Examples

```
System:    READY
User:      smsg smtp numqueue
System:    Msg from SMTP: * Current Number of Mail Messages Queued is 50
```

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:  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
           +Msg from SMTP:  * -------------------------------------------
           +Msg from SMTP:  * Highest num queued: 500
           +Msg from SMTP:  * High reached at: Wed, 28 Jul 93 20:00:00 EST
           READY
```

Field descriptions:

The statistics about SMTP include:

- The date that SMTP was last started.
- Statistics about mail handled by SMTP over the past four days, including:

  From TCP
  The number of pieces of mail that arrived over TCP connections

  From Spool
  The number of pieces of mail that arrived from spool (local or NJE senders)

  BSMTP Logs
  The number of pieces of mail generated in response to requests to VERBose batch SMTP connections

  Error Mail
  The number of pieces of mail generated to return error mail to the sender

  To Local
  The number of pieces of mail delivered to local recipients

  To RSCS
  The number of pieces of mail delivered to recipients on the RSCS network

  To TCP
  The number of pieces of mail delivered to recipients on the TCP/IP network

Passive Opns
The number of TCP connections through which mail was received

Active Opens
The number of TCP connections through which mail was delivered

Highest num queued
The highest number of messages queued up in SMTP and the time and date when this occurred

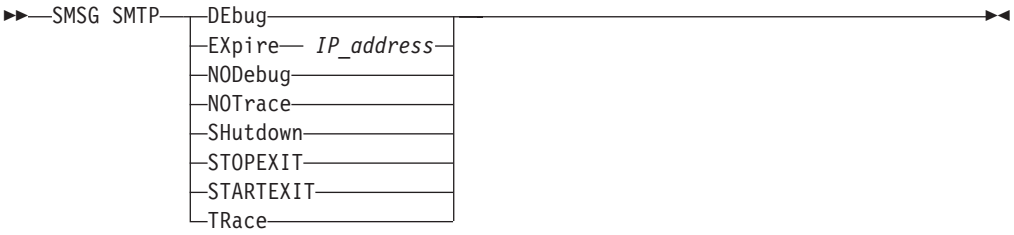
High reached at
The time and date when the highest number of messages queued in SMTP occurred

SMSG SMTP command for the authorized user

Purpose

As an authorized user, use the privileged 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. Specifying this parameter is the same as adding the DEBUG statement to the SMTP configuration data set (SMTPCONF).

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, see 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, see 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:  smsg 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

SMSG commands from authorized users are accepted only from users that are specified in the SMSGAUTHLIST statement.

Context

See the z/OS Communications Server: IP Configuration Reference for information about the SMTP configuration data set (SMTPCONF) and for a description of how to assign authorized users with 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 18 is an example of a mail gateway.

In Figure 18, 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.

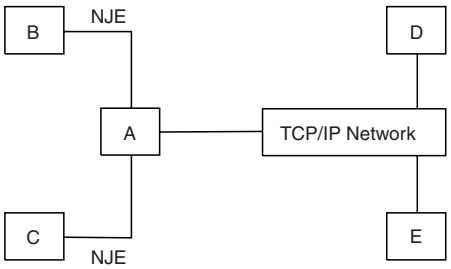


Figure 18. SMTP as a mail gateway

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 338.

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:

user_id	Is the user ID of the TSO user on host A.
A.domain	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:

user_id	Is the user ID of the user on the host.

NJEHost Is the name of the NJE host (B or C).
A.domain 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 topic describes the SMTP commands as listed in Table 21.

Table 21. SMTP commands

Subcommand	Description	See
DATA	Define the following information as data.	"DATA command—Define the following information as data" on page 350
EXPN	Verify if a mailbox exists on the local host.	"EXPN command—Verify whether a mailbox exists on the local host" on page 352
HELO	Identify the domain name of the sending host to SMTP.	"HELO command—Identify the domain name of the sending host to SMTP" on page 352
HELP	Get help with SMTP commands.	"HELP command—Get help with SMTP commands" on page 353
MAIL FROM	Specify the sender of the mail.	"MAIL FROM command—Specify the sender of the mail" on page 353
NOOP	Return a `250 OK` return code when SMTP is responding.	"NOOP command—Return a 250 OK return code when SMTP is responding" on page 354

Table 21. SMTP commands (continued)

Subcommand	Description	See
QUEU	Get information about mail queued at SMTP for delivery.	"QUEU command—Get information about mail queued at SMTP for delivery" on page 354
QUIT	End an SMTP connection.	"QUIT command—End an SMTP connection" on page 356
RCPT TO	Specify the recipients of the mail.	"RCPT TO command—Specify the recipients of the mail" on page 356
RSET	Reset the SMTP connection to the initial state.	"RSET command—Reset the SMTP connection to the initial state" on page 357
TICK	Insert an identifier into the batch SMTP response data set.	"TICK command—Insert an identifier into the batch SMTP response data set" on page 357
VERB	Enable or disable verbose mode. **Note:** VERB ON can cause spool problems for SMTP if the REPLY TO: user is not a valid NJE node user.	"VERB command—Enable or disable verbose mode" on page 358
VRFY	Verify if a mailbox exists on the local host.	"VRFY command—Verify whether a mailbox exists on the local host" on page 358

Restrictions:

- If the DISALLOWCMD statement was used, the server will not support the EXPN, HELP, QUEU, VERB, and VRFY commands.
- The TSO SMTP command uses the Pascal socket API, so VMCF must be started for the command to be successful. If the SMSG SMTP command is invoked and VMCF is not active, the following message is issued to the terminal of the TSO user: `EZY2040I SMSG: VMCF is not active on the system`.

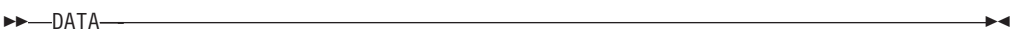
Data sets containing SMTP commands can be written to the JES spool as SYSOUT data sets. These SYSOUT data sets contain either punch or NETDATA records. Data sets originate from users on the same system as the SMTP address space or from users on any system connected to the host system through an NJE network.

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



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, see 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. See 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

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:

```
SMTP client:  EXPN mike
SMTP server:    250 mike@abc.com
```

Verify whether `users-hackers` is a mailing list on host abc.com:

```
SMTP client:  EXPN users-hackers
SMTP server:    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

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

Parameters

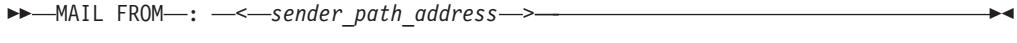
command_name
Indicates any of the SMTP commands.

MAIL FROM command—Specify the sender of the mail

Purpose

Use the MAIL FROM command to specify the sender of the mail.

Format



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

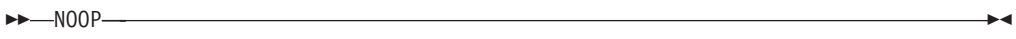
- The MAIL FROM command is used once after a HELO command.
- If the host system has never heard of the sender host, a positive reply is sent, but a message is logged in the SMTP console.

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



Parameters

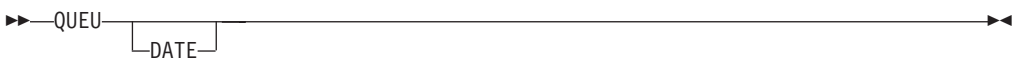
There are no parameters for this command.

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, see the z/OS Communications Server: IP Configuration Reference.

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 might 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 try the query again. 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 trying the query again. 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

Parameters

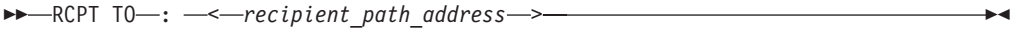
There are no parameters for this command.

RCPT TO command—Specify the recipients of the mail

Purpose

Use the RCPT TO command to specify mail recipients.

Format



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 2000 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, see 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

Parameters

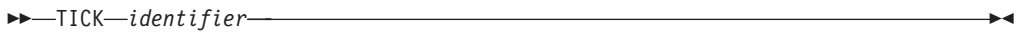
There are no parameters for this command.

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



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

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:

```
SMTP client: VRFY mike
SMTP server: 250 mike@abc.com
```

Verify whether `users-hackers` is a mailing list on host abc.com:

```
SMTP client:  VRFY users-hackers
SMTP server:  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 that are defined in the SMTPGLOB object. A reference copy of this object is included in the SEZACMAC library; the object lists constant value declarations that are used by SMTP.

The default values of some of these constants are:

- Command lines must not exceed the MaxCommandLine value (512 characters).
- Data lines must not exceed 998 characters in length for mail RFCs (this value does not include the carriage return/linefeed character (CRLF), which must be added to each data line). Internally, SMTP uses a slightly larger MaxDataLine value to hold record attributes.

  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 is 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 is presented to the user along with any other notes that are to be processed.
- Path addresses must not exceed the MaxPathLength value (256 characters).
- Domain names must not exceed the MaxDomainName value (256 characters).
- User names, the local part of a mailbox specification, must not exceed the MaxUserName value (256 characters).

The limit on the number of RCPT commands in a single SMTP job is 2000. If you have more than 2000 RCPT commands, the excessive RCPT commands receive a 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.
- The 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 example shows 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
```

Note: The date header must contain the time and the correct time zone. If the time zone is not present, then the time the e-mail is received on the remote side defaults to a time zone of GMT. See RFC 822 for the required syntax of this information.

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 IEGNEGER 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
: 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.

Note: The date header must contain the time and the correct time zone. If the time zone is not present, then the time the e-mail is received on the remote side defaults to a time zone of GMT. See RFC 822 for the required syntax of this information.

```
//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
 //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. See 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 topic briefly 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.

For a comprehensive discussion of sendmail, see the industry-accepted document *sendmail* by O'Reilly & Associates, Inc.

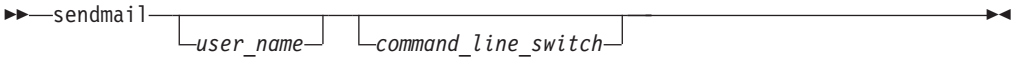
You can also find more information about sendmail on Web site *http://www.sendmail.org*. For the features added after version 8.8.7, see *SENDMAIL INSTALLATION AND OPERATION GUIDE*, that can be found on Web site *http://www.sendmail.org/~ca/email/doc8.12/op.html*.

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
See 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 might 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

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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. Sending electronic mail using the Communications Server SMTP application

The Communication Server SMTP (CSSMTP) application is a mail forwarding SMTP client. CSSMTP processes data sets that are in the JES spool file that contain mail messages and then forwards the mail messages to a target server. This topic describes how to prepare mail messages, add them to the JES spool data set, and forward them to the target server.

This topic describes the following information:

- Creating mail messages on the JES spool data set
  - "Using the SMTPNOTE command"
  - "Using the TSO TRANSMIT command to send a mail file" on page 370
  - "Using the IEBGENER utility to copy a mail file to a JES sysout file" on page 371
- "SMTP commands" on page 373
- "SMTP commands and reply codes across a TCP/IP connection" on page 379
- "CSSMTP exit for unwanted mail" on page 379
- "Example of receiving mail" on page 379
- "Example of an undelivered mail notification" on page 380
- "Example of generated error reports" on page 380

Creating mail messages on the JES spool data set

This topic describes how to prepare mail messages and add them to the JES spool data set.

Using the SMTPNOTE command

Purpose

Use the SMTPNOTE command to prepare mail for one or more recipients using the Time Sharing Option (TSO) EDIT command or to send mail that is created with another system editor.

Send electronic mail to one or more recipients on TCP networks using the SMTPNOTE command. Use the SMTPNOTE command to transmit mail messages to the JES spool data set to be processed by the CSSMTP application. If the CSSMTP application does not have an ExtWrtName statement, you must customize the SMTPJOB variable in the SMTPNOTE CLIST to match the CSSMTP application job name; otherwise, ensure that the SMTPJOB variable in the SMTPNOTE CLIST matches the value that is specified on the ExtWrtName configuration statement. The DOMAIN variable should also be set in the SMTPNOTE CLIST when you are using CSSMTP. For more information about customizing the SMTPNOTE CLIST, see the steps for customizing the SMTPNOTE CLIST (optional) in z/OS Communications Server: IP Configuration Guide.

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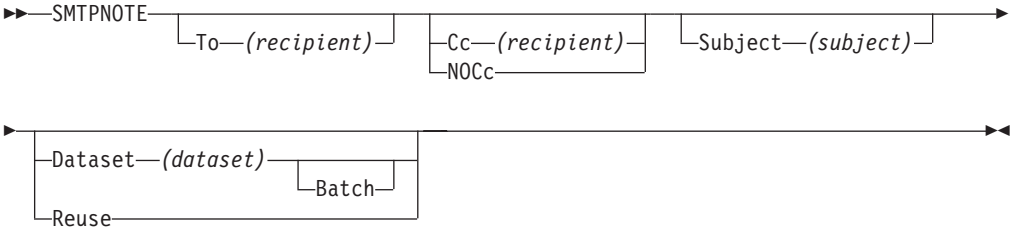
Format



Parameters

To (*recipient***)**
Specifies a single recipient for the mail message. 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 recipient list with a blank line. You must specify at least one mail recipient.

Cc (*recipient***)**
Specifies a single copy recipient for the mail message. 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 copy 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 the Cc parameter takes place.

(*recipient***)**
Specifies the path address of the mail recipient. The format of the recipient parameter is equivalent to the path syntax, as described in RFC 2821, without the less than (<) and greater than (>) delimiters. For information about accessing RFCs, see Appendix D, "Related protocol specifications," on page 451.

The *recipient* parameter has one of the following formats:

user_id@host_name
A user on a host in your domain, possibly on your local node.

user_id@host_name .domain
A user on a host in a specified domain.

Restrictions:

- The CSSMTP application does not rewrite the specified path name. The batch job must specify the proper email address formats, such as *userid@host.domain*. For example, in the command string *user_id%nje_host_name@gateway_name.domain*, the term *user_id%nje_host_name* is treated as a user ID.
- The CSSMTP application does not support source routing, such as *@host1,@host2:userid@host3* or *NJEuserid%NJEhost* format. For example, in the address string *@host1,@host2,...,@hostn :user_id @host_name*, the *@host1,@host2,...,@hostn* portion of the address is ignored and the *user_id @host_name* portion of the address is used as the recipient value.
- The CSSMTP application does not generate source routing addressing formats.

Subject (*subject*)
Specifies the subject of the mail message. If the subject is specified as a keyword, the message cannot contain embedded blanks; otherwise, the subject can be any character string. The maximum length is 233 characters.

Batch
Specifies that no prompting takes 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, can be blocked or unblocked, and can have records that are 1 – 243 characters in length. The *data_set_name* variable is the name of the sequential data set that contains the mail message text. The data set name must be a valid data set name, and is fully qualified if it is within single quotation marks (').

Reuse
Causes SMTP to reuse the contents of a mail message that was previously canceled. If a mail message was not canceled, the Reuse parameter is ignored.

Guidelines:

- When the To, Cc, Subject, or Dataset parameters are specified more than once, the SMTPNOTE application uses the last value that was specified. No error messages are generated if there are duplicate parameters on the command line.
- SMTPNOTE does not require quotation marks around blanks, or single quotation marks, semicolons, or commas around data set names.

Restriction: Do not use extended attribute data sets (PDSE) with the SMTPNOTE command.

Examples

After you enter the SMTPNOTE command, you are prompted for the mail recipients (To:), the copy recipients (Cc:), and the subject of the mail message (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 enter a blank line to indicate the end of the list.

After you answer the prompts, SMTPNOTE invokes the TSO EDIT command to enable you to prepare your mail message. Typically, the TSO editor starts in INPUT mode. Enter the text of your mail message line by line. When your mail message is complete, enter a null line (that is, do not type anything when you are prompted) and press **Enter**. The editor switches to EDIT mode.

In EDIT mode, you can use all of the functions of the editor. You can also return to INPUT mode, send the mail message, or cancel the mail message. For a complete description of the EDIT command, see z/OS TSO/E Command Reference.

If you invoke the SMTPNOTE command with the Reuse or Dataset parameter, your session is immediately placed in EDIT mode. The contents of the previously canceled mail message or the data set that you specify are already part of the mail message. You can add to or change the existing data.

To send the mail message, enter `END SAVE` in EDIT mode, and then enter `SEND`. To cancel the mail message, enter `END SAVE` or `END NOSAVE` in EDIT mode, and then enter `CANCEL`. If you cancel a mail message, you can recover the data that you

entered by invoking the SMTPNOTE command with the Reuse parameter. The recipients and subject of the mail message are not saved, and must be reentered. The following is an example of the results 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
```

Using the TSO TRANSMIT command to send a mail file

Purpose

Use a TSO TRANSMIT (XMIT) command to send to the spool file a previously constructed mail file that contains SMTP commands to be processed by CSSMTP for one or more mail messages. See "SMTP commands" on page 373 for more information about each SMTP command.

Examples

1. Construct a mail file named MYCSSMTP.NOTE:

```
HELO YOURMVS
MAIL FROM:<CAROL@YOUR.MVSDOMAIN.COM>
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@YOUR.MVSDOMAIN.COM>
To:   <msgs@rsch.our.edu>
Cc:   <alice@ai.our.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
```

2. Use the XMIT command to put the file *userid*.MYCSSMTP.NOTE into the JES spool data set:

```
XMIT jesnode.cssmtp1 DA(userid.mycssmtp.note)
```

jesnode
The JES node name or host name.

cssmtp1
The external writer name if the ExtWrtName statement is specified in the CSSMTP application configuration file, or the CSSMTP application address space name if the ExtWrtName statement is not specified in the CSSMTP application configuration file.

userid.**mycssmtp.note**
The SMTP commands data set.

Note: If you send 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 as shown in the following example:

```
XMIT jesnode.cssmtp1 DA(pds(member)) SEQ
```

In this example, `pds` is the name of the partitioned data set and `member` is the name of the PDS member that is to be sent to the CSSMTP1 external writer name.

Using the IEBGENER utility to copy a mail file to a JES sysout file

Purpose

Use the IEBGENER utility to copy a previously constructed mail file to the JES spool data set that contains SMTP commands for one or more mail messages for the CSSMTP application to process. See "SMTP commands" on page 373 for more information about each SMTP command.

Examples

- Construct a mail file named *userid*.MYCSSMTP.NOTE:

```
HELO YOURMVS
MAIL FROM:<CAROL@YOUR.example.COM>
RCPT TO:<msgs@rsch.example.edu>
RCPT TO:<alice@ai.example.edu>
DATA
Date: Thur, 26 Mar 92 21:48:57 EST
From: Carol< CAROL@YOUR.example.COM>
To:   <msgs@rsch.example.edu>
Cc:   <alice@ai.example.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
```

- Create JCL using the IEBGENER utility:

```
//jobname  JOB (accounting.information),"programmer.name",CLASS=A,MSGCLASS=A,
//             NOTIFY=userid
//COPY    EXEC PGM=IEBGENER
//SYSPRINT  DD SYSOUT=*
//SYSIN     DD DUMMY
//SYSUT1    DD DISP=SHR,DSN=userid.MYCSSMTP.NOTE
//SYSUT2    DD SYSOUT=(A,CSSMTP1),SPIN=ALLOC
```

- Create JCL with inline input for SYSUT1 and SYSUT2 using the IEBGENER utility:

```
//jobname  JOB (accounting.information),"programmer.name",CLASS=A,MSGCLASS=A,
//             NOTIFY=userid
//COPY    EXEC PGM=IEBGENER
//SYSPRINT  DD SYSOUT=*
//SYSIN     DD DUMMY
//SYSUT1    DD *
HELO YOURMVS
MAIL FROM:<CAROL@YOUR.example.COM>
RCPT TO:<msgs@rsch.example.edu>
RCPT TO:<alice@ai.example.edu>
DATA
Date: Thur, 26 Mar 92 21:48:57 EST
From: Carol <CAROL@YOUR.example.COM>
To:   <msgs@rsch.example.edu>
Cc:   <alice@ai.example.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=(A,CSSMTP1),SPIN=UNALLOC
```

Rules:

- If necessary, code the DCB attributes on the SYSUT2 DD statement. The following example shows how to code the DCB attributes:

  ```
  //SYSUT2 DD SYSOUT=(A,CSSMTP1),DCB=(LRECL=133,BLKSIZE=27930),FREE=CLOSE
  ```

  The logical record limit for files is 1024 bytes. The block size limit for files that are placed on the spool file is 32760.
- Do not place spanning record files on the spool file for the CSSMTP application to use, because the CSSMTP application does not support these files.
- Use SPIN=UNALLOC or CLOSE=FREE when you create multiple sysout files in one job. This creates a separate sysout group for each sysout file and prevents CSSMTP from holding or deleting sysout files if one sysout file contains an error.

cssmtp1
: The external writer name if the ExtWrtName statement is specified in the CSSMTP application configuration file, or the CSSMTP application address space name if the ExtWrtName statement is not specified in the CSSMTP application configuration file.

userid.**MYCSSMTP.NOTE**
: The SMTP commands data set.

SMTP commands

The following are general SMTP commands and data rules for CSSMTP:

Rules:

- The following size limits apply:
  - The SMTP command lines must not exceed 510 characters in length
  - Data lines must not exceed 998 characters in length
  - Path addresses must not exceed 255 characters in length
  - Domain names must not exceed 255 characters in length
  - User names, which are the local part of a mailbox specification, must not exceed 64 characters in length
  - Maximum number of RCPT records per mail message is 2000
- Files must not contain graphic characters (0x00 through 0x3f) except for the tab character (0x09) or newline character (0x15).

Tips:

- Records can be concatenated with the next line when the record is 80 bytes long and the last character is a less than (<) or newline (0x15) character .
- Use the EBCDIC code page. The default code page is EBCDIC IBM 1047. See the Translate configuration statement information in z/OS Communications Server: IP Configuration Reference for more details.

Result: Trailing blanks are removed from all records.

Table 22. SMTP commands that are supported by CSSMTP

Subcommand	Supported by SMTP Server	Supported by CSSMTP application	Description	Reference
DATA	YES	YES	Defines information as the data text of the mail body.	"DATA command: Define the following information as data" on page 375
EHLO	NO	YES	Identifies the domain name of the sending host to SMTP.	"EHLO command: Identify the domain name of the sending host to SMTP" on page 376
EXPN	YES	NO	Verifies whether a mailbox exists on the local host.	Command is not implemented
HELO	YES	YES	Identifies the domain name of the sending host to SMTP.	"HELO command: Identify the domain name of the sending host to SMTP" on page 376
HELP	YES	NO	Provides help with SMTP commands.	Command is not implemented
MAIL FROM	YES	YES	Specifies the mail sender.	"MAIL FROM command: Specify the sender of the mail" on page 377

Table 22. SMTP commands that are supported by CSSMTP (continued)

Subcommand	Supported by SMTP Server	Supported by CSSMTP application	Description	Reference
NOOP	YES	NO	Returns a 250 OK return code when SMTP is responding.	Command is not implemented
QUEU	YES	NO	Gets information about mail that is queued at SMTP for delivery.	Command is not implemented
QUIT	YES	YES	Stops SMTP processing.	"QUIT command: End SMTP processing" on page 377
RCPT TO	YES	YES	Specifies the mail recipients.	"RCPT TO command: Specify the recipients of the mail" on page 377
RSET	YES	YES	Resets the SMTP processing to the initial state.	"RSET command: Reset the SMTP processing to the initial state" on page 378
STARTTLS	NO	YES	Tells the CSSMTP application that the SMTP server is currently able to negotiate the use of TLS.	"STARTTLS command: Indicate the ability to negotiate the use of TLS" on page 378
TICK	YES	NO	Inserts an identifier into the batch SMTP response data set.	Command is not implemented
VERB	YES	NO	Enables or disables verbose mode. **Note:** VERB ON can cause spool problems for SMTP if the REPLY TO: *user* is not a valid NJE *node.user*.	Command is not implemented
VRFY	YES	NO	Verifies whether a mailbox exists on the local host.	Command is not implemented

Note: The EXPN, HELP, NOOP, QUEU, TICK, VERB, and VRFY commands and the optional commands SAML, SEND, SOML, and TURN (see RFC 821 for details), are not implemented in the CSSMTP application. These commands are ignored and are not processed.

Data sets that contain SMTP commands can be written to the JES spool data set 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 CSSMTP address space or from users on any system that is connected to the host system through an NJE network.

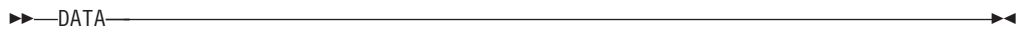
DATA command: Define the following information as data

Purpose

Use the DATA command to define the data text that composes the mail body.

Guideline: Use the DATA command after a HELO or EHLO command, a MAIL FROM command, and at least one RCPT TO command have been accepted.

Format



Parameters

This command has no parameters.

Results:

- 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 server encounters a record that begins with two periods in the body of the mail, it discards the leading period. This convention, which must be followed for batch SMTP connections, permits the body of mail to contain records that would otherwise be interpreted as signaling the end of the body of the mail.
- If a QUIT command is not found at the end of a batch SMTP command data set, a QUIT command is implied.
- If the header of the mail in a batch SMTP command is not explicitly specified with the DATE record, the CSSMTP application adds one. You can modify this behavior with the header statement in the configuration. See Header statement in the z/OS Communications Server: IP Configuration Reference.
- If a blank line between the mail header and the mail body is not explicitly specified, the CSSMTP application adds one.
- If a Message-ID header is not explicitly specified in the mail message, the CSSMTP application adds one for this mail message. The Message-ID is a mail message identifier. For example:

  `Message-ID: <TESTMAIL.SYS00006.CSSMTP1.mydomain.com.Sep302008.160454.541437.1>`

  – The Message-ID header consists of the following information:
    - `TESTMAIL`: The job name of the mail message of the JES spool file. This behavior can be modified with the header statement in the configuration. See Header statement in the z/OS Communications Server: IP Configuration Reference.
    - `SYS00006`: The job identifier of the JES spool file. This behavior can be modified with the header statement in the configuration. See Header statement in the z/OS Communications Server: IP Configuration Reference.
    - `CSSMTP1.mydomain.com`: The fully qualified host name on which the CSSMTP application is running
    - `Sep302008.160454.541437.1`: The date and time when the mail message was processed. The value `160454` represents the time 16:04:54.
  – If this mail message cannot be delivered, the CSSMTP application appends a U to the end of the Message-ID into the undeliverable mail notification. For example:

```
<TESTMAIL.SYS00006.CSSMTP1.mydomain.com.Sep302008.160454.541437.1U>
```

- If a Message-ID header is explicitly specified in the mail message, the CSSMTP application adds one into the undeliverable mail notification if this mail message cannot be delivered. For example:

  ```
  <TESTMAIL.SYS00006.CSSMTP1.mydomain.com.Sep302008.160454.541437.1U>
  ```

- If a From header is not explicitly specified, the CSSMTP application adds one with the *sender_path_address* value that is specified on the MAIL FROM command.

Restriction: When mail arrives over the JES spool interface using an SMTP batch or TSO TRANSMIT command, a newline character or less than (<) character in the last column of the 80-byte input record 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 is not processed correctly and data is missed. Check your mail file, correct the data, and resend the mail.

EHLO command: Identify the domain name of the sending host to SMTP

Purpose

Use the EHLO command to identify the domain name of the sending host to SMTP before you issue a MAIL FROM command.

Rule: Send the EHLO command once before a MAIL FROM command.

Requirement: When the STARTTLS command is used, the EHLO command must also be used. Currently, the only mail extension that is supported by the CSSMTP application is the STARTTLS command. See "STARTTLS command: Indicate the ability to negotiate the use of TLS" on page 378 for more information.

Format

Parameters

domain_name
Specifies the domain name of the sending host.

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 you issue a MAIL FROM command.

Format

Parameters

domain_name
Specifies the domain name of the sending host.

Usage

- The HELO command is sent once before a MAIL FROM command.

MAIL FROM command: Specify the sender of the mail

Purpose

Use the MAIL FROM command to specify the sender of the mail.

Guideline: Use the MAIL FROM command after a HELO or EHLO command.

Format

Parameters

sender_path_address
Specifies the full path address of the sender of the mail.

Requirement: The less than (<) and greater than (>) symbols that surround the *sender_path_address* parameter in the syntax diagram are required.

QUIT command: End SMTP processing

Purpose

Use the QUIT command to end SMTP processing.

Requirement: Ensure that this the last command in the spool file.

Format

Parameters

This command has no parameters.

RCPT TO command: Specify the recipients of the mail

Purpose

Use the RCPT TO command to specify mail recipients.

Restrictions:

- A maximum of 2000 RCPT TO commands can be processed on a single note. If you have more than 2000 RCPT commands in your batch job, only the first 2000 RCPT commands are processed; the remainder are ignored.

- You must issue a MAIL FROM command before you can issue an RCPT TO command.

Format

Parameters

recipient_path_address
Specifies the full path address of the mail recipient.

Requirement: The less than (<) and greater than (>) symbols that surround the *recipient_path_address* parameter in the syntax diagram are required.

RSET command: Reset the SMTP processing to the initial state

Purpose

Use the RSET command to reset SMTP processing to the initial state. The sender and recipient buffers are erased and the process is ready to begin a new mail transaction.

Format

Parameters

This command has no parameters.

STARTTLS command: Indicate the ability to negotiate the use of TLS

Purpose

Use the STARTTLS command to tell the SMTP application to negotiate the use of TLS.

Requirement: You must issue an EHLO command before you can issue the STARTTLS command. If you issue the STARTTLS command, it must be issued before you can issue the MAIL FROM command.

When STARTTLS is specified, the scope of the security attribute is set for the mail messages that follow in the JES spool file until another HELO or EHLO SMTP command is issued. See the CSSMTP security details in z/OS Communications Server: IP Configuration Guide for more information.

Format

Parameters

This command has no parameters.

SMTP commands and reply codes across a TCP/IP connection

When SMTP commands arrive over a TCP/IP connection, all responses (positive or negative) are returned over that TCP/IP connection. See RFC 2821 for more detailed information about the SMTP protocol and the SMTP commands and reply code sequences that are generated between an SMTP client and SMTP server.

The SMTP reply code is generated by the remote SMTP server when it receives an SMTP command over a TCP/IP connection. These reply codes might appear in the CSSMTP log file or in error reports. All SMTP reply codes contain a 3-digit number. The first digit of the reply code indicates the successful responses shown in the following table:

First digit	Description
2	Indicates a positive response; the command was accepted.
3	Indicates a positive response to the SMTP DATA command. The remote SMTP server is ready to receive the data that is associated with the command.
4	Indicates a temporary negative response. Reissue this command at a later time.
5	Indicates a permanent negative response. The command has been rejected.

CSSMTP exit for unwanted mail

You can use an CSSMTP exit to inspect and filter unwanted mail (spam) that is sent through the CSSMTP application. See CSSMTP exit information in z/OS Communications Server: IP Configuration Reference for details.

Example of receiving mail

The CSSMTP application processes the spool file that contains mail messages and forwards those mail messages to a target server where a mail recipient receives the mail. The following is an example of receiving mail:

```
Received: from VIC000.XYZdomain.com (VIC000)
by VIC000.XYZdomain.com (VIC000 [1.1.1.1])
for <USER1.VIC000> (USER1.VIC000)
with ESMTP (IBM CSSMTP z/OS V01R11.00)
Id <USER1C.JOB00035.VIC000@XYZdomain.com.Sep062008.101336.934866.1> ;
Sat, 06 Sep 2008 10:13:37 -0400
Date: Thur, 5 Sep 2008 10:12:57 -0400
From: Carol <CAROL@YOUR.MVSDOMAIN.COM>
To: someuser@some.domain.com
Cc: Alice <alice@ai.our.edu>
Subject: update
Message-ID: <USER1C.JOB00035.VIC000@XYZdomain.com.Sep062008.101336.934866.1>

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.
```

Example of an undelivered mail notification

If the CSSMTP application cannot deliver a piece of mail and a report was requested, then the CSSMTP application reports this situation as an undeliverable problem.

If it is requested, an undeliverable mail notification that explains the reason that the mail was not delivered is returned to the original sender. See the CSSMTP report statement information in z/OS Communications Server: IP Configuration Reference for details. The CSSMTP application might be unable to deliver a mail message because a target server is unreachable or an incorrect recipient user ID on the destination host. If mail cannot be delivered, the body of the original mail message is included in the undeliverable mail notification. The following is an example of an undeliverable mail notification:

```
Mail was not delivered to the following recipients:
<userx@vic000.XYZdomain.com>
Reply text:550 User 'userx' Unknown



Original mail text:
Received: from vic000.XYZdomain.com (vic000)
by vic000.XYZdomain.com (vic000 [1.1.1.1])
for <USER1.vic000> (USER1.vic000)
with ESMTP (IBM CSSMTP z/OS V01R11.00)
Id <USER1UD2.JOB00046.vic000@XYZdomain.com.Sep072008.132807.37174.1> ;
Sun, 07 Sep 2008 13:28:08 -0400
Subject:  test of undeliverable
from: me at vic000
to:   user1 at vic000
Date: Sun, 07 Sep 2008 13:28:08 -0400
Message-ID: <USER1UD2.JOB00046.vic000@XYZdomain.com.Sep072008.132807.37174.1>


 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.
```

Example of generated error reports

When a spool file of SMTP commands is processed, information that is related to detected spool file errors is accumulated in an error file. Errors can be generated because of bad record lengths, commands that are not valid, syntax errors for commands, and other conditions. If any error reports have been generated at completion of the spool file processing, the error report can be sent to the mail administrator or sent to the sysout file. See the CSSMTP report statement information in z/OS Communications Server: IP Configuration Reference for details.

```
                   Error Report for USER1UD2 (JOB00046)
Job USER1UD2/       /DEST (JOB00046) created by VIC000.USER1 at Sun, 07 Sep 2008 13:28:07 -0400
For DDname: SYSUT2    Dataset name: USER1.USER1UD2.JOB00046.D0000102.SMTPUDV2
CSSMTP_XYZ generated the following messages:
--- Line     2 Mail     1 : Undeliverable mail for testid@test.com
    Message-Id: <USER1UD2.JOB00046.VIC000@XYZdomain.com.Sep072008.132807.37174.1>
    Mail was not delivered to the following recipients:
    userx@vic000.XYZdomain.com
    Reply  : 550 User 'userx' Unknown

Completed at Sun, 07 Sep 2008 13:28:08 -0400

     1 = mail messages found
```

```
     0 = mail messages with errors

     0 = recipients to whom mail was sent successfully
     1 = recipients to whom mail messages could not be delivered

Disposition of the JES file was DELETE
```

Chapter 9. Using remote printing

z/OS Communications Server 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 topic describes the remote printing commands listed in Table 23.

Note: Although this information describes the commands and parameters that are valid for the MVS LPR client, you might not get the same results from non-MVS servers, because those servers might not support the same commands and parameters.

Table 23. Remote printing commands

Command	Description	See
LPQ	Request a list of the printer queue on a remote printer.	"LPQ command—Request a list of the printer queue on a remote printer"
LPR	Print to a remote printer.	"LPR command—Print to a remote printer" on page 385
LPRM	Remove a job from the printer queue on a remote host.	"LPRM command—Remove a job from the printer queue on a remote host" on page 397
LPRSET	Set the default printer and host name.	"LPRSET command—Set the default printer and host name" on page 399
TSO SMSG	Monitor the Status of LPD	"TSO SMSG command—Monitoring the Status of LPD" on page 400

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 active, an ABEND0D6 can occur.

Format

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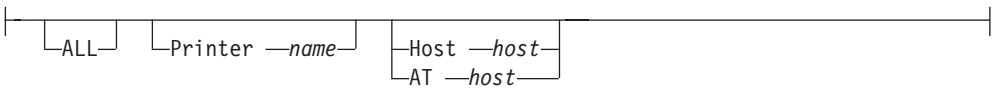
Opt Parms 1:



Opt Parms 2:

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.
- The input string for parameters is limited to 255 bytes. To use the input string effectively, remove any extra embedded blanks and use shorter parameter labels. For example, use P instead of the fullword Printer as a parameter.

LPR command—Print to a remote printer

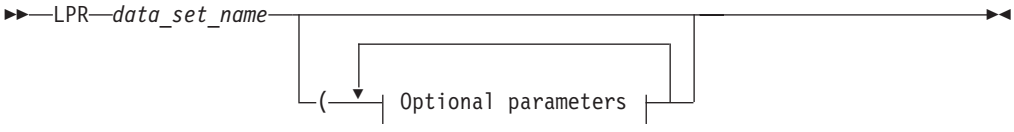
Purpose

Use the LPR command to print to a remote printer.

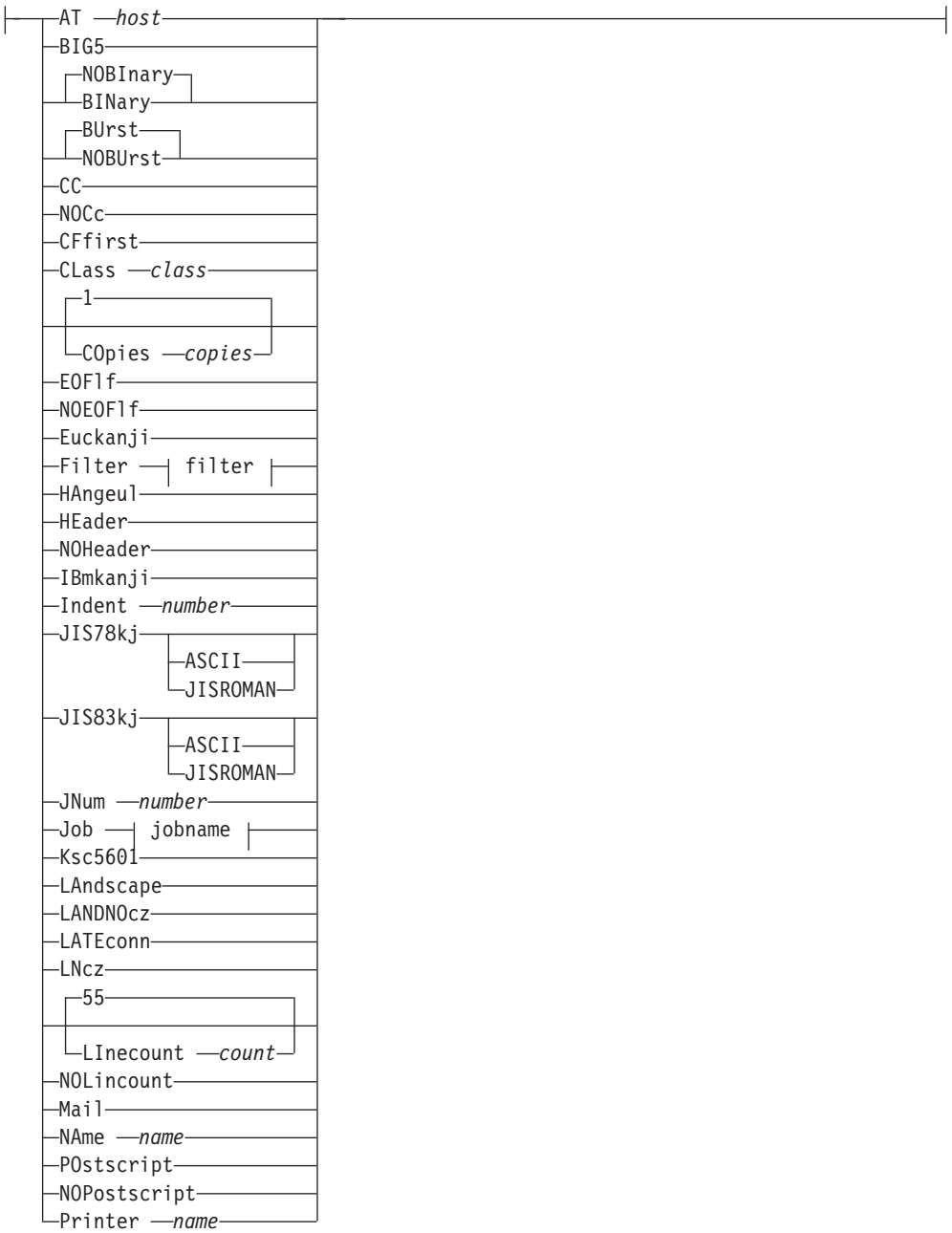
Notes:

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.
3. The TSO LPR command is written in the PASCAL language, so the size of the data set to be printed is limited to 2,147,483,647 (X'7FFFFFFF') bytes.

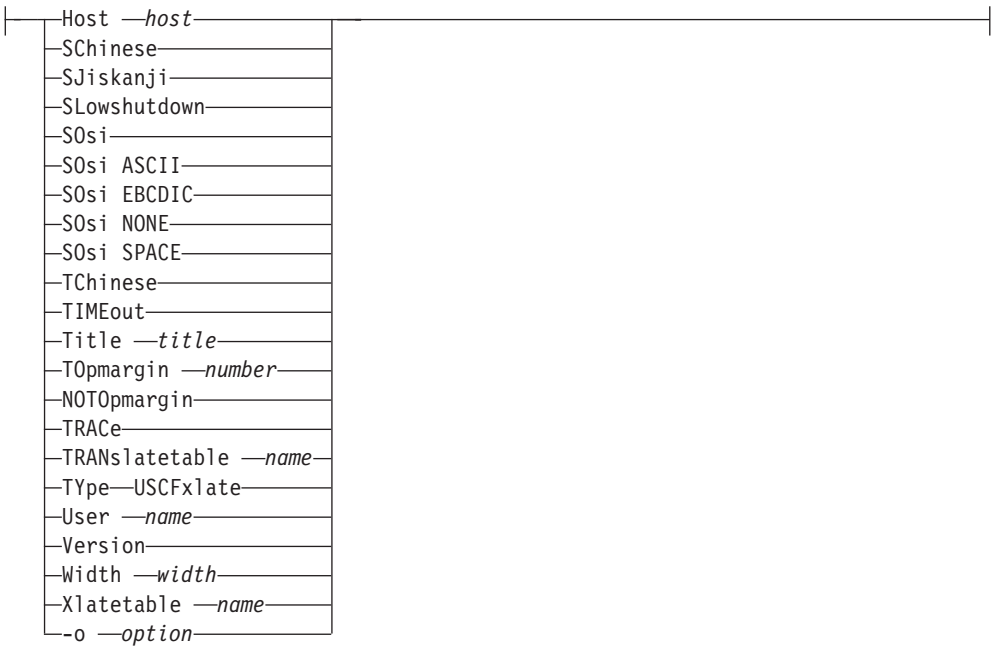
Format



Optional parameters:



More optional parameters:



filter:

jobname:

Parameters

data_set_name
Specifies the name of the data set to be printed. This cannot be the name of a z/OS UNIX 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 (banner) page to be printed on the remote printer. This is the default.

NOBUrst
Prevents a burst (banner) 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:

Character	Meaning
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 might 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 a single alphanumeric character . For example, CLASS c.

COpies *copies*
Specifies the number of copies to be printed. The default is one copy.

EOFlf
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. See 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 D, "Related protocol specifications," on page 451.]

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	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 the printer you are printing to also affects pagination. See "Usage" on page 396 for further information.

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.

HEader
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 might 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. See 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.

See 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.

See 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
/ls 11.2 def
/ld ls 2 mul def
/lt ls 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 might 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

- The input string for parameters is limited to 255 bytes. To use the input string effectively, remove any extra embedded blanks and use shorter parameter labels. For example, use P instead of the full word Printer as a parameter.
- 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,FOR=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 POstscript 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, HEader, 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

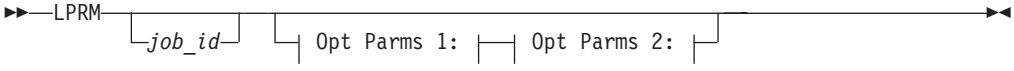
Purpose

Use the LPRM command to remove a job from the printer queue on a remote host.

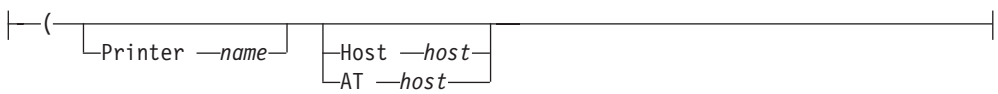
Notes:

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

- The input string for parameters is limited to 255 bytes. To use the input string effectively, remove any extra embedded blanks and use shorter parameter labels. For example, use P instead of the full word Printer as a parameter.
- 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 might finish, but you could inadvertently remove the second job instead.

LPRSET command—Set the default printer and host name

Purpose

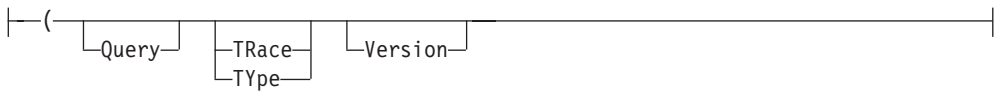
Use the LPRSET command to set the default printer and host name. The printer and host name can also be included in the line printer commands (LPR, LPQ, and LPRM).

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

Optional Parameters:



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

- The input string for parameters is limited to 255 bytes. To use the input string effectively, remove any extra embedded blanks and use shorter parameter labels. For example, use TR instead of the fullword Trace as a parameter.
- 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
  ```

TSO SMSG command—Monitoring the Status of LPD

Purpose

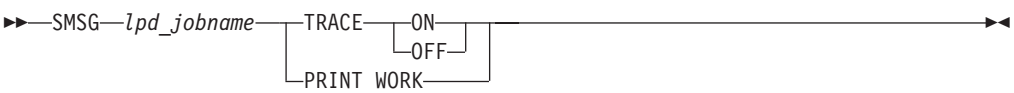
The TSO SMSG command provides an interactive interface to the LPD server to:

- Turn on and off diagnostics tracing
- Query the work queue currently being used by LPD server

These commands are privileged so the commands are accepted only from users specified in the OBEY statement in the LPD server configuration data set. For more information regarding this statement, see the z/OS Communications Server: IP Configuration Reference. Responses to the SMSG commands are sent to the SYSPRINT file that is associated with the LPD started procedure job.

Note: The TSO SMSG LPD command uses the Pascal socket API, so VMCF must be started for the command to be successful. If VMCF is not active, the following message is issued to the terminal of the TSO user: `EZY2040I SMSG: VMCF is not active on the system`.

Format



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 command does not display on the screen for the user. The user must look in the SYSPRINT file that is associated with the LPD job to view 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 10. Using GDDMXD/MVS with the X Window System

This topic describes GDDMXD/MVS and the GDDMXD CLIST. This information 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 topic:

- "Overview of GDDMXD/MVS"
- "Using GDDMXD/MVS" on page 405
- "GDDMXD/MVS: User-specified options" on page 407
- "GDDMXD keyboard functions" on page 414

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.

GDDMXD/MVS keyboard and character set mappings

The following member names contain the described character sets:

Member name	Description
GDXALTCS	A member of SEZAINST that contains a second character set (the 3270 alternate character sets).
GDXAPLCS	A member in the SEZAINST data set that contains sample keyboard mapping for APL2.
KEYCODE	A member of SEZALOAD that displays key codes. You can edit this data set to change keyboard mappings.

GDDM: Executable code

The following member names contain the described executable code or sample:

Member name	Description
GDXLIOX0	A member of SEZALOAD that contains executable code
XDEFAULT	A member of 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

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- 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 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 wanted 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, see 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.

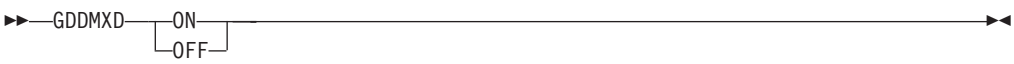
To invoke the GDDMXD CLIST, use the GDDMXD command in the format described in "GDDMXD command—Invoke the GDDMXD CLIST."

GDDMXD command—Invoke the GDDMXD CLIST

Purpose

Use the GDDMXD command to invoke the GDDMXD CLIST.

Format



Parameters

ON Enables GDDMXD/MVS. GDDM output is sent to the X Window System display. The system responds with `GDDMXD/MVS active`.

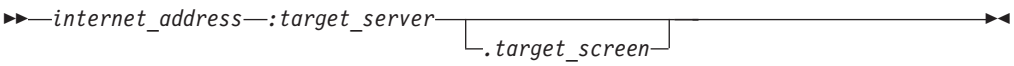
OFF
Disables GDDMXD/MVS. The system erases the data set that was created when GDDMXD/MVS was activated and responds with `GDDMXD/MVS inactive`.

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



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 "GDDMXD/MVS: User-specified options" on page 407 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 24.

Table 24. 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 409 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.

GDDMXD/MVS: 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 25 are supported by GDDMXD/MVS.

Table 25. GDDMXD/MVS options

Option	Description	See
ANFontn	Specifies the X Window System font used for characters in the alphanumeric presentation space.	"ANFontn option—Specify the X Window System font used for characters in the alphanumeric presentation space" on page 408
CMap	Specifies whether the default color map is loaded or bypassed.	"CMap option—Specify whether the default color map is loaded or bypassed" on page 409
Compr	Controls the technique used to compress bit-mapped data when a graphics window size of 480 by 352 pixels is specified.	"Compr option—Control the technique used to compress bit-mapped data" on page 409
Enter	Overrides the default key mapping for Enter.	"Enter option—Override the default key mapping for Enter" on page 410
GColornn	Specifies a color name.	"GColornn option—Specify a color name" on page 410
Geometry	Specifies the size and location of the initial GDDMXD graphics presentation space.	"Geometry option—Specify the size and location of the initial GDDMXD graphics presentation space" on page 411
GMCPnn	Overrides GDDM multicolor patterns with workstation color names.	"GMCPnn option—Override GDDM multicolor patterns with workstation color names" on page 412
HOSTRAST	Performs raster image processing at the host.	"HostRast option—Perform raster image processing at the System/370 host" on page 412

Table 25. GDDMXD/MVS options (continued)

Option	Description	See
NewLine	Overrides the default key mapping for NewLine.	"NewLine option—Override the default key mapping for NewLine" on page 413
XSync	Requests that the X Window System process one request at a time.	"XSync option—Request that the X Window System process one request at a time" on page 414
ZWL	Tells GDDMXD/MVS to draw all lines using 0-width lines.	"ZWL option—Tell GDDMXD/MVS to draw all lines using 0-width lines" on page 414

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

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.

n	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

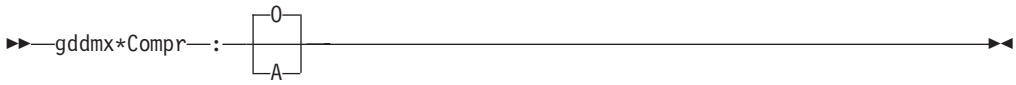
During initialization, GDDMXD/MVS issues the X Window System call, XInstallColormap, to load the default color map. If the CMap option is specified as N, the XInstallColormap call is not made. This option is for X Window System servers that load their own color map and do not want the clients to load 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.

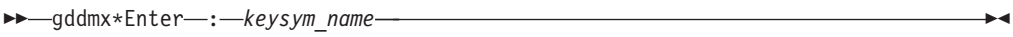
A or a
Specifies that a logical AND function must be used when compressing bit-mapped data.

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



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

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 26 lists the GDDM colors that GDDMXD/MVS maps to the X Window System.

Table 26. GColors

GColor*nn*	**GDDM color**	**X Window System color**
GColor1	Blue	Blue
GColor2	Red	Red
GColor3	Magenta	Magenta

Table 26. GColors (continued)

GColor*nn*	**GDDM color**	**X Window System color**
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
```

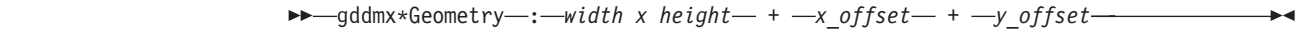
In this example, specifying the `GColor3` entry in the *user_id*.X.DEFAULTS data set maps the GDDM color, magenta, to the X Window System new color of pink.

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



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

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

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

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.

GDDMXD 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, see 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 SEZAINST(GDXALTCS) when it is initialized. Before using GDDMXD, copy the installed TCP/IP copy of SEZAINST(GDXALTCS) to *user_id*.GDXALTCS.PSS, or allocate the common installed copy of 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 GDXAPLCS.MAP data set is created to override the default map. It s used to define the map for the workstation. The following steps describe how to set up the GDXAPLCS.MAP data set.

Procedure

1. Invoke the program KEYCODE from the TCP/IP load module library in 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 437 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 437.
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 11. 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 an 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 can 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 information describes how to use the REXEC and RSH clients.

The following subjects are covered in this topic:

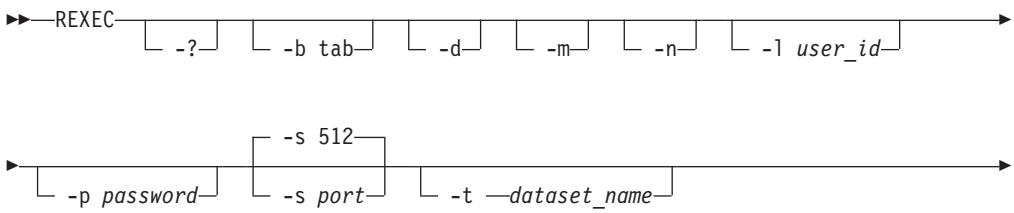
- "REXEC command - Execute a command on the remote host and receive the results on your local host"
- "Using the NETRC data set" on page 419
- "Submitting REXEC and RSH requests in batch" on page 420
- "Using remote execution clients in a z/OS UNIX environment" on page 426
- "The z/OS UNIX orexec/rexec command—Execute a command on the remote host" on page 427

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.

Format



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Restriction: The REXEC parameters -b, -d, -l, -m, -n, -p, -s, and -t are case sensitive and must be entered in lowercase letters. The *user_id* and *password* parameters might be case sensitive, depending on the operating system of the remote host.

Parameters

-? Displays the help message.

-b tab
Specifies the Tab setting. Valid values are in the range 1 - 12 and the default value is 1.

-d Activates debug tracing.

-m Specifies that the machine control character (X'09') is added to the beginning of the output lines for the data sets that are associated with the SYSPRINT or OUTPUT DD cards and have the machine control attribute. When you use this parameter, it should be the first parameter that is passed to REXEC so that all output lines are changed.

-n Prevents use of 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 *tran_table*
Specifies the data set name of a translation table to be used. The search order when the -t parameter is specified:

```
userid.tran_table.TCPXLBIN
hlq.tran_table.TCPXLBIN
```

If this data set is not found, REXEC terminates with message EZA4805I.

Note: If the -t parameter is not specified on the invocation of the REXEC command, a hardcoded default table is used that is identical to the STANDARD member in the SEZATCPX data set.

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. When you are using IPv6 link-local addresses, you can provide scope information along with the host name or IP address, as described in the support for scope information in the z/OS Communications Server: IPv6 Network and Application Design Guide.

command
Specifies the command to be executed on the remote host.

Example

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

- Omitting the **-p** *password* causes the NETRC data set to be searched by following the search order.
- The -n parameter can be used to suppress usage of the NETRC data set.
- If the *user_id*, or the *password*, or both are not provided as input parameters or specified from usage of the NETRC data set, the system prompts you to supply the parameters.
- When you issue a command that is to be executed on the remote host, do not place the command in quotation marks. Doing so can result in unexpected results.

  Note: There is no such restriction when using the z/OS UNIX **orexec** command.
- The condition code 12 is 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.
- The Tab setting is used exclusively by the client and is not forwarded to the server. The tab setting value determines the alignment of the output. If a Tab character is included in the output data stream, blank characters are included in the output up to the next Tab setting. The processing is the same whether the output is displayed or written to a data set.

Using the NETRC data set

The NETRC data set provides you with an alternative to specifying the user_id and password values 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 password is specified on the -p parameter on the REXEC command, no NETRC data sets are used. The keywords **machine**, **login**, and **password** must be specified in lowercase. The user ID and password might be case sensitive and if supplied in the incorrect case, failures might occur when connecting to a REXEC server. Contact the administrator of the server's system if you are uncertain which case should be used.

The *hostname* value that is specified after the **machine** keyword can include scope information, as described in the support for scope information in the z/OS Communications Server: IPv6 Network and Application Design Guide.

Guideline: If either *hostname%scope* or *IPv6_address%scope* is specified as the *foreign_host* command parameter, there must be an entry in the NETRC data set that contains a string identical to the value that follows the **machine** keyword so that the correct user ID and password values are selected.

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, the REXEC command prompts you for your current password.

The following is an example of a NETRC data set:

```
machine mvs1 login user28 password abcdef
```

The following is a sample of the response that displays after using 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 417. 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 might 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. Regardless of which ddname you use for the REXEC or RSH output, a new data set must have the DCB=(...) parameter specified on the DD card. Any data set you use must have a logical record length (LRECL) greater than 0. If the LRECL is equal to 0 then the data set is not 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 419 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 can 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.

   The following example shows 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 1 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 1 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 *user_id* 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.

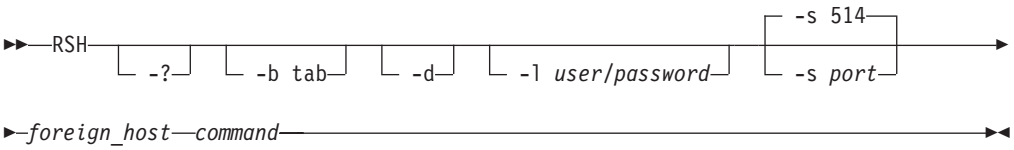
RSH command—Execute a command on a remote host and receive the results on your local host

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.

Format



Notes:

1. The parameters for the RSH command could be case sensitive, depending on the remote host you are targeting.
2. The RSH command uses the MESSAGECASE setting in the TCPIP.DATA file to determine whether messages are issued in uppercase or mixed case characters.

Parameters

-? Lists the valid parameters for the RSH command.

-b tab
Specifies the Tab setting. Valid values are in the range 1 - 12. The default value is 1.

-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 issuing the command. When you are using IPv6 link-local addresses, you can provide scope information along with the name or IP address, as described in the support for scope information in the z/OS Communications Server: IPv6 Network and Application Design Guide.

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 mvs1 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 mvs1 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 1 is 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.
- The tab setting is used exclusively by the client and is not forwarded to the server. The tab setting value determines the alignment of the output. If a tab character is included in the output data stream, blank characters are included in the output up to the next tab setting. The processing is the same whether the output is displayed or written to a data set.

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 mvsone 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 mvsone 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 mvsone 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
```

Tip: The RSH server code obtains the remote host name by resolving the remote IP address into a host name. If the remote host connects using a link-local address, then the remote host name that is generated by the resolver can have the format *hostname%scope*. Adding scope information to the appropriate RHOSTS.DATA remote host definitions results in a more efficient search for a matching remote host name. See the support for scope information in the z/OS Communications Server: IPv6 Network and Application Design Guide for details about including scope information on configured host names.

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 deamon (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 deamon (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

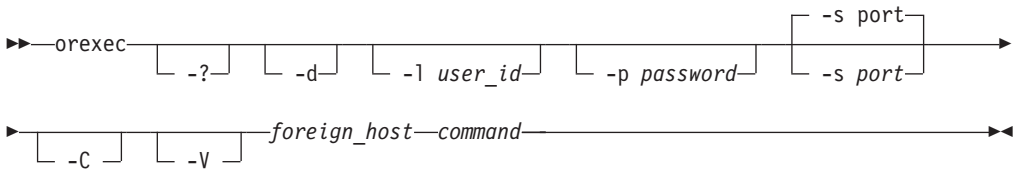
Purpose

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, see 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 can 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.

-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 is the port number defined in */etc/services*.

-C Forces messages to be displayed in uppercase characters.

-V Displays the z/OS Communications Server version and release.

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. When using IPv6 link-local addresses, scope information can be provided

along with the name or IP address, as described in the s upport for scope information in the z/OS Communications Server: IPv6 Network and Application Design Guide.

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. The **orexec** command 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

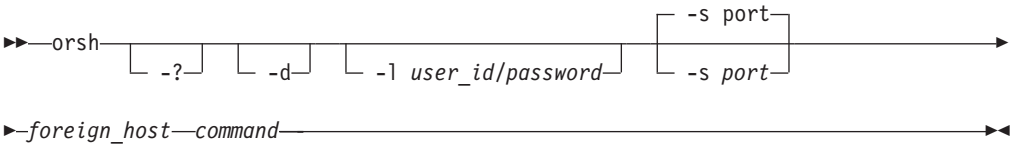
Purpose

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 a shell entry defined to TCP. For information about */etc/services*, Protocol Number, and Port Assignments, see 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 can 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*.

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. When using IPv6 link-local addresses, scope information can be provided along with the name or IP address, as described in the support for scope information in the z/OS Communications Server: IPv6 Network and Application Design Guide.

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 or -s) and assigning the remaining string as the command. The command you specify must not require a response from you to complete. The **orsh** commnd 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 mvs1 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.

Appendix A. Specifying data sets and files

This topic describes the file-naming formats for the following operating systems:

- "MVS data set and file naming"
- "AIX and UNIX file specifications" on page 435
- "AS/400 operating system file specifications" on page 435
- "VM file specifications" on page 436

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 set and file naming

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.

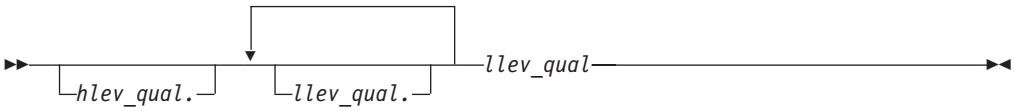
For information about the //DD file name syntax for FTP, see "ddname support with FTP" on page 63.

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.

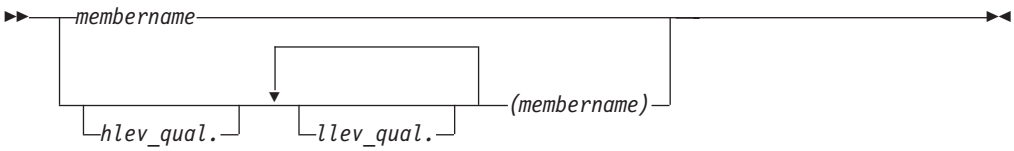
The leftmost qualifier in the data set name is the *high-level qualifier*. The rightmost qualifier in the data set name is the *low-level qualifier*. Partitioned data sets can be further qualified with a member name in the rightmost position. Qualifiers lying between them are called intermediate-level 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 (').

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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 set file naming

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 set file naming

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 character, or the 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 251 for information about the MODE subcommand, and "TYpe subcommand—Set the data transfer type" on page 328 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 27 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 27. 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: For the data transfer of "ASCII to EBCDIC to ASCII—all data", 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 file specifications

For the Advanced Interactive Executive (AIX) and UNIX operating systems, data is stored in files. Related files are stored in a directory. z/OS Communications Server files are UNIX files.

Specify AIX and UNIX files in the following format:

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. See the following 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.

Requirement: A directory name and file name should not include characters that have a special meaning to the shell, such as backslash (\), ampersand (&), and period (.).

Tips:

- If a z/OS UNIX file name contains any single quotation marks ('), enclose the name in double quotation marks (").
- If a z/OS UNIX file name contains any double quotation marks ("), enclose the name in single quotation marks (').

AS/400 operating system file specifications

For the AS/400 operating system, data is stored in files.

Specify AS/400 files in the following format:

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.

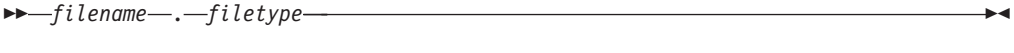
The FTP subcommand PUT is used to copy a local file member into a file at the remote host. See the following example:

```
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 file specifications

Data is stored in files on VM hosts. Specify VM files in the following format:



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 topic 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 28 lists the mapping values for the APL2 character set.

Table 28. 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**

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Table 28. Mapping values for the APL2 character set (continued)

Character name	Character set value	EBCDIC value	Default keycode
Del Stile	8	DC	**C** + **Alt**
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**

Table 28. Mapping values for the APL2 character set (continued)

Character name	Character set value	EBCDIC value	Default keycode
R Underbar	8	59	**1C** + **Alt**
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**

Table 28. Mapping values for the APL2 character set (continued)

Character name	Character set value	EBCDIC value	Default keycode
F Underbar	8	46	**2A** + **Alt**
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**

Table 28. Mapping values for the APL2 character set (continued)

Character name	Character set value	EBCDIC value	Default keycode
N Underbar	8	55	**3B** + **Alt**
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 topic 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 445
- "Operation of PF and PA keys with TELNET" on page 447
- "Sense codes for special key operation with TELNET" on page 448

Character set cross reference table

Table 29 describes the language, codefiles, and character sets for the Telnet 3270 DBCS Transform extended language support.

Table 29. 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	ASCIII	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

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Table 29. TCP/IP character set cross reference (continued)

Keyword	Codefiles	Description	Character set	Description	CCSID[1]	CPGID[2]
	SJDCKETA SJDCKATE	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 30 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, see the z/OS Communications Server: IP Configuration Reference.

Table 30. 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 redisplays 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 redisplays the screen by switching between Alphanumeric and Alphanumeric-Kana mode.

Table 30. 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 30. 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 with TELNET

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 then press 1

PF14 Press ESC then press 2

PF15 Press ESC then press 3

PF16 Press ESC then press 4

PF17 Press ESC then press 5

PF18 Press ESC then press 6

PF19 Press ESC then press 7

PF20 Press ESC then press 8

PF21 Press ESC then press 9

PF22 Press ESC then press 0

PF23 Press ESC then press .

PF24 Press 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 with TELNET

Table 31 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 31. 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.

Table 31. Sense codes (continued)

Sense code	Problem description
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.
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.

Table 31. Sense codes (continued)

Sense code	Problem description
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.
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	The 3270 outbound data stream contains a command that is not in this list. • WRITE • ERASE/WRITE • ERASE/WRITE ALTERNATE • ERASE ALL UNPROTECTED The error occurred in a WRITE STRUCTURED FIELD command.
50001	SO/SI is on longer a pair. SET REPLY mode. The error occurred in the GRFTOMAP Process.

Appendix D. Related protocol specifications

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

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.

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

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

RFC Title and Author

RFC 652
Telnet output carriage-return disposition option D. Crocker

RFC 653
Telnet output horizontal tabstops option D. Crocker

RFC 654
Telnet output horizontal tab disposition option D. Crocker

RFC 655
Telnet output formfeed disposition option D. Crocker

RFC 657
Telnet output vertical tab disposition option D. Crocker

RFC 658
Telnet output linefeed disposition D. Crocker

RFC 698
Telnet extended ASCII option T. Mock

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RFC 726
Remote Controlled Transmission and Echoing Telnet option J. Postel, D. Crocker

RFC 727
Telnet logout option M.R. Crispin

RFC 732
Telnet Data Entry Terminal option J.D. Day

RFC 733
Standard for the format of ARPA network text messages D. Crocker, J. Vittal, K.T. Pogran, D.A. Henderson

RFC 734
SUPDUP Protocol M.R. Crispin

RFC 735
Revised Telnet byte macro option D. Crocker, R.H. Gumpertz

RFC 736
Telnet SUPDUP option M.R. Crispin

RFC 749
Telnet SUPDUP—Output option B. Greenberg

RFC 765
File Transfer Protocol specification J. Postel

RFC 768
User Datagram Protocol J. Postel

RFC 779
Telnet send-location option E. Killian

RFC 783
TFTP Protocol (revision 2) K.R. Sollins

RFC 791
Internet Protocol J. Postel

RFC 792
Internet Control Message Protocol J. Postel

RFC 793
Transmission Control Protocol J. Postel

RFC 820
Assigned numbers J. Postel

RFC 821
Simple Mail Transfer Protocol J. Postel

RFC 822
Standard for the format of ARPA Internet text messages D. Crocker

RFC 823
DARPA Internet gateway R. Hinden, A. Sheltzer

RFC 826
Ethernet Address Resolution Protocol: Or converting network protocol addresses to 48.bit Ethernet address for transmission on Ethernet hardware D. Plummer

RFC 854
Telnet Protocol Specification J. Postel, J. Reynolds

RFC 855
Telnet Option Specification J. Postel, J. Reynolds

RFC 856
Telnet Binary Transmission J. Postel, J. Reynolds

RFC 857
Telnet Echo Option J. Postel, J. Reynolds

RFC 858
Telnet Suppress Go Ahead Option J. Postel, J. Reynolds

RFC 859
Telnet Status Option J. Postel, J. Reynolds

RFC 860
Telnet Timing Mark Option J. Postel, J. Reynolds

RFC 861
Telnet Extended Options: List Option J. Postel, J. Reynolds

RFC 862
Echo Protocol J. Postel

RFC 863
Discard Protocol J. Postel

RFC 864
Character Generator Protocol J. Postel

RFC 865
Quote of the Day Protocol J. Postel

RFC 868
Time Protocol J. Postel, K. Harrenstien

RFC 877
Standard for the transmission of IP datagrams over public data networks J.T. Korb

RFC 883
Domain names: Implementation specification P.V. Mockapetris

RFC 884
Telnet terminal type option M. Solomon, E. Wimmers

RFC 885
Telnet end of record option J. Postel

RFC 894
Standard for the transmission of IP datagrams over Ethernet networks C. Hornig

RFC 896
Congestion control in IP/TCP internetworks J. Nagle

RFC 903
Reverse Address Resolution Protocol R. Finlayson, T. Mann, J. Mogul, M. Theimer

RFC 904
Exterior Gateway Protocol formal specification D. Mills

RFC 919
Broadcasting Internet Datagrams J. Mogul

RFC 922
Broadcasting Internet datagrams in the presence of subnets J. Mogul

RFC 927
TACACS user identification Telnet option B.A. Anderson

RFC 933
Output marking Telnet option S. Silverman

RFC 946
Telnet terminal location number option R. Nedved

RFC 950
Internet Standard Subnetting Procedure J. Mogul, J. Postel

RFC 952
DoD Internet host table specification K. Harrenstien, M. Stahl, E. Feinler

RFC 959
File Transfer Protocol J. Postel, J.K. Reynolds

RFC 961
Official ARPA-Internet protocols J.K. Reynolds, J. Postel

RFC 974
Mail routing and the domain system C. Partridge

RFC 1001
Protocol standard for a NetBIOS service on a TCP/UDP transport: Concepts and methods NetBios Working Group in the Defense Advanced Research Projects Agency, Internet Activities Board, End-to-End Services Task Force

RFC 1002
Protocol Standard for a NetBIOS service on a TCP/UDP transport: Detailed specifications NetBios Working Group in the Defense Advanced Research Projects Agency, Internet Activities Board, End-to-End Services Task Force

RFC 1006
ISO transport services on top of the TCP: Version 3 M.T. Rose, D.E. Cass

RFC 1009
Requirements for Internet gateways R. Braden, J. Postel

RFC 1011
Official Internet protocols J. Reynolds, J. Postel

RFC 1013
X Window System Protocol, version 11: Alpha update April 1987 R. Scheifler

RFC 1014
XDR: External Data Representation standard Sun Microsystems

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Using ARP to implement transparent subnet gateways S. Carl-Mitchell, J. Quarterman

RFC 1032
Domain administrators guide M. Stahl

RFC 1033
Domain administrators operations guide M. Lottor

RFC 1034
Domain names—concepts and facilities P.V. Mockapetris

RFC 1035
Domain names—implementation and specification P.V. Mockapetris

RFC 1038
Draft revised IP security option M. St. Johns

RFC 1041
Telnet 3270 regime option Y. Rekhter

RFC 1042
Standard for the transmission of IP datagrams over IEEE 802 networks J. Postel, J. Reynolds

RFC 1043
Telnet Data Entry Terminal option: DODIIS implementation A. Yasuda, T. Thompson

RFC 1044
Internet Protocol on Network System's HYPERchannel: Protocol specification K. Hardwick, J. Lekashman

RFC 1053
Telnet X.3 PAD option S. Levy, T. Jacobson

RFC 1055
Nonstandard for transmission of IP datagrams over serial lines: SLIP J. Romkey

RFC 1057
RPC: Remote Procedure Call Protocol Specification: Version 2 Sun Microsystems

RFC 1058
Routing Information Protocol C. Hedrick

RFC 1060
Assigned numbers J. Reynolds, J. Postel

RFC 1067
Simple Network Management Protocol J.D. Case, M. Fedor, M.L. Schoffstall, J. Davin

RFC 1071
Computing the Internet checksum R.T. Braden, D.A. Borman, C. Partridge

RFC 1072
TCP extensions for long-delay paths V. Jacobson, R.T. Braden

RFC 1073
Telnet window size option D. Waitzman

RFC 1079
Telnet terminal speed option C. Hedrick

RFC 1085
ISO presentation services on top of TCP/IP based internets M.T. Rose

RFC 1091
Telnet terminal-type option J. VanBokkelen

RFC 1094
NFS: Network File System Protocol specification Sun Microsystems

RFC 1096
Telnet X display location option G. Marcy

RFC 1101
DNS encoding of network names and other types P. Mockapetris

RFC 1112
Host extensions for IP multicasting S.E. Deering

RFC 1113
Privacy enhancement for Internet electronic mail: Part I — message encipherment and authentication procedures J. Linn

RFC 1118
Hitchhikers Guide to the Internet E. Krol

RFC 1122
Requirements for Internet Hosts—Communication Layers R. Braden, Ed.

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Requirements for Internet Hosts—Application and Support R. Braden, Ed.

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TCP alternate checksum options J. Zweig, C. Partridge

RFC 1155
Structure and identification of management information for TCP/IP-based internets M. Rose, K. McCloghrie

RFC 1156
Management Information Base for network management of TCP/IP-based internets K. McCloghrie, M. Rose

RFC 1157
Simple Network Management Protocol (SNMP) J. Case, M. Fedor, M. Schoffstall, J. Davin

RFC 1158
Management Information Base for network management of TCP/IP-based internets: MIB-II M. Rose

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RFC 1186
MD4 Message Digest Algorithm R.L. Rivest

RFC 1187
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Proposed Standard for the Transmission of IP Datagrams over FDDI Networks D. Katz

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Experimental Internet Stream Protocol: Version 2 (ST-II) C. Topolcic

RFC 1191
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Convention for defining traps for use with the SNMP M. Rose

RFC 1227
SNMP MUX protocol and MIB M.T. Rose

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

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RFC 1353
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RFC 1354
IP Forwarding Table MIB F. Baker

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Multiprotocol Interconnect on X.25 and ISDN in the Packet Mode A. Malis, D. Robinson, R. Ullmann

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RFC 5175
IPv6 Router Advertisement Flags Option B. Haberman, Ed., R. Hinden

RFC 5282
Using Authenticated Encryption Algorithms with the Encrypted Payload of the Internet Key Exchange version 2 (IKEv2) Protocol D. Black, D. McGrew

RFC 5996
Internet Key Exchange Protocol Version 2 (IKEv2) C. Kaufman, P. Hoffman, Y. Nir, P. Eronen

Internet drafts

Internet drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Other groups can also distribute working documents as Internet drafts. You can see Internet drafts at http://www.ietf.org/ID.html.

Appendix E. Accessibility

Publications for this product are offered in Adobe Portable Document Format (PDF) and should be compliant with accessibility standards. If you experience difficulties when using PDF files, you can view the information through the z/OS Internet Library website or IBM Knowledge Center. If you continue to experience problems, send an email to mhvrcfs@us.ibm.com or write to:

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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. See z/OS TSO/E Primer, z/OS TSO/E User's Guide, and z/OS ISPF User's Guide Vol 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 or Library Server versions of z/OS books in the Internet library at www.ibm.com/systems/z/os/zos/bkserv/.

One exception is command syntax that is published in railroad track format, which is accessible using screen readers with IBM Knowledge Center, as described in “Dotted decimal syntax diagrams.”

Dotted decimal syntax diagrams

Syntax diagrams are provided in dotted decimal format for users accessing IBM Knowledge Center using a screen reader. In dotted decimal format, each syntax element is written on a separate line. If two or more syntax elements are always

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present together (or always absent together), they can appear on the same line, because they can be considered as a single compound syntax element.

Each line starts with a dotted decimal number; for example, 3 or 3.1 or 3.1.1. To hear these numbers correctly, make sure that your screen reader is set to read out punctuation. All the syntax elements that have the same dotted decimal number (for example, all the syntax elements that have the number 3.1) are mutually exclusive alternatives. If you hear the lines 3.1 USERID and 3.1 SYSTEMID, you know that your syntax can include either USERID or SYSTEMID, but not both.

The dotted decimal numbering level denotes the level of nesting. For example, if a syntax element with dotted decimal number 3 is followed by a series of syntax elements with dotted decimal number 3.1, all the syntax elements numbered 3.1 are subordinate to the syntax element numbered 3.

Certain words and symbols are used next to the dotted decimal numbers to add information about the syntax elements. Occasionally, these words and symbols might occur at the beginning of the element itself. For ease of identification, if the word or symbol is a part of the syntax element, it is preceded by the backslash (\) character. The * symbol can be used next to a dotted decimal number to indicate that the syntax element repeats. For example, syntax element *FILE with dotted decimal number 3 is given the format 3 * FILE. Format 3* FILE indicates that syntax element FILE repeats. Format 3* * FILE indicates that syntax element * FILE repeats.

Characters such as commas, which are used to separate a string of syntax elements, are shown in the syntax just before the items they separate. These characters can appear on the same line as each item, or on a separate line with the same dotted decimal number as the relevant items. The line can also show another symbol giving information about the syntax elements. For example, the lines 5.1*, 5.1 LASTRUN, and 5.1 DELETE mean that if you use more than one of the LASTRUN and DELETE syntax elements, the elements must be separated by a comma. If no separator is given, assume that you use a blank to separate each syntax element.

If a syntax element is preceded by the % symbol, this indicates a reference that is defined elsewhere. The string following the % symbol is the name of a syntax fragment rather than a literal. For example, the line 2.1 %OP1 means that you should see separate syntax fragment OP1.

The following words and symbols are used next to the dotted decimal numbers:

- A question mark (?) means an optional syntax element. A dotted decimal number followed by the ? symbol indicates that all the syntax elements with a corresponding dotted decimal number, and any subordinate syntax elements, are optional. If there is only one syntax element with a dotted decimal number, the ? symbol is displayed on the same line as the syntax element, (for example 5? NOTIFY). If there is more than one syntax element with a dotted decimal number, the ? symbol is displayed on a line by itself, followed by the syntax elements that are optional. For example, if you hear the lines 5 ?, 5 NOTIFY, and 5 UPDATE, you know that syntax elements NOTIFY and UPDATE are optional; that is, you can choose one or none of them. The ? symbol is equivalent to a bypass line in a railroad diagram.
- An exclamation mark (!) means a default syntax element. A dotted decimal number followed by the ! symbol and a syntax element indicate that the syntax element is the default option for all syntax elements that share the same dotted

decimal number. Only one of the syntax elements that share the same dotted decimal number can specify a ! symbol. For example, if you hear the lines 2? FILE, 2.1! (KEEP), and 2.1 (DELETE), you know that (KEEP) is the default option for the FILE keyword. In this example, if you include the FILE keyword but do not specify an option, default option KEEP will be applied. A default option also applies to the next higher dotted decimal number. In this example, if the FILE keyword is omitted, default FILE(KEEP) is used. However, if you hear the lines 2? FILE, 2.1, 2.1.1! (KEEP), and 2.1.1 (DELETE), the default option KEEP applies only to the next higher dotted decimal number, 2.1 (which does not have an associated keyword), and does not apply to 2? FILE. Nothing is used if the keyword FILE is omitted.

- An asterisk (*) means a syntax element that can be repeated 0 or more times. A dotted decimal number followed by the * symbol indicates that this syntax element can be used zero or more times; that is, it is optional and can be repeated. For example, if you hear the line 5.1* data area, you know that you can include one data area, more than one data area, or no data area. If you hear the lines 3*, 3 HOST, and 3 STATE, you know that you can include HOST, STATE, both together, or nothing.

  Notes:

  1. If a dotted decimal number has an asterisk (*) next to it and there is only one item with that dotted decimal number, you can repeat that same item more than once.
  2. If a dotted decimal number has an asterisk next to it and several items have that dotted decimal number, you can use more than one item from the list, but you cannot use the items more than once each. In the previous example, you could write HOST STATE, but you could not write HOST HOST.
  3. The * symbol is equivalent to a loop-back line in a railroad syntax diagram.

- + means a syntax element that must be included one or more times. A dotted decimal number followed by the + symbol indicates that this syntax element must be included one or more times; that is, it must be included at least once and can be repeated. For example, if you hear the line 6.1+ data area, you must include at least one data area. If you hear the lines 2+, 2 HOST, and 2 STATE, you know that you must include HOST, STATE, or both. Similar to the * symbol, the + symbol can only repeat a particular item if it is the only item with that dotted decimal number. The + symbol, like the * symbol, is equivalent to a loop-back line in a railroad syntax diagram.

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z/OS Communications Server information

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

Planning

Title	Number	Description
z/OS Communications Server: New Function Summary	GC27-3664	This document is intended to help you plan for new IP or SNA 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.
z/OS Communications Server: IPv6 Network and Application Design Guide	SC27-3663	This document is a high-level introduction to IPv6. It describes concepts of z/OS Communications Server's support of IPv6, coexistence with IPv4, and migration issues.

Resource definition, configuration, and tuning

Title	Number	Description
z/OS Communications Server: IP Configuration Guide	SC27-3650	This document describes the major concepts involved in understanding and configuring an IP network. Familiarity with the z/OS operating system, IP protocols, z/OS UNIX System Services, and IBM Time Sharing Option (TSO) is recommended. Use this document with the z/OS Communications Server: IP Configuration Reference.

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Title	Number	Description
z/OS Communications Server: IP Configuration Reference	SC27-3651	This document presents information for people who want to administer and maintain IP. Use this document with the z/OS Communications Server: IP Configuration Guide. The information in this document includes: • TCP/IP configuration data sets • Configuration statements • Translation tables • Protocol number and port assignments
z/OS Communications Server: SNA Network Implementation Guide	SC27-3672	This document presents the major concepts involved in implementing an SNA network. Use this document with the z/OS Communications Server: SNA Resource Definition Reference.
z/OS Communications Server: SNA Resource Definition Reference	SC27-3675	This document describes each SNA definition statement, start option, and macroinstruction for user tables. It also describes NCP definition statements that affect SNA. Use this document with the z/OS Communications Server: SNA Network Implementation Guide.
z/OS Communications Server: SNA Resource Definition Samples	SC27-3676	This document contains sample definitions to help you implement SNA functions in your networks, and includes sample major node definitions.
z/OS Communications Server: IP Network Print Facility	SC27-3658	This document is for systems programmers and network administrators who need to prepare their network to route SNA, JES2, or JES3 printer output to remote printers using TCP/IP Services.

Operation

Title	Number	Description
z/OS Communications Server: IP User's Guide and Commands	SC27-3662	This document describes how to use TCP/IP applications. It contains requests with which a user can log on to a remote host using Telnet, transfer data sets using FTP, send and receive electronic mail, print on remote printers, and authenticate network users.
z/OS Communications Server: IP System Administrator's Commands	SC27-3661	This document describes the functions and commands helpful in configuring or monitoring your system. It contains system administrator's commands, such as TSO NETSTAT, PING, TRACERTE and their UNIX counterparts. It also includes TSO and MVS commands commonly used during the IP configuration process.
z/OS Communications Server: SNA Operation	SC27-3673	This document serves as a reference for programmers and operators requiring detailed information about specific operator commands.
z/OS Communications Server: Quick Reference	SC27-3665	This document contains essential information about SNA and IP commands.

Customization

Title	Number	Description
z/OS Communications Server: SNA Customization	SC27-3666	This document enables you to customize SNA, and includes the following information: • Communication network management (CNM) routing table • Logon-interpret routine requirements • Logon manager installation-wide exit routine for the CLU search exit • TSO/SNA installation-wide exit routines • SNA installation-wide exit routines

Writing application programs

Title	Number	Description
z/OS Communications Server: IP Sockets Application Programming Interface Guide and Reference	SC27-3660	This document describes the syntax and semantics of program source code necessary to write your own application programming interface (API) into TCP/IP. You can use this interface as the communication base for writing your own client or server application. You can also use this document to adapt your existing applications to communicate with each other using sockets over TCP/IP.
z/OS Communications Server: IP CICS Sockets Guide	SC27-3649	This document is for programmers who want to set up, write application programs for, and diagnose problems with the socket interface for CICS® using z/OS TCP/IP.
z/OS Communications Server: IP IMS Sockets Guide	SC27-3653	This document is for programmers who want application programs that use the IMS™ TCP/IP application development services provided by the TCP/IP Services of IBM.
z/OS Communications Server: IP Programmer's Guide and Reference	SC27-3659	This document describes the syntax and semantics of a set of high-level application functions that you can use to program your own applications in a TCP/IP environment. These functions provide support for application facilities, such as user authentication, distributed databases, distributed processing, network management, and device sharing. Familiarity with the z/OS operating system, TCP/IP protocols, and IBM Time Sharing Option (TSO) is recommended.
z/OS Communications Server: SNA Programming	SC27-3674	This document describes how to use SNA macroinstructions to send data to and receive data from (1) a terminal in either the same or a different domain, or (2) another application program in either the same or a different domain.
z/OS Communications Server: SNA Programmer's LU 6.2 Guide	SC27-3669	This document describes how to use the SNA LU 6.2 application programming interface for host application programs. This document applies to programs that use only LU 6.2 sessions or that use LU 6.2 sessions along with other session types. (Only LU 6.2 sessions are covered in this document.)
z/OS Communications Server: SNA Programmer's LU 6.2 Reference	SC27-3670	This document provides reference material for the SNA LU 6.2 programming interface for host application programs.
z/OS Communications Server: CSM Guide	SC27-3647	This document describes how applications use the communications storage manager.

Title	Number	Description
z/OS Communications Server: CMIP Services and Topology Agent Guide	SC27-3646	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
z/OS Communications Server: IP Diagnosis Guide	GC27-3652	This document explains how to diagnose TCP/IP problems and how to determine whether a specific problem is in the TCP/IP product code. It explains how to gather information for and describe problems to the IBM Software Support Center.
z/OS Communications Server: ACF/TAP Trace Analysis Handbook	GC27-3645	This document explains how to gather the trace data that is collected and stored in the host processor. It also explains how to use the Advanced Communications Function/Trace Analysis Program (ACF/TAP) service aid to produce reports for analyzing the trace data information.
z/OS Communications Server: SNA Diagnosis Vol 1, Techniques and Procedures and z/OS Communications Server: SNA Diagnosis Vol 2, FFST Dumps and the VIT	GC27-3667 GC27-3668	These documents help you identify an SNA problem, classify it, and collect information about it before you call the IBM Support Center. The information collected includes traces, dumps, and other problem documentation.
z/OS Communications Server: SNA Data Areas Volume 1 and z/OS Communications Server: SNA Data Areas Volume 2	GC31-6852 GC31-6853	These documents describe SNA data areas and can be used to read an SNA dump. They are intended for IBM programming service representatives and customer personnel who are diagnosing problems with SNA.

Messages and codes

Title	Number	Description
z/OS Communications Server: SNA Messages	SC27-3671	This document describes the ELM, IKT, IST, IUT, IVT, and USS messages. Other information in this document includes: • Command and RU types in SNA messages • Node and ID types in SNA messages • Supplemental message-related information
z/OS Communications Server: IP Messages Volume 1 (EZA)	SC27-3654	This volume contains TCP/IP messages beginning with EZA.
z/OS Communications Server: IP Messages Volume 2 (EZB, EZD)	SC27-3655	This volume contains TCP/IP messages beginning with EZB or EZD.
z/OS Communications Server: IP Messages Volume 3 (EZY)	SC27-3656	This volume contains TCP/IP messages beginning with EZY.
z/OS Communications Server: IP Messages Volume 4 (EZZ, SNM)	SC27-3657	This volume contains TCP/IP messages beginning with EZZ and SNM.
z/OS Communications Server: IP and SNA Codes	SC27-3648	This document describes codes and other information that appear in z/OS Communications Server messages.

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