



**IBM® Sterling Connect:Express®
for UNIX**

FTP Guide

Version 1.5

Copyright

This edition applies to the 1.5 Version of IBM® Sterling Connect:Express® for UNIX and to all subsequent releases and modifications until otherwise indicated in new editions.

Before using this information and the product it supports, read the information in Notices, on page 31.

Licensed Materials - Property of IBM

IBM® Sterling Connect:Express® for UNIX

© Copyright IBM Corp. 1999, 2014. All Rights Reserved.

US Government Users Restricted Rights - Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Table of Contents

FTP PROTOCOL SUPPORT BY STERLING CONNECT:EXPRESS.....	4
INTRODUCTION.....	4
THE FTP PROTOCOL.....	5
<i>FTP commands supported by Sterling Connect:Express.....</i>	<i>5</i>
<i>FTP REPLIES issued by Sterling Connect:Express.....</i>	<i>6</i>
<i>Sterling Connect:Express Reply to the LIST command.....</i>	<i>7</i>
FTP TRANSFERS WITH STERLING CONNECT:EXPRESS.....	9
CONTROL OF FTP TRANSFERS BY STERLING CONNECT:EXPRESS.....	9
<i>Server functions : identification of the file to be transferred.....</i>	<i>9</i>
<i>Client Functions : FTP transfer request to Sterling Connect:Express.....</i>	<i>10</i>
<i>User interface.....</i>	<i>10</i>
.....	10
<i>General parameters : configuration of the FTP options.....</i>	<i>11</i>
<i>Partners directory : management of connections.....</i>	<i>11</i>
<i>Files directory : management of transfers.....</i>	<i>12</i>
<i>File allocation.....</i>	<i>13</i>
<i>FILE ALLOCATION by Sterling Connect:Express FTP SERVER.....</i>	<i>14</i>
<i>FTP Replies by Sterling Connect:Express FTP server.....</i>	<i>15</i>
<i>TRC return codes.....</i>	<i>18</i>
<i>PRC return codes.....</i>	<i>20</i>
FTP SUPPORT BY STERLING CONNECT:EXPRESS FOR UNIX.....	21
TOM FTP.....	21
<i>FTP option installation.....</i>	<i>21</i>
STERLING CONNECT:EXPRESS PARAMETERS.....	22
<i>Sterling Connect:Express SYSIN File.....</i>	<i>22</i>
<i>Partners directory.....</i>	<i>22</i>
<i>Files Directory.....</i>	<i>23</i>
<i>FTP Extended Identification.....</i>	<i>24</i>
<i>Transfer Request Parameters.....</i>	<i>26</i>
FILES ALLOCATION IN SERVER MODE.....	27
STORING DATA.....	29

FTP Protocol Support by Sterling Connect:Express

This chapter describes how FTP protocol is managed by Sterling Connect:Express, on any platforms.

Introduction

Today LAN's replace clusters of terminals and TCP/IP has become a standard; using FTP as a file transfer protocol has become natural. Strong points of FTP are heterogeneity and wide spreading; no TCP/IP product can be delivered without FTP utility. One of its weak points is the lack of applicative interface allowing to include the file transfer process in an automated exploitation.

To remedy to this FTP applications gap, the FTP protocol has been developed and placed under monitoring of Sterling Connect:Express. The goal of this development is to allow applications and users to exchange files in an organized and secured manner, with identified partners, including all facilities which Sterling Connect:Express users are accustomed to.

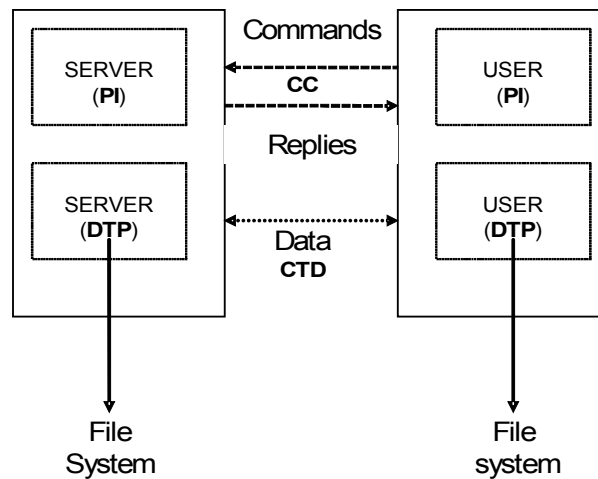
Choices made during FTP implementation under Sterling Connect:Express let users use existing FTP applications by allowing them to exchange targeted files (defined in the Files directory) with recognized partners (Those of the Partners directory).

Implementation focuses on a subset of FTP facilities meaningful to accomplish the task of file transfer (logging facilities, Transmission and Reception of a file). File management (directory management, rename, delete ...) are not supported.

The FTP Protocol

RFC 959 specifies the FTP protocol and refers to RFC 854 (TELNET PROTOCOL SPECIFICATION). It is recommended to read documents of reference for a full comprehension of the subject.

User opens the control connection (CC) with the FTP server (Protocol Interpreter). The exchange of commands (user → server) and replies (REPLY server → user) during this connection allows to identify the user and to negotiate one or several successive file transfers. The data transfer will take place on an other connection (CTD) established with the data transfer server (Data Transfer Process).



The diagram above represents the FTP model in the simplest case : negotiation and execution of transfer are done between the same sites.

FTP commands supported by Sterling Connect:Express

FTP support by Sterling Connect:Express is limited to functionalities evoked by commands underlined in the list hereafter. Underlined and italicized FTP commands are not yet supported. FTP commands divide in three types :

a) Access control

USER username
PASSword password
ACCOUNT
CWD (Change Working Directory)
CDUP (Change to Parent Directory)
SMNT (Structure MouNT)
REIN (REINitalize)
QUIT

b) Transfer parameters

PORT TCP/IP address + port n°
PASV
TYPE ASCII (PRINT, NOPRINT)
EBCDIC (PRINT, NOPRINT)
IMAGE
LOCAL byte size
STRU File
Record
Page
MODE Stream
Block
Compressed

c) FTP services

RETRieve path
STORe path
STOU path
STOre Unique path
APPEnd path
ALLOcate
REStart
RNFR ReName From
RNTO ReName TO
ABORt
DELEte
RMD ReMove Directory
MKD MaKe Directory
PWD Print Working Directory
LIST
NLST Name LiST
SITE
SYSTem
STATus
HELP item
NOOP

FTP REPLIES issued by Sterling Connect:Express

Replies are built by the server according to usual syntaxes and completed by the own information's of the monitor:

Request number attributed by Sterling Connect:Express (STOR, STOU, RETR, APPE).

Results : number of bytes exchanged and number of records processed by Sterling Connect:Express.

Return codes TRC, SRC.

Examples of REPLY by the FTP server under Sterling Connect:Express are given in annex. On-line help is provided to the FTP client (HELP, SYST, SITE, STAT, PWD commands).

Sterling Connect:Express Reply to the LIST command

An FTP client has the possibility to ask the server the list of the available files. Sterling Connect:Express reply to this demand consists of a list of symbolic names and attributes associated to in the Files directory.

Attributes concern the authorized transfer direction and the allocation of the file on the server:

- A symbolic name can be used for transmission (STOR, STOU, APPE) or for reception (RETR) or both ways.
- A symbolic name can be associated to a partner, to a list of partner or to all partners(\$\$ALL\$\$).
- Allocation rules defined for a symbolic file can affect demand of transfer (physical name fixed in the directory, pre allocated file...).

Transfer parameters have to be related to the allocation parameters (Format and length of the record). See, according to the platform, the correspondence table Data storage and transfer options.

FTP Transfers with Sterling Connect:Express

This chapter describes how FTP transfers are managed by Sterling Connect:Express, on any platforms.

Control of FTP Transfers by Sterling Connect:Express

FTP Transfers are managed in the same way than any other type of transfer (PeSIT, ETEBAC3, ODETTE...).

A unique request number identifies each FTP transfer running under control of Sterling Connect:Express. It is associated to a partner in the Partners directory and a file profile in the Files directory. FTP transfers can be visualized through the operator interface of the monitor (Requests, LOG File, journal). FTP transfers can be automated through the user interface of the monitor (Operator, batch, application).

Server functions : identification of the file to be transferred.

The monitor processes all transfer demands from the three following information :

- Partner symbolic name
- File symbolic name
- File physical name

The partner symbolic name is fixed during the connection, after controls of the password and the network address.

File physical and symbolic names are obtained during the reception of RETR, APPE, STOR or STOU commands. Each of these two parameters can be fixed by default in the parameters of Sterling Connect:Express.

This determines three possibilities for “path”, unique parameter of FTP transfer demand:

Identification of the file to be transferred : path =

<SYNBNAME!Data-Set-Name>:the two parameters provided, separated by “ ! ”

<Data-Set-Name>: The symbolic name is taken by default (see C:E parameters)

<SYNBNAME!> : The physical name is the one associated to the symbolic name in the Files directory

SYNBNAME(optional) :

File name from the monitor Files directory

Each FTP partner can have a default file profile: a default profile is defined in the general parameters of Sterling Connect:Express.

Data-Set-Name (optional):

The physical name (DSN LOCAL) set in the Files directory is the default.

(Refer to APPENDIX about ‘File allocation’).

Particular case of STORe Unique (STOU) command:

FTP STOU command means that the server does not have to scratch the file if it exists; user expects the server to add a version number to the file name indicated in the STOU command parameter.

Processing of the STORe Unique command by Sterling Connect:Express : an index, built from the request number, is added in case of duplicate.

Note: allocations rule 1 (pre-allocated file) excludes the use of STOU.

Client Functions : FTP transfer request to Sterling Connect:Express

FTP transfer request requires, as parameters, a local file name (LOCAL DSN) and a remote file name (REMOTE DSN) or 'path', both implied in the process of transfer.

More, it is necessary to fixe FTP transfer options (transfer mode, data structure, data type).

These parameters (REMOTE DSN, FTP PARAMETERS) may be set in the Files directory of the monitor(They are only used in case of output request). They can also be specified at time of the FTP transfer request.

User interface

The user interface of Sterling Connect:Express is the same for all protocols:

- Operator interface
- Batch interface
- Program interface
- User exits
- User commands

General parameters : configuration of the FTP options

Start of the FTP monitor : Procedure name
FTP monitor Configuration: Number of sessions, TCP/IP port number...

These parameters are dependent of each platform.

Local identification

Symbolic name and password of the local monitor.

Default Profile

It is a symbolic file name, defined in the Files directory of Sterling Connect:Express. The default profile specified in general parameters is taken into account for input connections with partners defined with no default profile.

List Option

In server mode, the reception of the FTP 'LIST' command makes Sterling Connect:Express send a file containing all the symbolic names under which the online client can undertake transfers. This list is built in function of transmitter partner and receiver partner field of each file in the Files directory.

The option allows to exclude from the list symbolic names to which is associated the keyword \$\$ALL\$\$.
Only, the symbolic names of file associated to the online partner, or to a list of partners whose it belongs to will be sent in response to the LIST command.

Partners directory : management of connections

Any partner (parameter of the FTP USER command) has to be defined in the partners directory. The session protocol number is 2.

Input connection

During an input connection the FTP USER and PASSWORD parameters are interpreted as symbolic name and partner password, used to identify this one in the Partners directory.

Controls focus on the following parameters :

- Transfer protocol
- Password
- IP address (if any)
- Number of active sessions for the partner
- Status of the partner (enable, disable)

Output connection

The output request for a partner provokes the connection with the distant site. Local identification parameters (symbolic name and password) of the monitor will be used as FTP connection USER and PASSWORD parameters, if no ALIAS name has been defined for the partner.

Default profile

Each partner may be associated a 'default FTP profile' : this symbolic file name has to be defined in the Files directory. The partner default profile is used in case of input connections. If it is not specified in the partner definition, the profile defined in general parameters is taken.

Files directory : management of transfers

A symbolic file name in the Files directory of Sterling Connect:Express defines a transfer profile. This profile allows the management of the transfer by specifying:

- Flows (directions and partners) allowed
- File allocation rules
- File allocation parameters (reception)
- Processing (exits and user commands)
- The remote file name for an output request (transmission and reception)
- FTP transfer options (transfer mode, data structure, data type) for an output request.

The profile name is indicated explicitly during an output request. In case of input request it can be absent : the 'default profile' defined for the partner (or the default profile of the monitor if none) allows managing such a demand.

Flows:

Usual rules are available (directions, partner transmitter / receiver, list of partners). The FTP LIST command received from an FTP client provokes the transfer of the list of symbolic names available for transfer with the online partner.

It is possible to limit this list to the symbolic files explicitly dedicated to the current partner. The full list, without limitation, includes files defined with key words \$\$ALL\$\$ in transmitter and receiver fields. The list sent to the FTP client indicates allocation rules and transfer direction for each symbolic file.

Allocation rules

Allocation rules works in a standard manner :

Fixed/dynamic:

The physical file name is fixed by the Files directory parameter or can be specified at time of demand.

Rule 0. 1.2.3 :

File has to exist (1), to be created at reception time(2), to be determined by exit user (3).

Rule 0 : On reception the file is created or over-written.

Rule 1 : TRC allocation error = 3001 if the file does not exist . On reception the file is over-written.

Rule 2: TRC allocation error = 3001 if the file exists, except in case of STORE Unique an index &REQNUMB is added in case of duplicate.

Rule 3: file name passed to the user exit which can modify it and execute the allocation itself.

Allocation parameters

Allocation rule 2 for received files, makes allocation parameters mandatory.

FTP parameters :

- Data type : ASCII (default), EBCDIC or BINARY
- Data structure : FILE (default) or RECORD
- Transfer mode : STREAM (default), BLOCK, COMPRESS
-

In case of an output request (client mode) the FTP transfer parameters can be fixed in the Files directory or specified at time of the FTP transfer request.

Remote file name:

In case of an output request (client mode) it is possible to specify the 'path' that will be carried by the FTP transfer command. It can be fixed in the Files directory or specified at time of the FTP transfer request.

File allocation

In the following :

'Symb' designates a symbolic file name

'DSN' designates a physical file name considered on the host C:E-FTP (local DSN ,remote DSN).

'file' designates the physical name of the file exchanged.

A FTP transfer demand may be formulated in several manners: STORE (reception by the server), RETRIEve (transmission by the server), STORE Unique (reception by the server with attribution of a version number in case of duplicate), APPEnd (reception by the server with data appended to the existent file).

Each demand is specified with a parameter, 'path', which indicates the file name on the server side.

With FTP Connect:Express this 'path' can be constituted of the couple 'Symbolic name!Physical file name' or one of the two elements :

Path = 'Symb'!'file' or 'symb'! or 'file'

In FTP client mode, the path can be specified in the fields 'REMOTE DSN' in the monitor file directory or at transfer request time.

Parameters of the transfer request.

Only the 'Definition type' is used during the parameters control of the output transfer request .

This control (FIXED or DYNAMIC) focuses on the 'LOCAL DSN'; It does not concern the 'REMOTE DSN'.

In FTP server mode the local physical name of the file to be transferred is determined by the monitor from the parameter 'path' of the FTP demand, and under control of the Files directory parameters.

The local physical name is built from the 'LOCAL DSN' found in the Files directory (entry : SYMB).

Usual keywords (&PARTNID, &FILENAM, &REQ..., &USRVAR1, &USRVAR2, &EXTDSN...) are available.

Using &EXTDSN, &USRVAR1 and &USRVAR2 open the building of the local physical name to the use of the physical file name from the client.

Remark : The 'file' issued from FTP CLIENT can be any character string; FTP server Sterling Connect:Express will change it to make it available on the local platform .

Only (&PARTNID, &FILENAM, &REQ..) are available in the 'file' string.

Particular case of the allocation rule 1:

The allocation rule 1 supposes that in reception the file exists and is scratched. This is contradictory with the STORE Unique command use that allows the writing of duplicate file. A STORE Unique command received for a file with allocation rule 1 is rejected with the code TRC=2018.

Below is summarized the use of symbolic keywords in the LOCAL data set name definition in case of input FTP transfers.

FILE ALLOCATION by Sterling Connect:Express FTP SERVER

Depending on the LOCAL DSN definition

Reception (STOR, APPE), Transmission(RETR)

FTP Command received	Pathname symb!file	Available Keywords in the LOCAL DSN definition
STOR RETR APPE	symb!	&PARTNID, &FILENAM, &REQ..., &C, &A, &Y, &M, &J, &QQ
STOR RETR APPE	symb!file	&PARTNID, &FILENAM, &REQ..., &C, &A, &Y, &M, &J, &QQ: &USRVARi, &EXTDSN: from 'file'
STOR RETR APPE	file	&PARTNID, &FILENAM, &REQ..., &C, &A, &Y, &M, &J, &QQ &USRVARi, &EXTDSN: from 'file'

Reception (STOU)

FTP Command received	Pathname symb!file	Rule 1	2	3	Available Keywords in the LOCAL DSN definition
STOU	symb!	Rejected TRC=2018	+ REQNUMB (duplicate)	LOCAL DSN defined for 'symb'	&PARTNID, &FILENAM, &REQ..., &C, &A, &Y, &M, &J, &QQ
STOU	symb!file	Rejected TRC=2018	+ REQNUMB (duplicate)	LOCAL DSN defined for 'symb'	&PARTNID, &FILENAM, &REQ..., &C, &A, &Y, &M, &J, &QQ &USRVARi, &EXTDSN from 'file'
STOU	file	Rejected TRC=2018	+ REQNUMB (duplicate)	LOCAL DSN defined for 'symb'	&PARTNID, &FILENAM, &REQ..., &C, &A, &Y, &M, &J, &QQ &USRVARi, &EXTDSN from 'file'

FTP Replies by Sterling Connect:Express FTP server.

The following appears on a UNIX FTP client.

Sterling Connect:Express replies are in bold case. Commands and parameters from User are underlined. Explanations are italicized.

ftp> open mvs 4100

Connected to mvs.paris_labs.ig.stercomm.com.

220-Sterling Connect:Express For IBM/MVS FTP monitor TOM430 (06/27/13).

220-A STERLING COMMERCE product.

220 Job: STC08854 97/07/01 16:23:58

OPEN command is answered:

Version of Connect:Express software (product date)

The system identification of the C:E FTP server process and the connection date and time.

Name (mvs:usr): ftp1

331 FTP1 password please ?

Password: _____

230-FTP1 User logged on at Connect:Express FTP for IBM/MVS.

230 Default profile is FTPV

USER / PASW commands are returned the default profile: FTPV.

ftp> dir

200 PORT Command executed.

DATA session is opened.

125 LIST Command accepted.

-D 2 T VB 00244 18000 FTPGDG!PSR\$TST.GDG.TSTGDG0(+01)

-D 2 * VB 00244 27800 FTPV!PSR\$TST.A.VVV.&REQNUMB

-F 1 R - - - FTPVAL1!PSR\$TST.A.VVV

250 list completed successfully.

The LIST of symbolic files from C:E Files directory available for User FTP1 is sent.

A number of File attributes are showed.

Default profile FTPV is part of the list.

Following attributes are sent:

- *Dynamic or Fixe Allocation*
- *- Allocation rule: 2 = to be created, 1 = pre-allocated*
- *- Direction Transmission, Reception, * = both*
- *- File record format (Variable, Fixe, Blocked ..)*
- *- Record length*
- *- Block size*

ftp> pwd

ftp>

PWD command (Print Working Directory) is returned the default pro file.

ftp> rstat

211-Sterling Connect:Express for IBM/MVS FTP monitor TOM222 (07/02/97).

211-Default profile is FTPV

211 Mode: STREAM ; type: ASCII ; Format: NON-PRINT; structure: FILE .

ftp>

RSTAT command (Remote status) is returned the active FTP transfer parameters.

Help is available on line.

It explains the FTP facilities supported by Sterling Connect:Express the general features of FTP transfers monitoring.

ftp> rhelp

214-The Connect:Express FTP commands are:

214-*ABOR,*ACCT,*ALLO, APPE,*CDUP,*CWD,*DELE, HELP, LIST, *MKD, MODE

214- NLST, NOOP, PASS,*PASV, PORT, PWD, QUIT,*REIN,*REST, RETR, *RMD

214-*RNFR,*RNTO, SITE,*SMNT, STAT, STOR, STOU, STRU, SYST, TYPE, USER

214-

214-Commands preceded by "*" are not implemented

214-

214-TYPE may be ASCII, EBCDIC, IMAGE

214-STRU may be RECORD, FILE

214-MODE may be STREAM, BLOCK, COMPRESS

214-

214-HELP is available for:

214-*APPE, *LIST, *PWD, RETR, SITE, STOR, STOU, *TRC

214-

214-Connect:Express keywords:

214-REQUEST = QQQnnnnnn: transfer identification by monitor.

214-TRC = return code from monitor.

214-Profile = symbolic file name defined in the monitor directory.

214 Type HELP SITE command for C:E special services description.

ftp> rhelp site

214-Connect:Express on IBM/MVS, special services.

214-C:E monitor identifies one transfer by a unique REQUEST number: QQQnnnnnn

214- QQQ = Julian date modulo 186.

214- nnnnnn = Sequence number.

214-

214-Some REPLY shows a TRC return code. This TRC is from C:E monitor.

214-Type HELP TRC Ftp command to get a list of some usual TRC codes.

214-

214-The name of the remote file you specify for STOR, RETR, STOU and APPE

214-Ftp commands must be structured this way:

214- {Profile}!{Dname} where

214- Profile is a symbolic name (1 to 8 characters) known by C:E monitor.

214- A Default profile may be specified by C:E at connection (REPLY 125).

214- If {Profile} is omitted, this Default is kept

214- Dname is a MVS data set name (1 to 44 characters).

214- C:E monitor associates a MVS Dname to the Profile in its Directory.

214- If {Dname} is omitted this Default Dname is taken.

214- Dname may contain C:E variables such as:

214 &REQNUMB, &REQTIM, &REQDAT, &PARTNID, &FILENAM.

ftp> rhelp stou

214-STOU {Profile}!{Dname}:

214-Profile = symbolic identification by monitor (8 characters).

214-If omitted, default is taken.

214-Dsname = MVS data set name (44 characters).

214-If omitted default is taken from Profile entry in monitor directory.

214-

214-If the request is accepted by monitor, the transfer will be identified by:
214-REQUEST = QQQnnnnnn from monitor.
214-If the request is rejected by monitor, a TRC return code is issued.
214-Note the REQUEST number or the TRC code.
214-
214-File is created if not found.
214 If "dsname" exists, "dsname.{Request number}" is created.
ftp>

Example: transmission to Sterling Connect:Express FTP server.

```
ftp> put
(local-file) TESTFTP.c
(remote-file) prod01.a.v.&reqnumb
200 PORT Command executed.
125 STOR Command accepted, transfer starting REQUEST: 18300001.
The C:E transfer request number is returned.
226-Transfer completed successfully.
226 bytes RECV : 107222      records processed : 4028
At end of transfer the bytes and records counts are returned.
107222 bytes sent in 147,8 seconds (0,7082 kb/s)
ftp> get
(remote-file) ftpf!prod01.a.v.ddd
(local-file) work.c
200 PORT Command executed.
451 DSN allocation error SRC=LOCA. (TRC=3001)
ftp>
If the transfer is rejected by Sterling Connect:Express return codes are issued.
```

TRC return codes.

Current errors are:

- FTP negotiations error: TRC=15.. (invalid parameter), TRC=16.. (command rejected), TRC=11 (invalid command length). In these cases the demand is not transmitted to the monitor.
- User identification, transfer request rejected by monitor: TRC=2...
- Allocation error: TRC=3... + SRC. Monitor has accepted transfer.
- I/O error: TRC=3... Monitor has accepted transfer.

PRC return codes.

Code	Description
100 Codes	The requested action is being taken. Expect a reply before proceeding with a new command.
110	Restart marker reply.
120	Service ready in (n) minutes.
125	Data connection already open, transfer starting.
150	File status okay, about to open data connection.
200 Codes	The requested action has been successfully completed.
200	Command okay.
202	Command not implemented
211	System status, or system help reply.
212	Directory status.
213	File status.
214	Help message.
215	NAME system type. (NAME is an official system name from the list in the Assigned Numbers document.)
220	Service ready for new user.
221	Service closing control connection. (Logged out if appropriate.)
225	Data connection open, no transfer in progress.
226	Closing data connection. Requested file action successful (file transfer, abort, etc.).
227	Entering Passive Mode
230	User logged in, proceed.
250	Requested file action okay, completed.
257	"PATHNAME" created.
300 Codes	The command has been accepted, but the requested action is being held pending receipt of further information.
331	User name okay, need password.
332	Need account for login.
350	Requested file action pending further information.
400 Codes	The command was not accepted and the requested action did not take place. The error condition is temporary, however, and the action may be requested again.
421	Service not available, closing control connection. (May be a reply to any command if the service knows it must shut down.)
425	Can't open data connection.
426	Connection closed, transfer aborted.
450	Requested file action not taken. File unavailable (e.g., file busy).
451	Requested action aborted, local error in processing.
452	Requested action not taken. Insufficient storage space in system.
500 Codes	The command was not accepted and the requested action did not take place.
500	Syntax error, command unrecognized. This may include errors such as command line too long.
501	Syntax error in parameters or arguments.
502	Command not implemented.
503	Bad sequence of commands.
504	Command not implemented for that parameter.
530	User not logged in.
532	Need account for storing files.
550	Requested action not taken. File unavailable (e.g., file not found, no access).
552	Requested file action aborted, storage allocation exceeded
553	Requested action not taken. Illegal file name.

Chapter 3

This chapter describes how FTP protocol is managed by Sterling Connect:Express for UNIX.

FTP Support by Sterling Connect:Express for UNIX

Tom_ftp.

The FTP transfers manager is a unique process, started by Sterling Connect:Express monitor. The program is strf/tom_ftp file. It is listening to incoming calls on the TCP/IP PORT number defined in the SYSIN parameters file (FTPSPORT keyword). The manager is also listening to the monitor and takes into account the interruption and stop commands.

The manager has in charge to accept connections under control of Sterling Connect:Express and its Partners directory. Once the connection is established with a partner (FTP control connection), the processing is transmitted at transfer server level.

FTP option installation

Sterling Connect:Express for UNIX product is delivered with all its options.

Define the FTPSPORT= parameter in the /config/sysin file.

Sterling Connect:Express Parameters

FTP transfer environment is common with other transfer protocol environments. Some parameters are specific to FTP.

A symbolic file can be shared between FTP transfers and transfers undertaken under the other protocols. Monitoring and all results of the FTP transfers are accessible in the same manner than all the other types of transfer.

Sterling Connect:Express SYSIN File

This file contains the Default FTP Symbolic File Name (DEFILE). From 1 to 8 characters, this keyword gives the default file used for FTP transfer in Server mode.

Partners directory

```
C:E/UNIX 150-11 ----- PARTNERS DIRECTORY ----- ce01
OPTION ==>
SYMBOLIC NAME          : FTPPSR
PASSWORD .....        : PSR           PASSWORD OF PARTNER
INITIALIZATION STATUS . : E           E:ENABLE H:DISABLE
PARTNER TYPE .....    : T           T/O
PROTOCOL NUMBER (ANY).. : 2 (N)      1:ETEBAC 3, 2:FTP, 3:PESIT (Y/N)
SESSION / PRESENTATION : 6 /        TABLES 1->9 / 1->9
X25 PORT .....        : 0           X25 DEVICE NAME
MAX. NO. CONNECTIONS .. : 10/10/10  01->64 TOT/IN/OUT
TYPE OF CONNECTION .... : T           X, P, T OR M
X25 DIAL NUMBER ..... :             1-15 CHARACTERS
LOCAL DIAL NUMBER ..... :             1-15 CHARACTERS
EXTRA NETWORK FIELD ... :
FACILITIES .....     :
TCPIP HOST .....      : localhost          PORT . : 05025
TCPIP ADDRESS .....   :             DEFAULT FILE ... : FTPFILE
DPCSID ALIAS .....    :             SSLPARM ID ..... :
DPCPSW ALIAS .....   :             CONTROL OF CERTIFICATES :
NUMBER OF RETRIES .... :             INTERV.SESS ,TRF : , MINUTES
DO YOU WANT TO GO ON ?
OPTION : VIEW          UPD : 08/06/06 10:41 root
-ENTER- NEXT FIELD    -F3- CANCEL          -F8- COMPLETION
```

The connection type is 'T'.

Incoming sessions :

- 1 TCP/ IP address control in case of input call can be inhibited by using SYSTCP (see User's Guide) or by using host name instead of IP address.
- 2 The default file profile is only used in case of input call.

Outgoing sessions:

- 3 The PORT number is only used in case of output call.
- 4 The "21" PORT number is generally the default standard FTP port number.

Files Directory

```
C:E/UNIX 150-11 ----- FILES DIRECTORY -----
ce01
OPTION ==>

SYMBOLIC NAME      :      DEFAULT

INITIALIZATION STATUS . : E                E:ENABLE      H:DISABLE
DIRECTION (INQUIRY) ... : * (N)          T:TRANS. R:REC. *:TRANS./REC. (Y/N)
RECEIVING PARTNER .... : $$ALL$$        'NAME',#LISTE, $$ALL$$
TRANSMITTING PARTNER .. : $$ALL$$        'NAME',#LISTE, $$ALL$$
PRIORITY ..... : 0                0:URGENT 1:FAST 2:NORMAL
DEFINITION TYPE ..... : D                D:DYNAMIC F:FIXED
PRESENTATION TABLE ... : 5                1 -> 9 PRESENTATION TABLE
PARAMETER CARDS FILE  : Y                Y/N
SPACE TO RESERVE ..... : N                Y/N
ALLOCATION RULE ..... : 0                0:INDIF., 1:PREALL., 2:TO CREATE
PHYSICAL NAME ..... : /tmp/TOM_&REQNUMB.tmp
RECORD FORMAT ..... : TV                TF, TV, BF, BU, T*, B*, **
RECORD LENGTH ..... : 00255            1-5 NUMERIC CHARAC.
REMOTE DSN (FTP) ..... : /usr/products/update.txt
TYPE/STRUCTURE/MODE FTP : ARS                E/A/I/*,F/R/*,B/S/*
STORE UNIQUE (FTP) .... : N                Y/N FA : N Y/N NOT : (0-7)

OPTION : VIEW                UPD : 08/10/12 14:59 mve
-ENTER- NEXT FIELD          -F3- CANCEL                -F8- COMPLETION
```

Physical name defined in Files directory is taken by default. If definition type is 'Fixed', this name can't be changed at the transfer request; physical name given

PARAMETER CARDS FILE : If set (Y), FTP parameters for transfer can be taken from config/FICPARAMS.dat file.

REMOTE DSN : if set in client mode, this is physical name in remote host.

TYPE/STRUCTURE/MODE (*, File, Stream is supported by all clients) :

- Data Type : ASCII, EBCDIC, Image or Default (*). Default is useful in client mode when FTP remote server software sometimes does not support TYPE command.
- File Structure : File, Record or Default (*). Default is useful in client mode when FTP remote server software sometimes does not support STRU command.
- Transmission Mode : Block, Stream or Default (*). Default is useful in client mode when FTP remote server software sometimes does not support MODE command.

STORE UNIQUE : if set, when client transmitter mode is used, STORE UNIQUE (STOU command) is sent to FTP server.

FTP Extended Identification

FTP Extended identification enables the use of long FTP user names and passwords, in place of the symbolic 8 Characters values, and enables communications through firewalls.

For example, connecting to an FTP server through a firewall is done with this syntax:

```
USER my_username_any_length@server_host_name_any_length
PASSWORD my_password_any_length
```

The FTP Extended Identification File

You can define extended FTP identifications in the apmftpe file placed in the config directory:

```
$TOM_DIR/config/apmftpe
```

You can create and update this file through an editor, using the syntax shown below: Keyword ID is required, commas are used as separators. Extended id or extended password can be omitted.

```
ID=Aliasid,Ftp_Extended_Id,Ftp_Extended_Password
or
ID=Aliasid,Ftp_Extended_Id      (no password)
or
ID=Aliasid,,Ftp_Extended_Password      (no user name)
```

The FTP DPCSID ALIAS Field

The partner definition provides the DPCSID ALIAS field. If this field is set with \$\$FTPE\$\$ keyword, the alias id must be picked up in the apmftpe file, identified by the partner name. if the DPCSID ALIAS field is set with a name starting with '\$\$', \$\$alias for example, the alias id must be picked up in the apmftpe file, identified by the name "alias" from \$\$alias.


```

C:E/UNIX 150-11 ----- PARTNERS DIRECTORY -----
tom1
OPTION ===>

SYMBOLIC NAME ..... : PFTP01
PASSWORD ..... : PASSWD          PASSWORD OF PARTNER
INITIALIZATION STATUS . : E          E:ENABLE      H:DISABLE
PARTNER TYPE ..... : O          T/O
PROTOCOL NUMBER (ANY).. : 2 (N)    1:ETEBAC 3, 2:FTP, 3:PESIT (Y/N)
SESSION / PRESENTATION : 6 /    TABLES 1->9 / 1->9
X25 PORT ..... :
MAX. NO. CONNECTIONS .. : 20/10/10  01->64 TOT/IN/OUT
TYPE OF CONNECTION ... : T          X, P, T OR M
X25 DIAL NUMBER ..... :          1-15 CHARACTERS
LOCAL DIAL NUMBER ..... :          1-15 CHARACTERS
EXTRA NETWORK FIELD ... :          'USER-DATA-FIELD'
FACILITIES ..... :
TCPIP HOST ..... : localhost      PORT . : 05050
TCPIP ADDRESS ..... :          DEFAULT FILE .. : FFTP01
DPCSID ALIAS ..... : $$FTPE$$    SSLPARM ID .... :
DPCPSW ALIAS ..... : PASSWD      CONTROL OF CERTIFICATES :
NUMBER OF RETRIES ..... :          INTERV.SESS ,TRF : , MINUTES
DO YOU WANT TO GO ON ?
OPTION : VIEW          UPD : 10/04/01 15:33 gcz
-ENTER- NEXT FIELD    -F3- CANCEL          -F8- COMPLETION

```

For PFTP01, the apmfte file will provide the ID=PFTP01 information.

```

ID=PFTP01,Ftp_Extended_pftp01,Ftp_pftp01_Extended_Password
ID=alias,my_alias,my_alias_Password
ID=SPECID,my_user@address_of_server_destination.com

```

You can pass the DPCSID ALIAS with the transfer request, from sterm or itom. For example:

```

$TOM_DIR/itom/p1b8preq "/SFN=FILE01/DIR=T/SPN=PFTP01/SID=$$SPECID"
"/DSN=$TOM_DIR/config/sysin"

```

For this request, the apmfte file will provide the ID=SPECID information.

If a field is omitted in the apmfte file for the current definition, the value is taken from the directory, or the default sysin value. For example SPECID does not have a password: the password is PASSWD from the directory DPCPSW ALIAS field. If no extended user id is provide, the DPCSID name from the sysin is used: this is the way to just providing an extended password.

Transfer Request Parameters

```
C:E/UNIX 150-11 ----- TRANSFER REQUEST ----- ce01
OPTION ==>
FILE ..... : SYMBFILE          DIRECTION ..... : T (T/R)
PARTNER ..... : PARTNER.
DPCSID ALIAS ..... : MYNAME..      DPCPSW ALIAS ..... : MYPASSW.
ORIGIN..... :                      DESTINATION..... :
SENDER..... :                      RECEIVER ..... :
PHYSICAL NAME ..... : /usr/lib/libsock.a.....
REMOTE PHYSICAL NAME .. : PHYSICAL.FILENAME.TRANSMIT.....
LABEL:.....
RECORD FORMAT ..... : BU      TF, TV, BF, BU
RECORD LENGTH ..... : 02048
TYPE/STRUCTURE/MODE FTP : ***      E/A/I/*,F/R/*,B/S/*
STORE UNIQUE (FTP) .... : N      Y/N FA : N Y/N NOT : (0-7)
TYPE ..... : N      (N/I/H)
TYPE OF CONNECTION .... : T      (X/P/T)
PRIORITY ..... : 0      (0/1/2)
DATE ..... : 19980728101604      (YYYYMMDDHHMMSS)
API FIELD (ETEBAC3 : 80 CHARACTERS FOR CARD)
1...5...0...5...0...5...0...5...0...5...0...5...0...5...0
DO YOU WANT TO GO ON ?
-ENTER- NEXT FIELD          -F3- CANCEL          -F8- COMPLETION
```

Files Allocation in Server Mode

In the following:

- 'Symb' designates a symbolic file name
- 'DSN' designates a physical file name considered on the host C:E-FTP (local DSN ,remote DSN).
- 'file' designates the physical name of the file exchanged.

An FTP transfer demand may be formulated in several manners:

STORe (reception by the server), RETRIEve (transmission by the server), STORe Unique (reception by the server with attribution of a version number in case of duplicate), APPEnd (reception by the server with data appended to the existent file).

Each demand is specified with a parameter, 'path', that indicates the file name on the server site.

With FTP Sterling Connect:Express this 'path' can be constituted of the couple 'Symbolic name!Physical file name' or one of the two elements :

Path = 'Symb'!'file' or 'symb'! or 'file'

In FTP server mode the local physical name of the file to be transferred is determined by the monitor from the parameter 'path' of the FTP demand, and under control of the Files directory parameters.

The local physical name is built from the 'LOCAL DSN' found in the Files directory (entry : SYMB).

Usual keywords (&PARTNID, &FILENAM, &REQNUMB, &USRVAR1, &USRVAR2, &EXTDSN.. are available). Using &EXTDSN, &USRVAR1 and &USRVAR2 open the building of the local physical name to the use of the physical file name from the client.

Remark : The 'file' issued from FTP CLIENT can be any character string; FTP server Connect:Express will change it to make it available on MVS system .

Only (&PARTNID, &FILENAM, &REQNUMB) are available in the 'file' string.

Particular case of allocation rule 1:

Allocation rule 1 supposes that in reception the file exists and is scratched.

This is contradictory with the STORe Unique command use that allows the writing of duplicate file.

A STORe Unique command received for a file with allocation rule 1 is rejected with the code TRC=2018.

In server mode the local file physical name to be transferred is determined by the monitor from the 'path' parameter of received demand, and under control of the parameters found in the Files directory.

Example:

Reception of FTP command from some remote system:

```
STOR FTEST!ApplicationName/File.dat
```

- 'symb' and 'file' are given.
- The symbolic file is: FTEST

Processing by Sterling Connect:Express FTP server for Unix:

FTEST:

```
DSN LOCAL = /home/tmp/&EXTDSN
```

- The variable &EXTDSN is replaced by physical name sent by Ftp client application.

Resulting data set name is =

```
/home/tmp/ApplicationName/File.dat
```

Notes that ApplicationName is a directory and must exist.

FTEST:

```
DSN LOCAL = /home/tmp/ &PARTNID.&REQNUMB
```

The 'file' string received is ignored (no &EXTDSN, &USRVARi keyword)

Resulting data set name is =

```
/home/tmp/PARTFTP.A1700004
```

Depending on:

- FTP transfer parameters, transfer MODE - Data TYPE - Data STRUCTURE
- Record format of the file allocated on Unix (FIXED or VARIABLE format) data received via FTP by AFM will be processed in different ways:
- Data are submitted automatically to translation or not.
- The file structure allocated for reception (RECFM, LRECL) has to allow the storing of data and respect their structure when it is specified.

Data type Influence.

Three types of data are supported:

- ASCII: text files structured by separators, not submitted to translation; separator X'0D0A' are suppressed, the LRECL of the file has to be sufficient.
- EBCDIC : text files structured by separators, submitted to translation; separator X'15' are suppressed, the LRECL of the file has to be sufficient.
- BINARY: Data are not submitted to any processing before storing; (see hereafter data structure influence)

Data Structure Influence.

Two data structures are supported:

- File (FILE): record separator, if any, is part of data; for binary data, with no separator, they are segmented and stored in the file.
- Record (RECORD): record separator is part of protocol information; binary type data are stored by respecting the transportation record size (determined by the transmitter software): the file has therefore to be allocated consequently.

The processing is different for binary type data only, since ASCII or EBCDIC text files are implicitly structured.

Transfer Modes .

The transfer mode (STREAM, BLOCK) do not influence the way data are processed .

Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte character set (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan Ltd.
1623-14, Shimotsuruma, Yamato-shi
Kanagawa 242-8502 Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
J46A/G4
555 Bailey Avenue
San Jose, CA__95141-1003
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information is for planning purposes only. The information herein is subject to change before the products described become available. This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs. Each copy or any portion of these sample programs or any derivative work, must include a copyright notice as follows:

© IBM 2010. Portions of this code are derived from IBM Corp. Sample Programs.

© Copyright IBM Corp. 2010.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

Trademarks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at www.ibm.com/legal/copytrade.shtml.

Adobe, the Adobe logo, PostScript, and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

IT Infrastructure Library is a registered trademark of the Central Computer and Telecommunications Agency which is now part of the Office of Government Commerce.

Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

ITIL is a registered trademark, and a registered community trademark of the Office of Government Commerce, and is registered in the U.S. Patent and Trademark Office.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Cell Broadband Engine is a trademark of Sony Computer Entertainment, Inc. in the United States, other countries, or both and is used under license therefrom.

Linear Tape-Open, LTO, the LTO Logo, Ultrium and the Ultrium Logo are trademarks of HP, IBM Corp. and Quantum in the U.S. and other countries.

Connect:Express®, Connect Control Center®, Connect:Direct®, Connect:Enterprise, Gentran®, Gentran:Basic®, Gentran:Control®, Gentran:Director®, Gentran:Plus®, Gentran:Realtime®, Gentran:Server®, Gentran:Viewpoint®, Sterling Commerce™, Sterling Information Broker®, and Sterling Integrator® are trademarks or registered trademarks of Sterling Commerce, Inc., an IBM Company.

Other company, product, and service names may be trademarks or service marks of others.

