

## Co:Z SFTP Enhancements to support IBM FTP-compatible exits Dovetailed Technologies v 5.0.0 – January 2018

The Co:Z SFTP server supports user exits which are compatible with the exits supported by the IBM z/OS FTP server. This document lists discrepancies or special considerations for the implementation of Co:Z SFTP server exits. Unless specified, the implementation will support the interface documented in the “IBM z/OS Communications Server – Configuration Reference” manual.

### General Considerations

The exits use the same calling conventions and parameters as specified in the IBM documentation, but the names of the load modules must be altered so that the first two characters are “CZ”. This is to avoid customers unintentionally running FTP exits in LINKLST libraries for the Co:Z SFTP server. Existing “FT\*” exits may be relinked with “CZ\*” aliases if they are to be used with both Communications Server FTP and Co:Z SFTP server.

Co:Z exits run in the user Co:Z sftp-server job (process) that is started by SSHD using the user's MVS userid and privileges. The CZ\* exit load modules do *not* need to be in an APF authorized library.

### Changes:

v1.10.1 – changes to CZPOSTPR exit (confidence level)

v2.4.4 – the following changes apply to the CZCHKCMD exit interface:

Documentation ONLY corrections to the CZCHKCMD command table:

- Missing JES SFTP commands added: jesjobname, jeslrecl, jesowner, jesrecfm, jesstatus
- SFTP command ls /+[no]recall corrected to  
ls /+norecall passing SITE NOAUTORECALL  
ls /+nonorecall passing SITE AUTORECALL
- SFTP command ls /+nolabel corrected to pass SITE SFTP-LABEL
- SFTP command ls /+nospin corrected to pass SITE SFTP-SPIN
- SFTP command ls /+nooverflow corrected to pass SITE SFTP-OVERFLOW
- SFTP command ls /+nosysout corrected to pass SITE SFTP-SYSOUT
- SFTP command ls /+storclass corrected to  
ls /+storclas=xxxxxxx  
ls /+nostorclas

Code change in Co:Z SFTP v2.4.4 for the following:

- Corrected support for SFTP command ls /+nogdnt, passing SFTP-NOGDGNT as documented rather than SFTP-GDGNT

V3.5.0 – the following changes apply to the CZCHKCMD exit interface:

- reget and df added to the CZCHKCMD table

V5.0.0 – the following change applies to the CZCHKCMD exit interface:

- dynamic transfer options can be set for a RETR, STOR, or APPE command. See the specification for this interface in the *CZCHKCMD* section below.

### Enabling User Exits

Unless exit modules are present in a system LINKLST library, exits are enabled for a user's Co:Z sftp server by exporting the STEPLIB environment variable to point to the exit load module library. This may be set in:

/etc/ssh/sftp-server.rc - for all users

\$HOME/.ssh/sftp-server.rc – for a specific user.

### Exit: CZCHKIP

The actual TCP/IP connection is setup and the user is authenticated by IBM Ported Tools SSHD, This exit will be called when Co:Z sftp-server is started. If the exit rejects the session (RC != 0), then the session will be terminated.

### Exit: CZCHKPWD

Note: password field is blank, since SSHD handles passwords/login and it is not available to SFTP. This exit is called only after SSH authenticates the session and Co:Z sftp-server is started. If connection is rejected by user exit, sftp-server writes log message and rejects the SFTP\_FXP\_INIT command with an error.

### Exit: CZCHKCMD

Notes:

1. server-path is always absolute for HFS, or full quoted 'HLQ.DSN' for MVS datasets
2. The current directory is simulated by following "CWD" exit calls. The sftp-server does not modify the current directly; sftp clients always send full path names.
3. Command names are always folded to upper case
4. Command arguments may not be modified except where noted below.
5. 500 reply extension message is logged, but there is no mechanism for sending message back to client (other than retrieving /+error.log)
6. SFTP settings ("Is /+") are documented in the Co:Z SFTP User's Guide
7. FTP SITE commands are used in the exit for Co:Z SFTP settings with the same meaning. "SITE SFTP-xxxx" is used otherwise. **Customers that wish to use existing FTP exits** must ensure that they either allow or validate "SITE SFTP-xxxx" commands.
8. To set transfer options for a RETR, STOR, or APPE command, update the scratchpad (at offset 0) with the following:

COZ\_OPT=xxxx

where xxxx is four bytes containing a pointer to a buffer in 31 bit storage which must be allocated by the exit. This buffer contains a comma separated list of options, terminated by a null character (x'00'). For example, mode=text,trim. The exit is responsible for freeing this buffer, possibly in the post command exit (CZPOSTPR). The COZ\_OPT parameter is ignored for commands other than RETR, STOR and APPE. When the **SFTP\_CHKCMD\_OPTION\_ERROR\_FAIL** environment variable is set to true, the transfer will fail when an error is detected parsing or validating the transfer options. Consider setting this variable in the sitewide server configuration. For information on transfer options that can be set, see the SFTP User's Guide (<http://coztoolkit.com/docs/sftp/options.html>).

SFTP Command	FTP command passed to CHKCMD exit
chmod mode server-path	SITE CHMOD mode server-path <ul style="list-style-type: none"> <li>command args (mode and path) can be modified by exit</li> </ul>
chgrp grp server-path	SITE SFTP-CHOWN server-path <ul style="list-style-type: none"> <li>server-path may be modified by exit</li> </ul>
chown owner server-path	SITE SFTP-CHOWN server-path <ul style="list-style-type: none"> <li>server-path may be modified by exit</li> </ul>
SFTP protocol command “SSH2_FXP_SETSTAT” with option SSH2_FILEXFER_ATTR_ACMODTIME	SITE SFTP-ACMODTIME server-path <ul style="list-style-type: none"> <li>server-path may be modified by exit</li> <li>used by some SFTP clients to set the server file's last-access and last-modified times after upload.</li> </ul>
cwd server-path	CWD server-path <ul style="list-style-type: none"> <li>this is done by the server when it receives a “realpath” or “stat” packet for a directory. It does not actually change the CWD of the server unix process, but subsequent calls to the exit will use the directory as the “current directory”</li> </ul>
df server-path	LIST server-path <ul style="list-style-type: none"> <li>command args (server-path) can be modified by exit</li> </ul>
put client-path server-path	STOR server-path <ul style="list-style-type: none"> <li>command args (server-path) can be modified by exit</li> </ul> APPE server-path <ul style="list-style-type: none"> <li>command args (server-path) can be modified by exit if target is dataset and DISP=MOD</li> </ul>
get server-path client-path	RETR server-path <ul style="list-style-type: none"> <li>command args (server-path) can be modified by exit</li> </ul>
ls server-path	LIST server-path <ul style="list-style-type: none"> <li>command args (server-path) can be modified by exit</li> </ul>
ln oldpath newpath	LIST oldpath (followed by... STOR newpath <ul style="list-style-type: none"> <li>the newpath argument can be modified by</li> </ul>

	exit
ls /+[no]mount	SITE [NO]AUTOMOUNT
ls /+blksize=nnnnn ls /+noblksize	SITE BLKSIZE=nnnnn SITE BLKSIZE
ls /+bufno=nnn ls /+nobufno	SITE BUFNO=nnn n/a (CS FTP doesn't allow "unsetting" bufno)
ls /+copies=nnn ls /+nocopies	SITE SFTP-COPIES=nnn SITE SFTP-COPIES
ls /+condisp=catlg delete ls /+nocondisp	SITE CONDISP=CATLG DELETE SITE CONDISP
ls /+dataclas=xxxxxxxx ls /+nodataclas	SITE DATACLASS=xxxxxxxx SITE DATACLASS
ls /+dest=xxxxxxxx ls /+nodest	SITE SFTP-DEST=xxxxxxxx SITE SFTP-DEST
ls /+dir=nnn ls /+nodir	SITE DIRECTORY=nnn SITE DIRECTORY
ls /+disp=old shr new mod ls /+nodisp	SITE SFTP-DISP=xxx SITE SFTP-DISP
ls /+dsntype=LIBRARY PDS ls /+nodstype	SITE PDSTYPE=PDSE PDS SITE PDSTYPE
ls /+dsorg=xxx ls /+nodsortg	SITE SFTP-DSORG=xxx SITE SFTP-DSORG
ls /+forms=xxxxxxxx ls /+noforms	SITE SFTP-FORMS=xxxxxxxx SITE SFTP-FORMS
ls /+gdgnt ls /+nogdgnt	SITE SFTP-GDGNT SITE SFTP-NOGDGNT
ls /+hold ls /+nohold	SITE SFTP-HOLD SITE SFTP-NOHOLD
ls /+jesjobname=xxx ls /+nojesjobname	SITE JESJOBNAME=xxx SITE JESJOBNAME
ls /+jeslrecl=xxx	SITE JESLRECL=xxx

ls /+jesowner=xxx ls /+nojesowner	SITE JESOWNER=xxx SITE JESOWNER
ls /+jesrecfm=xxx	SITE JESRECFM=xxx
ls /+jesstatus=xxx ls /+nojesstatus	SITE JESSTATUS=xxx SITE JESSTATUS
ls /+label=xxx ls /+nolabel	SITE SFTP-LABEL=xxx SITE SFTP-LABEL
ls /+like=dsname ls /+nolike	SITE DCBDSN=dsname SITE DCBDSN
ls /+lrecl=nnnnn ls /+nolrecl	SITE LRECL=nnnnn SITE LRECL
ls /+maxvol=nnn ls /+nomaxvol	SITE VCOUNT=nnn SITE VCOUNT
ls /+mgmtclas=xxxxxxxxx ls /+nomgmtclas	SITE MGMTCLASS=xxxxxxxxx SITE MGMTCLASS
ls /+norecall ls /+nonorecall	SITE NOAUTORECALL SITE AUTORECALL
ls /+outdes=xxxxxxxxx ls /+nooutdes	SITE SFTP-OUTDES=xxxxxxxxx SITE SFTP-OUTDES
ls /+overflow=xxxx ls /+nooverflow	SITE SFTP-OVERFLOW=xxxxxx SITE SFTP-OVERFLOW
ls /+recfm=xxx ls /+norecfm	SITE RECFM=xxx SITE RECFM
ls /+retpd=nnnnn ls /+noretpd	SITE RETPD=nnnnn SITE RETPD
ls /+siteexit=any command	SITE any command
ls /+sequence=nnn ls /+nosequence	SITE SFTP-SEQUENCE=nnn SITE SFTP-SEQUENCE
ls /+space=type.pri.sec	SITE BLOCKS/CYLINDERS/TRACKS SITE PRI=nnn SITE SEC=nnn

ls /+nospace	SITE PRI SITE SEC
ls /+spin=unalloc ls /+nospin	SITE SFTP-SPIN=UNALLOC SITE SFTP-SPIN
ls /+storclas=xxxxxxx ls /+nostorclas	SITE STORCLASS=xxxxxxx SITE STORCLASS
ls /+sysout=x ls /+nosysout	SITE SFTP-SYSOUT=x SITE SFTP-SYSOUT
ls /+trtch=xxxxxxx ls /+notrtch	SITE SFTP-TRTCH=xxxxxxx SITE SFTP-TRTCH
ls /+ucount=nnn ls /+noucount	SITE UCOUNT=nnn SITE UCOUNT
ls /+unit=xxxxxxx ls /+nounit	SITE UNIT=xxxxxxx SITE UNIT
ls /+vol=xxxxxxx ls /+novol	SITE VOLUME=xxxxxxx SITE VOLUME
ls /+writer=xxxxxxxx  ls /+nowriter	SITE SFTP-WRITER=xxxxxxxx and SITE FILETYPE=JES if writer=INTRDR  SITE SFTP-WRITER
mkdir server-path	MKD server-path <ul style="list-style-type: none"> <li>● command args (server-path) can be modified by exit</li> </ul>
reget server-path client-path	RETR server-path <ul style="list-style-type: none"> <li>● command args (server-path) can be modified by exit</li> </ul>
rm server-path	DELE server-path <ul style="list-style-type: none"> <li>● command args (server-path) can be modified by exit</li> </ul>
rmdir server-path	RMD server-path <ul style="list-style-type: none"> <li>● command args (server-path) can be modified by exit</li> </ul>
rename oldpath newpath	RNFR oldpath (followed by... RNTO newpath <ul style="list-style-type: none"> <li>● command arg newpath can be modified by</li> </ul>

exit
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### ***Exit: CZCHKJES***

This exit is not implemented in Co:Z SFTP, but sites may prevent submission of jobs by disallowing the "SITE FILETYPE=JES" command in the CZCHKCMD exit.

### ***Exit: CZPOSTPR***

This exit provides 18 parameters; the 19<sup>th</sup>, added by IBM in V1.10 is not currently passed to the exit.

Prior to V1.10.1, the "Confidence level" will always be set to X'04' (not active).

Starting in V1.10.1, the "Confidence level will provide values compatible with IBM FTP:

<u>Operation</u>	<u>Confidence Level</u>
RETR	2 if error, 3 otherwise
STOR/APPE	2 if error, 0 otherwise
(other)	4

### ***Exit: FTP Server SMF User exit***

This exit is not implemented in Co:Z SFTP. Co:Z SFTP client and server write SMF 119 records if enabled in SMF.