

Co:Z® Co-Processing Toolkit for z/OS

Co:Z Toolkit Installation and Release Notes

V 8.1.1 Edition

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Release Notes



Attention!

When planning the installation of a new version of Co:Z, you should always review the release notes from all of the intermediate releases. Pay specific attention to MIGRATION ACTION and DEFAULT CHANGE notifications as these changes will affect the way the software runs in your installation unless you take specific action to retain the original behavior.

Co:Z Toolkit 8.1.1 [Enterprise | Community] - January 10, 2025

- Enterprise License users should download the software from the "Resources" tab in the *Enterprise Support System*. Community License users are required to fill out a request form to download the software. This Community License version expires in two years.

Co:Z SFTP enhancements and fixes:

- Removed the very old RUNSFTPx sample JCL members that didn't use the Co:Z sample scripts.
- Added a SFTPTEST JCL sample that can be used to quickly test the installation of the Co:Z SFTP client.
- increased the maximum path length for the COZ installation directory that is used to tailor the JCL samples during the installation process.
- Fixed a bug when the **filetag=use** option is set: If the file is untagged, then **mode=text** will be used properly if set.

Co:Z Toolkit 8.1.0 [Enterprise] - May 29, 2024

- This is currently an Enterprise only release. Enterprise License users should download the software from the "Resources" tab in the *Enterprise Support System*.

Co:Z SFTP enhancements and fixes:

- The **utfbom** option was added to Co:Z SFTP to support removal of UTF-8 Byte Order Marks (BOM) if present.
- Fixed a bug in the **filetag** option that was released in version 8.0.0 where an error could occur if file tagging is active and the source and target code pages are the same.
- Fixed a bug in the handling of **mfrdw** records where small records were not being padded to the 8 byte minimum length. This problem was also fixed in the Dataset Pipes and utility commands.
- Corrected an issue in the Co:Z SFTP server startup script when SFTP_LOG_KEEP_DAYS is set and SFTP_LOG_DIR is set to the user's home directory.

Co:Z Toolkit 8.0.0 [Enterprise | Community] - October 29, 2023

- **Release 8.0.0 contains fixes and changes for z/OS V3R1 compatability. Users should install this release prior to installing z/OS V3R1.**

- Enterprise License users should download the software from the "Resources" tab in the *Enterprise Support System*. Community License users are required to fill out a request form to download the software. This Community License version expires in two years.

Co:Z SFTP enhancement:

- The **filetag** option was added to Co:Z SFTP to support z/OS UNIX file tags.

Co:Z Batch enhancement:

- CoZBatch is enhanced to allow file tagging of **DD:STDIN** input in order to be compatible with shells built with "Enhanced ASCII", such as **bash**. See: [Co:Z Batch example](#)

Co:Z z/OS Utilities fix:

- Fixed file tagging issues in the **getpds** command: allow existing UNIX files to be retagged and disable redundant autoconversion if files are being tagged.

Co:Z Toolkit 7.2.0 - March 22, 2023

Co:Z SFTP fixes and enhancements

- Fixed an issue that could cause an ABEND during data set close after a put command.
- Added a new option **mkdirdsn** that controls whether or not issuing a **mkdir** or **lmkdir** will cause a PDS(E) to be created in the data set space. The original/default behavior is to create a PDS(E); **NOMkdirdsn** may now be set to do nothing.
- Enhanced the BPXWDYN **dsntype** option to allow for **library.2** for creating PDSE V2 libraries. Also added a new option **maxgens** for PDSE V2 creation.
- Enhanced the ssh-socket-info program to more accurately determine the local and remote connection information for the underlying ssh client.

Co:Z Launcher fixes and enhancements:

- Added a new setting **ssh-tunnel-loopback** which provides more control over which loopback adapter (IPv4 or IPv6) is used when ssh-tunnel is set to true. The legacy behavior has not changed.

Co:Z Toolkit 7.1.1 - May 9, 2022

Co:Z SFTP fixes and enhancements

- Fixed a compatibility bug introduced in 6.0.0: If GDGNT is set and a GDG relative reference is made to an existing generation, but the generation is cataloged on a migration volume that is not "MIGRAT", then it failed to be found. The code has been changed to be compatible with Co:Z release 5.x.x and earlier, so that in this case an attempt to open the dataset will be made anyway.
- Added a new feature: The **COZ_MIGRATED_VOLSER_LIST** environment variable can be used to configure a comma separated list of pseudo VOLSERS that are to be considered as migration volumes. The default is "MIGRAT" only. If used, sites should export this in both `/etc/ssh/sftp-server.rc` and `/etc/ssh/cozsftp_client.rc`. For example:

```
export COZ_MIGRATED_VOLSER_LIST=ARCIVE,MIGRAT # allow either
```

Co:Z Toolkit 7.1.0 - May 2, 2022

Co:Z Installation fixes and enhancements:

- Changed the installation script to guard against vendor implementations of **sed** and other utilities in \$PATH that do not work properly.

Co:Z SFTP fixes:

- Fixed a problem in the `cozsftp` client where an error would occur when issuing the **lcd** with a relative directory when the local CWD is the top level data set space (`//`).

Co:Z z/OS Utilities fixes and enhancements:

- Fixed the **getpds** command so that new stats will not be generated in the output statsfile when the corresponding member has no ISPF statistics.

Co:Z Toolkit 7.0.2 - January 11, 2022

Co:Z SFTP fixes:

- Fixed a problem in the Co:Z upgrade to OpenSSH version 8.4 sftp-server code related to the realpath support of symbolic links.

Co:Z Batch and Co:Z SFTP documentation:

- Updated the documentation to clarify that when the program executed by Co:Z Batch is a shell, STDIN is the input to the shell, i.e. a script subject to normal shell processing.

Co:Z Toolkit 7.0.1 - October 14, 2021

Co:Z SFTP fixes and enhancements:

- The message "CatalogSearch[W] dsn - no volumes - skipping DatasetInfo" was changed to a Debug level message. This condition is not a problem in many cases, and should not have been a warning.
- Added a new option: `gdgplusstat=dir | file | notfound`. This option allows you to indicate how status (e.g. "ls" command) is reported for a `//MY.GDG(+n)` data set.

Co:Z Toolkit 7.0.0 - September 28, 2021

Co:Z SFTP fixes and enhancements:

- The Co:Z sftp client and server have been refreshed to use OpenSSH version 8.4 code as a base. Co:Z is compatible with IBM OpenSSH 7.6 and earlier.
- Added a conditional execution feature for **cozsftp** subcommands. See [Conditional command processing](#) for more information.
- Changed the behavior of `conddisp=delete` so that `DALCDISP=DELETE` is now added when dynamically allocating data sets for writing. This will request the operating system to delete the data set if the job is

abnormally terminated.

- Enhanced the **dsput** and **dsget** commands to force HSM recall on migrated data sets (unless `NORECALL` is active). Previously, migrated data sets could not be used with these commands.
- Enhanced the **dsput** and **dsget** commands and data set DD: allocations to show progress during transfer.

Co:Z Batch enhancements:

- Add `_CEE_REALLOC_CONTROL=32K,25` to `COZBATCH` invocations (if not already specified) to increase the amount of here-document space available.

Co:Z Toolkit 6.2.3 - July 9, 2021

Co:Z SFTP fixes:

- Fixed the notification message variable `%bs` to support bytes transferred values that exceed a 32 bit number.
- Fixed a problem where the remote ip address and port number are not properly presented on the exit interface. This issue only occurred when an option that drives an exit is set using the `SFTP_ZOS_OPTIONS` variable in the `/etc/ssh/sftp-server.rc` file.
- Cleaned up various variable initialization and memory management issues that could potentially cause protection exceptions (0C4 ABEND).

Co:Z Toolkit 6.2.2 - February 02, 2021 (not released - items below are included in all subsequent releases)

Co:Z SFTP fixes:

- Cleaned up error handling in cases where the `ssh-socket-info` program fails to return accurate ssh client connection information.

Co:Z Toolkit 6.2.1 - January 15, 2021

Co:Z SFTP fixes:

- Fixed possible signal handling race condition in Co:Z SFTP client, which can be serious for customers who run the Co:Z SFTP client with `UID=0` (which is strongly discouraged).
- Fixed a problem where full 1023-character z/OS UNIX path names were not supported in some cases.

Co:Z z/OS Utilities fixes and enhancements:

- Enhanced the **putpds** command to support ISPF-compatible ENQs with the new **-S** option.
- For the **getpds** and **putpds** commands: corrected extended ISPF stats creation, fixed a parsing problem with the **-M** option allowing single quoting of data set names, and fixed a problem when comparing member stats to statsfile stats.

Co:Z Toolkit 6.2.0 - November 09, 2020

Co:Z Launcher fixes and enhancements:

- Updated LE storage options to avoid "out of memory" conditions that occur in some customer environments on z/OS V2R4.
- Fixed a problem in the Co:Z Launcher where continuation lines in `/etc/init.options` were not being

processed properly.

Co:Z SFTP fixes and enhancements:

- Updated LE storage options to avoid "out of memory" conditions that occur in some customer environments on z/OS V2R4.
- Updated the **dsget** and **dsput** commands to support individual members of partitioned data sets (both PDS and PDSE). The previous version of these commands only supported the transfer of a entire data set. For more information, refer to the command reference: *cozsftp*. For an example, see *Transfer a single PDS member between Co:Z systems*.

Added the `-t` option to the **dsput** and **dsget** to "trim" extra space allocation after transfer.

- Added the `ispfstats` option which, when combined with the `ispfencq` option will update member statistics on write. See *Dataset allocation options* for more information.

Co:Z z/OS Utilities enhancements:

- Added new *getpds* and *putpds* utilities to read/write contents of PDS(E) member(s) to/from a unix system services file system.
- Added new *copypds* utility. This utility uses the IEBCOPY COPYGROUP operation to copy an existing PDS(E) to a new or existing PDS(E) with optional member selection.
- The *pdsdir* command now displays extended statistics if present.

Co:Z Installation fixes and enhancements:

- Changed the installation script to guard against users who have defined aliases that override common commands like `ls`

Co:Z Toolkit 6.1.3 - October 28, 2020

Co:Z SFTP fixes and enhancements:

- Fixed a problem where an OC4 could occur when processing file patterns during session initialization. This fix affects both the Co:Z sftp-server and cozsftp.

Co:Z Toolkit 6.1.2 - October 21, 2020

Co:Z SFTP fixes and enhancements:

- Changed the Co:Z sftp-server to interact better with IBM's LE Heap management behavior.

Co:Z Toolkit 6.1.1 - June 12, 2020

Co:Z SFTP fixes and enhancements:

- Corrected a bug that can prevent opening existing GDG tape and migrated data sets when referenced via relative generation numbers. This defect was introduced in V6.0.0.
- Fixed a bug related to setting the exit return code in the sample **sftp_cat.sh** batch script (installed in `<COZ_HOME>/samples/sftp_batch`). For additional information on the sample batch scripts, see *Using the Co:Z SFTP client in batch*.

- When running on z/OS 2.4 or later, the saf-ssh-agent utility will no longer be used when the **cozsftp -k** option is specified. Instead, the IBM OpenSSH `IdentityKeyRingLabel` option is used.
- The **cozsftp** script has been updated to export `_CEE_REALLOC_CONTROL=32K,25`. This change addresses a scenario where fragmentation and running out of memory may occur. One symptom is: Can't ls: Too many matches for ...
- Fixed the **dsget** and **dsput** commands to assign the correct default target path when the target is not specified.

Co:Z Batch enhancements:

- The `SHELL` environment variable, if set in **DD STDENV**, will be used to override the user's default login shell.

Co:Z Toolkit 6.1.0 - May 01, 2020

Co:Z SFTP fixes and enhancements:

- Corrected a bug that can prevent opening existing tape and DFHSM migrated data sets. This defect was introduced in V6.0.0.
- Fixed a bug related to setting the initial z/OS directory with `export SFTP_ZOS_INITIAL_DIR=//`. The change allows this setting to correctly set the initial directory to `///userid` when the userid is 8 characters in length.
- Enhanced support for tape data sets. The following BPXWDYN allocation options will now be used when opening existing cataloged tape data sets if the label option is set: `recfm, lrecl, blksize, label, trtch, unit`. This can be useful for overriding DCB attributes or reading non-labeled tapes.
- Improved the log messages written when the `interimlogging` option is set. Specifically, a single log message will display "100%" for the "percent transferred" of a successful transfer. See the *Miscellaneous options* section for information on the log message format.
- Enhanced the exit code returned by the **cozsftp** client to indicate more clearly where a failure occurred. When a non-zero return code is set, it will be one of 8 (failure in SFTP), 12 (failure starting an SSH connection), or 16 (the SSH connection failed after starting SFTP).



MIGRATION ACTION

Because this change represents a different default behavior, existing Co:Z SFTP job steps will have different non-zero/failing return codes. We recommend that users examine their requirements for specific non-zero exit/return codes before deploying this version. If the old behavior is required, add: `export COZ_SFTP_EXIT_CODES=OLD` to your `/etc/ssh/cozsftp_client.rc` or user-specific `cozsftp_client.rc` script.

Co:Z Toolkit 6.0.0 - February 14, 2020

Co:Z SFTP enhancements:

- The `gdgnt` option is now **active** by default. This is a change from previous versions of Co:Z SFTP where `NOgdgnt` was the default. For many releases, we have recommended that users activate `gdgnt` in their site configuration files, as it provides the preferred behavior in nearly all cases. Starting with this release, this will be the default setting. For example:

GDGNT : (0) always refers to the latest generation

NOGDGNT : If job creates (+1), then later (+1) refers to it



DEFAULT CHANGE

As this change represents a different default behavior, we recommend that users examine their requirements for this setting before deploying this version. If the old behavior (NOgdnt) is required, it can be specified in the `default` section of the site configuration files `/etc/ssh/cozsftp_config` and `/etc/ssh/cozsftp_server_config`. `gdnt` means that relative generation references will use the current state for resolution; only users who use the same GDG more than once in the same job might be affected by this change.

- A new setting `ispfenq` can be used when writing to PDS and PDSE members so that they will be allocated with `DISP=SHR` and `ENQ` semantics that are compatible with ISPF. The default is `NOispfenq`. For more information, refer to the *Dataset allocation options* section of the User's Guide.
- The Co:Z SFTP `dsget` and `dsput` have been enhanced to support the transfer of partitioned data sets. Using this feature makes it possible to transfer Program Objects between z/OS systems, something that is not possible with the standard SFTP `get` and `put` commands. This feature includes support for both PDS and PDSE. For more information, refer to the command reference: *cozsftp*.
- SFTP base upgraded from OpenSSH 6.4p1 to 7.6p1 adding the following:
 - removed `-1` and `-2` `cozsftp` command options. Protocol 1 is no longer supported.
 - added `-a` and `-f` options to the `cozsftp put` subcommand. When specified, the `-a` option attempts to resume partial transfers of existing files. When specified, the `-f` flag will request that the server call `fsync` after the file has been transferred. These options may not be used with z/OS data sets on a remote Co:Z SFTP server, although the `disp=mode` setting may be sent to the remote server for appending to data sets.
 - added new subcommand, `reput`, which is equivalent to `put` with the `-a` flag set
 - added new options to `sftp-server`: `-p`, `-P` and `-Q`. These options support blacklist and whitelist features.

For more information on these new features, refer to the command reference: *cozsftp* and *sftp-server*.

- Fixed a bug in the error checking on data set write.
- Fixed a bug when processing data separated with the `mfrdw` linerule.

Co:Z Toolkit 5.6.0 - August 20, 2019

Co:Z SFTP enhancements:

- Enhanced the **cozsftp** client **get** subcommand to receive data packets out of order. This fixes a problem when downloading S3 objects from the Amazon AWS SFTP server.
- Fixed a bug in the base OpenSSH code for the `-R` option. The option has been changed to support the configuration of a maximum of one outstanding request at a time.

Co:Z Dataset Pipes enhancements:

- The Co:Z Dataset Pipes server script has been enhanced to enable automatic session log file cleanup. If the environment variable `DSPIPES_LOG_KEEP_DAYS` is present, session log files older than the specified value will be deleted when the current session terminates. For additional information, see [Logging Configuration for Dataset Pipes](#) in the Co:Z Dataset Pipes - User's Guide.

Co:Z Toolkit 5.5.0 - January 15, 2019

Co:Z SFTP enhancements:

- A new option `jessubmit` has been added to the sftp server. When this option is active (the default), submission of jobs via Co:Z SFTP through the internal reader is allowed. When this option is set to `NOjessubmit`, job submission is disallowed. For additional information, see [JES related options](#) in the Co:Z SFTP - User's Guide.
- A new option `eattr` has been added to support the BPXWDYN EATTR keyword which may be used during data set allocation. For additional information, see [Dataset allocation options](#) in the Co:Z SFTP - User's Guide.
- The `replace` option has been enhanced to support a new mode (`realloc`), which will cause an existing target data set to be deleted and reallocated prior to writing. For additional information, see [General transfer options](#) in the Co:Z SFTP - User's Guide.
- Two new commands have been added to the `cozsftp` client: `dsget` and `dsput`. These commands simplify the transfer of a sequential (PS) z/OS data set between the local z/OS system and a remote z/OS system running the Co:Z SFTP Server. When these commands are used, the allocation characteristics of the source data set are used to create the target data set. See [cozsftp](#) in the [Command Reference](#) section of the User's Guide for more information. For an example, see [Transfer data sets between Co:Z z/OS systems](#).
- The Co:Z SFTP server script has been enhanced to enable automatic sftp session log file cleanup. If the environment variable `SFTP_LOG_KEEP_DAYS` is present, session log files older than the specified value will be deleted when the current session terminates. For additional information, see [Co:Z SFTP Server logging](#) in the Co:Z SFTP - User's Guide.
- The messages logged from Co:Z SFTP at various logging levels have been significantly reduced.
- The optional CZCHKCMD exit, `chkcmd_homedir`, has been enhanced to support a Global Configuration File. By default, when this exit is configured, users are restricted to their home directory. With this change an optional global configuration file can be defined to configure user's access to posix files in other directories. For additional information, see `chkcmd_homedir.README` in the `install` directory (`<COZ_HOME>/bin/exits`).

Co:Z Launcher enhancements:

- The Co:Z Launcher now attempts to determine the fully qualified hostname of the z/OS system that it is running on when it initializes the Co:Z Agent on the Target System. This change will make it easier for remote systems to connect back to z/OS when running in `ssh-tunnel=false` mode.

Co:Z Dataset Pipes enhancements:

- The Co:Z DatasetPipes Server now attempts to determine the fully qualified hostname of the z/OS system that it is running on. This change will make it easier for `cozcontrol` and client Dataset pipes commands to

send messages back to z/OS when a durable session has been established. This option is not used for tunneled connections.

Co:Z Toolkit 5.1.1 - June 1, 2018

Co:Z SFTP enhancements:

- Fixed a bug in catalog search (IGGCSI00), which was changed in 5.0.0 to support dataset aliases. Affects catalog searches for GDG base entries with a large amount of associated catalog data.

Co:Z Dataset Pipes enhancements:

- Fixed a bug in catalog search (IGGCSI00), which was changed in 5.0.0 to support dataset aliases. Affects catalog searches for GDG base entries with a large amount of associated catalog data.

Co:Z Toolkit 5.1.0 - May 17, 2018

Co:Z SFTP enhancements:

- Fixed problems related to translating data sets using multibyte codepages such as UTF-8.
- Added error handling to skip individual catalog entries returned with errors by z/OS catalog search (IGGCSI00).
- Enhanced Co:Z SFTP client's read_passwd_dsn.sh script to ignore line numbers in columns 73-80 when reading ssh connection passwords from z/OS data sets.
- The sftp-server will no longer be linked with AC(1). This program was never distributed with the APF extended attribute enabled, and we do not advise that Co:Z sftp-server be run APF authorized. Customers that have user exits that require APF will need to relink with AC(1). Enterprise support customers should please open a ticket so that we can discuss your requirements.

Co:Z Target System Toolkit 1.3.1 - May 29, 2018

- Fixed the **cozcontrol** algorithm for selecting an ephemeral port for use in a **cozcontrol** tunneled durable connection.
- Updated the default for the environment variable COZ_CONTROL_PATH (removing :%p). Enables the **cozcontrol** command to use the tunnelling option (-t) when connecting to a SSH server that is not running on port 22.

Co:Z Toolkit 5.0.0 - February 21, 2018 - Updated

- The minimum z/OS release level has been updated for Co:Z 5.0.0. This change has been captured in the original 5.0.0 release notes below. Community license users running machine architectures lower than z10 or a z/OS release lower than V2R1 should use release 4.5.1. See the [Co:Z downloads page](#) to download this older release. Commercial support customers that do not meet these requirements should contact us for custom build information.

Co:Z Toolkit 5.0.0 - January 10, 2018

Co:Z Toolkit installation changes:

- Updated compiler TARGET, ARCHITECTURE and TUNE settings. In order to run this release of Co:Z, a minimum z/OS release V2R1 is required, along with a minimum machine architecture of z10. Enterprise

customers that do not meet these requirements should contact us for custom build information.

- Enhanced the installation process to automatically tailor the following component specific members in the Co:Z Sample JCL and PROCs PDS: COZCFGD, COZPROC, SFTPPROC and SFTPIND. Additionally, the PAX deliverable is now compressed reducing the size of the binary installation file.

Co:Z SFTP enhancements:

- Added support for referencing datasets by an alias.
- Updated the CZCHKCMD exit interface to allow transfer options to be set for GET and PUT commands. See the [Co:Z SFTP Exits Guide](#) for additional information.

Co:Z Dataset Pipes enhancements:

- Enhanced the catalog search function, adding support for dataset aliases.

Co:Z Toolkit 4.5.1 - October 9, 2017

Co:Z SFTP enhancements:

- Fixed a memory leak detectable when transferring hundreds of files to a dataset within the same session.

Co:Z Dataset Pipes enhancements:

- Fixed a problem with detection of logfile redirection in the WTO command.

Co:Z Toolkit 4.5.0 - July 26, 2017

Co:Z Launcher enhancements:

- Enhanced the Co:Z Launcher and Co:Z Dataset Pipes server to allow the execution of **cozclient** commands that must run in a separate OMVS address space.

Co:Z SFTP enhancements:

- Added a `cozsftp append` command which uploads a local-path and appends it to the end of a remote file on the remote machine. See [cozsftp append](#) in the [Command Reference](#) section of the User's Guide for more information.
- Updated the Co:Z SFTP Server to support clients that send/receive multiple concurrent files.
- Updated the **chkcmd_homedir** and **chkcmd_dsonly** optional user exits to address several issues. See the README files in `<COZ_INST>/bin/exits` for more information.
- Added a template `cozsftp_server_user_config` file to the samples.
- Added support for: [Using SMF type/subtype specific permissions](#).

Co:Z Dataset Pipes enhancements:

- Significant enhancements have been made in this release to Co:Z Dataset Pipes when used as a z/OS Remote Service. See [Co:Z Toolkit Installation and Release Notes](#), the [Co:Z Launcher User's Guide](#), and the [Co:Z Dataset Pipes User's Guide](#).
- Added a new client command, [cozcontrol](#), to start and stop a durable connection to the Dataset Pipes

subsystem on a z/OS server.

- Enhanced logging for the dspipes subsystem to be similar to Co:Z SFTP logging. Additionally, the `/etc/ssh/ssh_config` subsystem has been changed to use a shell script, `dspipes.sh`. See [z/OS Remote Services Configuration](#) in the [Co:Z Dataset Pipes User's Guide](#) for more information.
- In order to use the new Co:Z Remote Service functions, remote systems must be upgraded to Co:Z Target System Toolkit 1.3.0.

Co:Z Target System Toolkit 1.3.0 - July 24, 2017

- Added z/OS Remote Services durable sessions with the new `cozcontrol` command. In order to use this new function, the Co:Z Toolkit must be release 4.5.0 or later. Older versions of the Target System Toolkit will continue to work with Co:Z Toolkit 4.5.0.
- 32 bit executables are no longer available on the website download page. If needed, they can be built from Co:Z Target System Toolkit source code.

Co:Z Toolkit 4.2.0 - January 10, 2017

Co:Z Launcher enhancements and fixes:

- Fixed a problem in the way data set `amrc` was being collected. In some cases, useful error information was being lost prior to logging.

Co:Z SFTP enhancements:

- Added support for the BPXWDYN keywords `EXPDL` and `EXPDT`
- Enhanced the `sftp mkdir` command so that if it is issued in the data set space it will create a PDS (or PDSE if `dsntype=library`). The `mkdir` command will fail if a dataset already exists with the specified name.
- Fixed the `chkcmd_homedir` exit so that the Co:Z SFTP `error.log` can be retrieved.

Co:Z Toolkit 4.1.0 - October 4, 2016

Co:Z SFTP enhancements:

- A new Co:Z SFTP Server logging option may optionally be configured, enabling redirection of Co:Z SFTP logging output to a SYSOUT spool file. For additional information, see [Co:Z SFTP Server logging](#) in the Co:Z SFTP - User's Guide.
- Two optional CZCHKCMD exit modules have been added:
 - `chkcmd_dsonly` - restricts remote SFTP clients from accessing posix files. Access to the z/OS dataset and JES space is permitted.
 - `chkcmd_homedir` - restricts remote SFTP clients to only access files within the user's home directory. Access to the z/OS dataset and JES space is permitted.For additional information, see `chkcmd_homedir.README` and `chkcmd_dsonly.README` in the install directory (`<COZ_HOME>/bin/exits`).
- A change was made to allow the `jesincsysin` option to be set with a pattern matching `//-jes/nnnnn/ALL`. Additionally, the sample `cozsftp_server_config` file has been updated to define this pattern as follows:

```
# The following pattern is recommended to ensure a job log is transferred with the
# correct options. The pattern matches the following command:
#     get //-jes/nnnnn/ALL joblog.txt
# The special ALL file name is used to transfer all spool files to a concatenated output
# The jesincsysin option includes SYSIN spool files to the concatenated spool files downl
# This option is a convenient way to download all job input and output.
pattern: //-JES.*.ALL
mode=text, jesincsysin
```

Co:Z Toolkit 4.0.0 - July 14, 2016



Note

Our product support covers the newest release of the Co:Z toolkit software, plus the prior release for nine (9) months after general availability of the next major release. This will be extended for this release by an additional 7 months. This means that **support for 2.x.x releases will end on November 14, 2017**. The Co:Z release 3.0.0 has been available since November 2014.

Co:Z SFTP enhancements:

- A new Co:Z SFTP Server timeout option, `servertimeout`, may optionally be specified to limit how long an inactive client remains connected. See the [Co:Z SFTP options](#) Appendix in the Co:Z SFTP - User's Guide for more information.

Co:Z Launcher enhancements:

- The default values for two key Co:Z Launcher options are changed with this release:
 - `server-ports` is no longer a required option.
 - `ssh-forward-dynamic-port` defaults to `true`.

The intent of this change is to enable an ephemeral port to be used on z/OS by default, eliminating the need for reserved port ranges. Refer to the documentation in the COZCFGD parmlib member for additional documentation. In order to use this default:

- the `ssh-tunnel` option must be set to `true` (the default)
- IBM Ported Tools OpenSSH v1.3 or later is required
- The target ssh server must support dynamic reverse port forwarding (e.g. OpenSSH version 5.3 or later)

Note: Existing configurations using the `server-ports` option will continue to function without changes; however, we recommend enabling dynamic port forwarding when tunneling, if possible.

For additional information, see [Co:Z Launcher Properties](#) and [Configuration Best Practices](#).

- Two new environment variables have been added to enable long running Co:Z Launcher jobs to continue without termination due to inactivity:
 - `COZ_SERVER_TCP_KEEPALIVE` - If set, interval in seconds Co:Z Server sets the `TCP_KEEPALIVE`

socket option. Note that this setting must be lower than the time that any firewall(s) may time out the connection.

- **COZ_SERVER_KEEPAALIVE** - If set, interval in seconds Co:Z Server sends a NOOP packet. This option sends out actual data packets at the application level for situations where **TCP_KEEPAALIVE** does not work due to firewall configuration.

Dataset Pipes enhancements and fixes:

- A new option, **-f** has been added to the **todsn** and **tofile** commands. With the option set, the command will not wait until receiving an entire buffer before writing data to the output data set. This is the default if used with a tunneled socket or if the output is a **SYSOUT** data set.

Co:Z Batch enhancements:

- A set of "ssh" sample scripts and a JCL PROC have been added, similar to the "sftp" samples shipped with Co:Z. The **ssh_connect.sh** script connects an ssh client to a remote system running sshd and prepares it to run commands. The **ssh_pubkey.sh** sample script connects to a remote system and appends a public key to a user's **authorized_keys** file.

Co:Z Target System Toolkit 1.2.2 - July 14, 2016

- Supports the NOOP command sent when the **COZ_SERVER_KEEPAALIVE** environment variable is set on the server. Messages similar to the following are no longer written to the log: **todsn-client(nnnnn)[W]: unknown command packet->code=8, len=nnn ignored.**

Co:Z Target System Toolkit 1.2.1 - May 20, 2016

- Fixed a problem where a Co:Z client program (**fromsdn**, **todsn**, **fromfile**, **tofile**, etc...) could fail to work correctly if one of the standard handles (**stdin/stdout/stderr**) was closed by the target system prior to its invocation.
- Improved **SIGPIPE** error handling and diagnostics in **CoZAgent** and **CoZClient**.

Co:Z Toolkit 3.6.3 - May 15, 2016

Co:Z Launcher enhancements and fixes:

- Added a new property to the Co:Z Launcher: **ssh-forward-dynamic-port-wait** which can be used to change the amount of time the Launcher will wait for a dynamic port assignment from the target system. The default is 30 seconds, which has been increased from the original wait time of 10 seconds.
- Increased the time to wait for the Co:Z Launcher to establish the **saf-ssh-agent** from 5 to 30 seconds. The original wait time was sometimes not sufficient on heavily loaded z/OS systems.
- Fixed a problem in the way the Co:Z Launcher parsed **/etc/init.options**, which could in some cases result in an incorrect setting of the timezone used for message timestamps.

Co:Z Toolkit 3.6.2 - (not released - items below are included in all subsequent releases)

Co:Z SFTP enhancements and fixes:

- Fixed a problem with the Co:Z sftp-server's implementation of **posix-rename** which could result in an SFTP packet ID mismatch.

Co:Z Launcher enhancements and fixes:

- Modified the saf-ssh-agent termination process to shutdown more cleanly. This change eliminates unsightly but harmless BPXP023I messages in the job log.

Co:Z Toolkit 3.6.1 - January 25, 2016

Co:Z SFTP enhancements and fixes:

- In order to prevent a potential recursive logging error, the console notifications function has been updated to disable WTO messages when the Co:Z SFTP server log file has been redirected to `/dev/console`. Setting `SFTP_LOGFILE=/dev/console` is not recommended. Refer to [Co:Z SFTP Server logging](#) in the Co:Z SFTP User's Guide for additional information.

Co:Z Launcher enhancements and fixes:

- Fixed a problem with the `ssh-forward-dynamic-port` option. In the previous release, if this option was not specified, or explicitly set to `false`, an ephemeral port on z/OS was allocated and this port number was also sent to the target system for its reverse port forwarding port. This release ensures that a port from the supplied port range is used if `ssh-forward-dynamic-port=false`

Dataset Pipes enhancements and fixes:

- In order to prevent a potential recursive logging error, the `wto` command will not write a message when logging has been redirected to `/dev/console`.

Co:Z Toolkit 3.6.0 - December 8, 2015

Co:Z SFTP enhancements and fixes:

- Added a feature to optionally write console notifications on command completion. Notifications are written following the call to the Post Processing Exit, if one exists, for the following commands: **put**, **get**, **rm** and **rename**. Notifications are supported for the Co:Z SFTP client and server. The message format is configured in the sitewide server and client configuration. See the [Session config files](#) Appendix in the Co:Z SFTP - User's Guide for more information. Once configured, the notification feature is enabled using the Co:Z SFTP option, `notify`. See the [Co:Z SFTP options](#) Appendix in the Co:Z SFTP - User's Guide for more information. This option can be set globally for all users in the site-wide configuration or can be enabled on a per user basis. This option can also be enabled using file patterns in either the sitewide server/client configuration or user configuration.
- Enhanced the **saf-ssh-agent** utility to support more ssh multiple authentication combinations. The saf-ssh-agent utility is used when the `-k` option is specified on the **cozsftp** command. This fix also applies to the Co:Z Launcher when the **saf-cert** property is specified.
- Fixed a problem where the specification of BPXWDYN keywords on Dataset Allocation might not be built correctly and in some cases, could cause an 0C4 ABEND. This fix also applies to Dataset Pipes.
- Changed the behavior of the Co:Z Translator when a codepage user `technique` option is specified (0-9), but the associated custom table is not found. Previously, an Informational level message was written, but this was possible to overlook. The Translator now throws an exception. This fix also applies to Dataset Pipes.

Co:Z Launcher enhancements and fixes:

- Enhanced the `ssh-forward-dynamic-port` option to use an ephemeral port on z/OS. Now, when this option is

set to true, reserved port ranges on z/OS are no longer required.

- Modified the Co:Z Launcher to work around a race condition in the z/OS Unix System Services socket listen() call. Under this race condition, two Co:Z Server processes could to bind and listen on the same localhost:port pair.

Co:Z Toolkit 3.5.1 - October 9, 2015

This release makes the following minor changes to the 3.5.0 (Beta) release, and is no longer considered "Beta".

Co:Z SFTP enhancements and fixes:

- Changed a dataset write seek error message to warning
- Fixed a problem in the cozsftp client preventing the listing of a symbolic link for a directory target.
- Fixed a problem where log messages generated by setting the `interimlogging` option were incorrectly written on completion of commands that did not result in a transfer.

Co:Z Toolkit 3.5.0 (Beta) - July 7, 2015

Note: We recommend that you use this release if you are evaluating or testing Co:Z outside of a production environment. We expect to provide production support for this release level within 60 days. If you are a commercial customer and have specific support requirements, please contact us.

Co:Z SFTP enhancements and fixes:

- SFTP base upgraded from OpenSSH 5.0p1 to 6.4p1 adding the following:
 - recursive file transfer in a directory tree (`get/put -r`)
 - sftp server read-only mode
 - sftp “df” command - displays file system attributes
 - improved performance of directory listings
 - “ls -h” option - human readable file attribute units
- OpenSSH 6.4 changes sftp so that non-error messages are not printed to stdout if running a batch file (-b). In effect, the -q (quiet mode) option is turned on with -b and cannot be turned off. This has been changed so that -b does not force -q. The -q option can be specified in addition to -b.
- Fixed rename and remove to write an SMF record when the check command exit rejects the user's request.
- Fixed the status code reported when "no file or directory" was the cause of error. Status code 552 is now reported rather than 550 in these cases.
- Added manpages for the **cozsftp** and **sftp-server** commands. See the [Command Reference](#) in the Co:Z SFTP User's Guide.

Co:Z Toolkit 3.1.2 - August 13, 2015

Co:Z Launcher fixes:

- Fixed a problem occurring with `ssh-forward-dynamic-port` set to true. There were some scenarios where

pthread_cond_timedwait was called with an invalid time argument.

Co:Z Toolkit 3.1.1 - July 6, 2015

Co:Z SFTP enhancements and fixes:

- Fixed a problem where an **ls** command issued from **cozsftp** could encounter an error, but not cause a non-zero return code to be set.
- Changed the logging level of the message that reports a failure to read a Co:Z SFTP config file (either **cozsftp_config** or **cozsftp_server_config**) from warning to informational.

Co:Z Toolkit 3.1.0 - May 1, 2015

Co:Z SFTP enhancements and fixes:

- Added "false" statements to the beginning of **sftp-server.sh** and **cozsftp** shell scripts. This is a workaround suggested by IBM so that shell scripts do not silently fail with `exitCode=0` when a fork/spawn error occurs.

Co:Z Launcher enhancements and fixes:

- Fixed a problem where a Co:Z Dataset Pipes command from the target system caused a network reset during very large transfers. Both the Co:Z server version 3.1.0 and the target system toolkit version 1.2.0 updates are required for this fix. These can be installed and run in any order, but both need to be installed in order to see the fix.

Co:Z Target System Toolkit 1.2.0 - May 1, 2015

- Fixed a problem where a Co:Z Dataset Pipes command from the target system caused a network reset during very large transfers. Both the Co:Z server version 3.1.0 and the target system toolkit version 1.2.0 updates are required for this fix. These can be installed and run in any order, but both need to be installed in order to see the fix.

Co:Z Toolkit 3.0.1 - March 16, 2015

Co:Z SFTP enhancements and fixes:

- Fixed a problem where a system symbol in the VOLSER of a data set's catalog entry failed to be resolved, causing the data set to not be usable by Co:Z.
- Fixed a problem where the number of bytes transferred was incorrectly reported in SMF records on an unsuccessful file transfer. This error only occurred when a write error was detected on the first write to a dataset
- Added a new informational log message listing the options in effect for a transfer. While this information was available with debug logging in prior releases, many customers do not have debug logging enabled in production. This new message will improve our ability to address common transfer questions. The following is an example message (note that the asterisk indicates a setting from a matching pattern that overrides a current setting):

```
ZosSettings[I]:                               Transfer                               options:
clientcp=ISO8859-1,*conddisp=catlg[catlg],*lrecl=62,*mode=text[binary],
*recfm=fb,servercp=IBM-1047,trim
```

- Added support to automatically convert ISO-8859-*nn* to ISO8859-*nn* because z/OS does not support the

format, ISO-8859-*nn*, which contains two dash characters.

- Several Translate Exception error log messages have been updated to report reason codes as hex rather than decimal.
- Added `HEAP= , ,ANYWHERE` to the Co:Z SFTP client option **ssh-le-options** in the sample `cozsftp_config`. 'ANYWHERE' is the IBM default, and this setting will prevent failures if a customer were to override this default in `PARMLIB`.

Co:Z Launcher enhancements and fixes:

- Added a new optional property, `ssh-forward-dynamic-port`, that allows the target ssh server to dynamically assign the target port. In order to enable this option, IBM Ported Tools OpenSSH v1.3 or higher is required and the `ssh-tunnel` option must be set to `true`.
- Updated the sample `COZCFGD` member, setting an additional environment variable: `server-env-COZ_TRSUB_ANSI_X3.4-1968=ISO8859-1`. This eliminates **cozagent** warnings stating that "ANSI_X3.4-1968" is not a codepage recognized by z/OS.
- Added `HEAP= , ,ANYWHERE` to the sample `COZCFGD` **ssh-le-options** setting. 'ANYWHERE' is the IBM default, and this setting will prevent failures if a customer were to override this default in `PARMLIB`.
- Fixed a problem where an 0C4 ABEND could occur when using the properties exit to set a new property rather than overriding an existing property.

Co:Z Target System Toolkit 1.1.4 - March 16, 2015

- Minor changes to package structure.

Co:Z Target System Toolkit 1.1.3 - November 14, 2014 (not released - items below are included in all subsequent releases)

- Added a new **cozagent** option, `-n`, which runs the `target-command` without a shell.

Co:Z Toolkit 3.0.0 - December 12, 2014 - Correction

- The original release notes incorrectly listed the minimum machine architecture. This has been corrected in the original 3.0.0 release notes below. Community license users running machine architectures lower than z9 or a z/OS release lower than 1.12 should use release 2.4.5. See the [Co:Z downloads page](#) to download this older release. Commercial support customers that do not meet these requirements should contact us for custom build information.

Co:Z Toolkit 3.0.0 - November 12, 2014



Note

Our product support covers the newest release of the Co:Z toolkit software, plus the prior release for nine (9) months after general availability of the next major release. This means that **support for 1.x.x releases will end on September 12, 2015**. The Co:Z release 2.0.1 has been available since January 2012.

Co:Z SFTP enhancements and fixes:

- Modernized compiler TARGET,ARCHITECTURE and TUNE settings. In order to run this release of Co:Z, a minimum z/OS release 1.12 is required, along with a minimum machine architecture of z9 and above. Commercial support customers that do not meet these requirements should contact us for custom build information.
- The `sftp-server` binary is now built with the `AC=1` link option in order to make it easier for customers that require the Co:Z server to be APF-authorized for their exits. In order to run APF-authorized, the `extattr +a sftp-server` command must be executed after installing this release.
- Enhanced the `smf` option to support an optional parameter that identifies which user exit is called when an SMF record is written: IEFU84 or IEFU83. If no parameter is provided the default is IEFU84 (as in the prior release).



Note

Migration consideration: If the customer has modified Co:Z SFTP server to be APF-authorized, then the IEFU83 exit is required. The site wide configuration must be updated to include `smf=u83`.

- Added a new `linerule` option, `L4`. When transferring binary files with this option, each record is delimited (preceded) by a four byte length of the record that follows. See the [Co:Z SFTP options](#) Appendix in the Co:Z SFTP - User's Guide for more information.
- Enhanced error logging for the `TranslateException` message capturing the offset of the last successfully translated byte.

The following is an example message showing that an error occurred writing a text file to a dataset with different client and server code pages:

```
ZosDataset[E]: TranslateException: Exception occurred during translation,
RC=4, Reason=0xc, input offset=10250005
```

The following is a variant of this message reported by the `fromdsn` command:

```
fromdsn(HLQ.TEST.DATA)[E]: caught TranslateException: Exception occurred
during translation, RC=4, Reason=0xc, record/offset=13/7
```

- Added support for logging interim (in-flight) file transfer records to the Co:Z log and/or real-time SMF Interface (only). Co:Z SFTP supports real-time SMF type 119 records that are compatible with the following IBM FTP records:
 - Subtype 100 - FTP server transfer initialization record
 - Subtype 101 - FTP client transfer initialization record

In addition to the standard real-time FTP initialization records, Co:Z SFTP creates the following real-time SMF 119 record subtypes:

- Subtype 194 - Co:Z SFTP server interim transfer record
- Subtype 195 - Co:Z SFTP client interim transfer record

This feature is enabled by the new `interimlogging` option.

See the [Co:Z SFTP options](#) Appendix and the [SMF Information](#) Appendix in the Co:Z SFTP - User's Guide for more information.

- Updated the sample C++ program, `CoZSmfServer.C`, to output a text summary of each SMF record received on a Unix datagram socket. This sample demonstrates how to use the Real-Time Co:Z SMF Interface. See the [SMF Information](#) Appendix in the Co:Z SFTP - User's Guide for more information.
- Corrected the following two environment variables in documentation and the sample site `cozsftp_client.rc` file:
 - `COZ_SFTP_USER_CLIENT_CONFIG` -> `COZ_SFTP_USER_CONFIG`
 - `COZ_SFTP_USER_CLIENT_RC` -> `COZ_SFTP_USER_RC`

See [Configuring the Co:Z SFTP Client](#) in the Co:Z SFTP - User's Guide for more information.

Co:Z Launcher enhancements and fixes:

- Added additional debugging information to the `saf-ssh-agent`.

Co:Z Toolkit 2.4.5 - May 29, 2014



Note

This is planned to be the last 2.x release of the Co:Z Toolkit. Barring any high severity defect fixes, the next release of the toolkit will be labeled 3.0.0

Co:Z SFTP enhancements and fixes:

- Fixed a bug introduced in 2.4.0 by a new feature enabling wild-card uploading to new generations of a GDG when the `gdgnt` option is enabled. Co:Z server was responding to `realpath` with the GDG base filename only, dropping the new version indicator of (+1). Some clients, such as PSFTP, require the returned path to contain (+1) in order for the subsequent open request to work.

Co:Z Launcher enhancements and fixes:

- Fixed a timing issue that was causing port forwarding failures in scenarios where several Co:Z Launcher jobs were running concurrently (or close together).

Co:Z Toolkit 2.4.4 - March 18, 2014

Co:Z Installation:

- A new IBM Ported Tools OpenSSH - Quick Install Guide is available. This guide will help you ensure your IBM Ported Tools OpenSSH installation is configured and tuned properly. For more information see: [IBM Ported Tools OpenSSH - Quick Install Guide](#).

Co:Z SFTP enhancements and fixes:

- Added an informational message to `cozsftp` and `sftp-server` to record the remote and local IP addresses. This

message is emitted once per session.

- Modified `read_password_dsn.sh` to ignore new password prompts like "user@host's new password: " This is to prevent an endless loop calling this script for old/new password changes. To disable this filter, export `SSH_ASKPASS_PROMPT_IGNORE=false`
- Added the `SFTP_LOGDIR` environment variable which allows configuration of the directory name (without trailing slash) where log files will be created, rather than `/tmp` or `$TMPDIR`. This variable is ignored if `SFTP_LOGFILE` is set.
- Fixed GDGNT support to pass the `BPXWDYN GDGNT` keyword on all allocations for read and write operations. In prior releases, GDGNT was only passed when creating new generations. This had the potential to cause some read operations to retrieve the wrong generation when GDGNT was set.
- Fixed a problem with translate table support where multiple simultaneous access to the translate table dataset might result in a `DATA SET <dsn> ALREADY IN USE` error.
- Fixed the FTP command passed to the `CHKCMD` exit when `ls /+nogdgnt` is executed. In prior releases, `SITE SFTP-GDGNT` was passed rather than `SITE SFTP-NOGDGNT`. Refer to the [Co:Z SFTP Exits Guide](#) for additional corrections to the documentation.
- Fixed a problem where the exit status code was not set correctly when a dataset write error occurred getting a very small file using the Co:Z SFTP client. This change addresses an issue running `cozsftp` from `COZBATCH` where the exitcode was not set to 1 when a dataset write error occurred.
- Changed SFTP Server to always treat a dataset name with a trailing slash (/) as a directory.
- Fixed a problem that occurs when using GUI clients to put a file C in directory (folder) //HLQ.A.B when //HLQ.A.B is an existing sequential dataset. The GUI client sends //HLQ.A.B/C causing the Co:Z SFTP Server to overwrite the existing sequential dataset //HLQ.A.B with the contents of file C. This problem was occurring due to a misinterpretation of the slash (/) in the path by the Co:Z SFTP Server. The error does not occur when the path contains a period (.) in place of the slash (/). This problem was originally reported with release 2.3.2.
- Added a Microsoft Windows 64 bit version of the Co:Z Target System Toolkit. This is for use with the Cygwin 64 bit version.

Dataset Pipes enhancements and fixes:

- Changed `todsn` behavior: if `-b` is specified with `-l` (except `-l none`), then `-w wrap` is made the default. This allows commands such as `todsn -b -l rdw` to work as generally expected.

Co:Z Toolkit 2.4.3 - December 2, 2013

Co:Z SFTP enhancements and fixes:

- Fixed the server-path passed to the `CZCHKCMD` exit on a wild-card put to a GDG with the `gdgnt` option enabled.

Co:Z Batch enhancements and fixes:

- For z/OS 2.1 or later, JES Symbols are automatically exported as environment variables to the target shell or program with `JES_` prefixes on the symbol names. See an [example](#) in the Co:Z Batch User's Guide.

Dataset Pipes enhancements and fixes:

- For z/OS 2.1 or later, the **jessym** command is available, a command line interface to the JES Symbol Service. See the [jessym](#) section of the Co:Z Dataset Pipes Command Reference for more information.
- Added a new option, **-i jobid**, to the **lsjes** command which displays a single line listing for the specified job. See the [lsjes](#) section of the Co:Z Dataset Pipes Command Reference for more information.
- Modified **todsn** to add support for the special dataset-name //INTRDR. If specified, the system internal reader is automatically allocated with a default RECFM=F and LRECL=80. Additionally, the new pseudo BPXWDYN option `symlist()` may be specified in order to pass one, or more JES system symbols to the internal reader. See the [example](#) in the Co:Z Dataset Pipes Command Reference.

Co:Z Launcher enhancements and fixes:

- Fixed a bug in the automatic buffer size increase feature introduced in version 2.3.1. Larger send and receive buffers will now be used in all cases unless otherwise specified.

Co:Z Toolkit 2.4.2 - July 12, 2013 (not released - items below are included in all subsequent releases)

Co:Z SFTP enhancements and fixes:

- Added a feature to allow the user versions of `cozsftp_config` and `cozsftp_server_config` files to have a `default:` section. In prior versions, the `default:` section was only allowed in the site versions of these files. If the same option *name* is specified in both the site and user config files, then the option *value* in the user config file has precedence.

Co:Z Launcher enhancements and fixes:

- Added a feature where code page translation exceptions are relaxed when writing to a printer, terminal or DUMMY DD. Prior to this release, if the source codepage had an invalid sequence, a translation exception would be thrown terminating the Launcher process. Now a substitution character is written and the process continues. The behavior is unchanged when writing to anything other than a printer, terminal or DUMMY dd (e.g. regular datasets).
- Fixed a problem with code page translation via `iconv` where some Unicode Services error codes were being ignored.

Co:Z Toolkit 2.4.1 - June 24, 2013

Co:Z SFTP enhancements and fixes:

- Fixed a problem where an 0C4 ABEND could occur after issuing an "ls" command in the dataset space that returned more than 512 entries. This is an issue that was introduced in release 2.2.0.

Co:Z Toolkit 2.4.0 - June 10, 2013

Co:Z SFTP enhancements and fixes:

- Added a feature to override the location of the user level Co:Z configuration files `sftp-server.rc`, `cozsftp_client.rc`, `cozsftp_server_config` and `cozsftp_config`. This feature is particularly useful if individual SFTP users do not have Unix System Services home directories. For details please refer to the following sections of the SFTP User's Guide:
 - [Sitewide server defaults](#)

- *Sitewide client defaults*
- Enhancements to improve the ability to distinguish whether a non-existent data set name is to refer to a new data set or an existing (pseudo) directory. As before and by default, a non-existent data set name is reported as a "directory" if other data sets exist at lower levels.
 - Added a new option: **maxdsndirlevels**, which can be used to specify the maximum number of levels that a data set name can have before it is always considered as a new file rather than a (pseudo) directory.
 - The '!' character may now be specified anywhere in a data set name to force a non-existent data set name to be considered as a file rather than a directory.

See: *Dataset Name Determination* Co:Z SFTP - User's Guide for more information.

- When downloading compressed datasets on EAV volumes with a remote SFTP client, Co:Z SFTP server will now use catalog information to provide a better estimate of the uncompressed data set size. In some cases this may significantly improve the performance of downloading these data sets, since many SFTP clients will only queue one read at a time after the estimated file size has been reached. This feature is only available on z/OS 1.12 or later systems
- Corrected error handling for an invalid sequence detected during conversion from UTF-8 to IBM-1047 on a put to a data set.
- **cozsftp** client **get** command wild-card enhancements:
 - Allow **get * //DD:MYDD** if the given DD was allocated with DISP=MOD.
 - Allow **get * //HLQ.GDG.BASE(+1)** if the **gdgnt** option is enabled.
 - As with all wild-card get commands, filtering of source files (e.g. **get abc***) is supported.
- **cozsftp** client **put** command wild-card enhancements and fixes:
 - Allow **put //HLQ.GDG.BASE(*) <dir>** - to upload all generations to a remote directory. For compatibility, **put //HLQ.GDG.BASE.*** is also supported.
 - Allow **put //HLQ.PDS(*) <dir>** - to upload all members of a PDS to a remote directory.

Note: Previously, the command: **put //HLQ.PDS <dir>** would also work, but the target directory was ignored and all files were written to the current working directory. This has been corrected. The preferred syntax is: **put //HLQ.PDS(*) <dir>**
 - Fixed an problem where **put //HLQ.DSN targetdir** failed. The put command will now upload the data set to "targetdir/hlq.dsn". If the target is a z/OS data set name, then that data set name will be used as the target.
 - Filtering of members is not currently supported when uploading a PDS or GDG. Only a single member or the "*" pattern is allowed.
- Co:Z SFTP server enhancements and fixes:
 - Allow wild-card uploading to new generations of a GDG. If the **gdgnt** option is enabled, then a remote

client may upload multiple files/generations with: **put abc* //HLQ.GDG(+1)**

- Fixed an issue where download of a specific GDG G000V00 failed with error: "Cannot download non-regular file".
- Addendum to Co:Z Toolkit 2.3.2 release notes:
 - In release 2.3.2, fixed a timing issue causing occasional failures when retrieving spool files for a job submitted using Co:Z. These failures were occurring even with the **jesjobwait** option set which ensures that Co:Z SFTP server wait until the job completes before listing or transferring the jobs spool files.

SFTP Sample Scripts enhancements:

- Changed scripts to ensure that a zero exit code does not result if the z/OS UNIX shell is unable to fork a new process.

Co:Z Launcher enhancements and fixes:

- Fixed a zero-return code bug from launcher if the agent process failed to run.
- Fixed (again) ssh process time message to appear only as a debug level message. Addresses unwanted ICH408I audit messages for some installations.

Co:Z Toolkit 2.3.2 - March 21, 2013

Co:Z SFTP enhancements and fixes:

- A new option, **jesincsysin**, is available for transferring JES spool files. When this option is enabled, spool file listings and concatenated output will contain SYSIN spool files, including JESJCLIN. Refer to *Transferring JES spool files* in the Co:Z SFTP - User's Guide for an example.
- Added an appendix, *Creating a Custom Unicode Table from the IBM FTP Translate Table*, to the Co:Z SFTP User's Guide. The appendix provides condensed instructions for creating a custom unicode table which can be used by the Co:Z SFTP **clientcp**, **servercp** and **technique** transfer options. Refer to IBM's Unicode Services User's Guide and Reference (SA22-7649) for complete information on the IBM supported method for adding new conversion tables to Unicode Services.
- Increased the saf-ssh-agent wait time to a maximum of 5 seconds (from 2 seconds). This wait time is related to the **cozsftp -k** option (SAF key authentication)
- Fixed a problem where the **cozsftp** put command could fail but not set the exit code appropriately.
- Fixed a problem where the `default:` section of `cozsftp_server_config` could be ignored if the `final pattern:` section in the file was skipped.
- Fixed a timing issue causing occasional failures when retrieving spool files for a job submitted using Co:Z. These failures were occurring even with the **jesjobwait** option set which ensures that Co:Z SFTP server wait until the job completes before listing or transferring the jobs spool files.

Dataset Pipes enhancements and fixes:

- A new option, **-S**, is available on the **lsjes** command. The **lsjes** command is used to display JES job and spool file status. When the **-S** option is specified, the listing of spool files will also include SYSIN files, including

JESJCLIN. Refer to the *Command Reference* for additional information.

Co:Z Target System Toolkit 1.1.2 - March 21, 2013

- Fixed an issue in a build from source for Solaris. On Solaris, the Co:Z Agent was terminating early resulting in a SIGINT when using **fromdsn/todsn** and **fromfile/tofile**. This issue was related to the way Solaris handles timer signals.

Co:Z Target System Toolkit 1.1.1 - January 24, 2013 (not released - items below are included in all subsequent releases)

- Fixed an issue with the LSB package for s390x (System z Linux) where an installation error could occur if attempting to install on an earlier generation distribution than the one used to build the LSB RPM.

Co:Z Toolkit 2.3.1 - January 3, 2013 (not released - items below are included in all subsequent releases)

Co:Z Launcher enhancements and fixes:

- Changed the default send and receive buffers from 16K to 180K. These default values can be modified in COZCFG DD as follows:

```
server-env-COZ_SERVER_SNDBUF=184320
server-env-COZ_SERVER_RCVBUF=184320
```

The SNDBUF is used when **fromdsn/fromfile** is called from the target system; the RCVBUF is used when **todsn/tofile** is called.

Additional performance improvement may be achieved on z/OS r1.13 or later by using IBM's INET_FASTPATH feature. To activate this, add the following to your COZCFG DD:

```
server-env-_BPXK_INET_FASTPATH=*
```

Co:Z Toolkit 2.3.0 - December 18, 2012

Co:Z SFTP enhancements and fixes:

- Added option `unixls`. When enabled, Co:Z SFTP server returns a Unix format listing of data sets to the client. Many clients incorrectly depend on this listing format in order to function correctly. This option is not enabled by default. Refer to the following sections of the Co:Z SFTP User's Guide for additional information:
 - *Client Compatibility* for general client information
 - *Miscellaneous Options* for `unixls` information
- Updated support for the `SFTP_ZOS_INITIAL_DIR` environment variable which can be used to override the home directory on the server. When set to `//`, the user's z/OS top level qualifier is used. As part of the enhancements in this release related to SFTP client compatibility, the string `/-/` is also recognized, setting the initial directory to the user's z/OS top level qualifier prefixed with `/-/`.
- Fixed a problem where the directory attribute was not set correctly when listing `//-JES` output. This change improves the usability of SFTP GUI clients when navigating JES spool files.
- Fixed a problem in PDS directory listings (issued by the **pdsdir** command and Co:Z SFTP PDS 'ls' commands) where the modified date was incorrectly displayed when the date was equal to the last day of the month.

- Fixed a problem in the `sftp_connect.sh` shell script (used by `sftp_get.sh` and `sftp_put.sh`) where userids beginning with a "\$" were not being used correctly. These scripts are located in `$COZ_HOME/samples/sftp_batch`.
- Changed the level of the child SSH process times log message from (I)info to (D)debug.
- Added support for FTP style translate tables when transferring files. The new option `trtab` can be specified in lieu of `servercp` and `clientcp`. See the [Co:Z SFTP General Transfer Options](#) for details.

Dataset Pipes enhancements and fixes:

- Added support for FTP style translate tables to **fromdsn**, **fromfile**, **todsn** and **tofile**. A translate table is specified via the `-T` option on these commands in lieu of the `-s` (source code page) and `-t` (target code page) options. See the [Dataset Pipes Command Reference](#) for details.

Co:Z Launcher enhancements and fixes:

- Changed the level of the child SSH process times log message from (I)info to (D)debug.

Co:Z Toolkit 2.2.1 - October 16, 2012

Co:Z SFTP enhancements and fixes:

- Updated the sample `sftp_connect` script to export the following two variables: `_BPX_SHAREAS=YES` and `_BPX_SPAWN_SCRIPT=YES`. This avoids problems that can happen when a user or installation login profile sets `_BPX_SHAREAS=NO`. *Please update scripts that have been modeled after the sample Co:Z Batch SFTP scripts distributed with the Co:Z Toolkit.*
- Fixed an error (0C4 abend) occurring with SMF enabled and Co:Z SFTP encountering an error writing SMF records. The error was occurring when Co:Z SFTP logged an error message about the SMF write failure.
- Improved the storage allocation algorithm to better support listing (`ls`) of very big directories (several hundred thousand files). Depending on the configuration of LE HEAP runtime options, Co:Z SFTP was running out of LE HEAP storage with a "xrealloc() error".
- Fixed a problem where SFTP readlink processing was failing when working with the z/OS settings directory.
- Fixed a problem where the Co:Z SFTP server `error.log` could not be transferred in some cases.
- Updated initial directory processing to support a high level data set qualifier with no allocated data sets. This change provides a fix for some SFTP clients that failed to connect when the initial remote directory was `//userid` and the `userid` did not have any data sets.
- Updated the [Using the Co:Z SFTP client in batch](#) section of the Co:Z SFTP User's Guide. The changes describe the recommend way of using Co:Z SFTP with Co:Z Batch. The `SFTPPROC` and `batch` scripts, provided as samples with Co:Z SFTP, simplify and improve the maintainability of Co:Z SFTP batch jobs.

Co:Z Launcher enhancements and fixes:

- Cleaned up authorization token generation and fixed a problem where the generated authorization token was not being properly verified in some cases.

Co:Z Batch enhancements and fixes:

- Fixed a problem where an OC4 abend occurred when the SAVEARGS DD was defined as a DUMMY device and environment variables were also defined as parameters to Co:Z Batch.

Co:Z Toolkit 2.2.0 - September 1, 2012

Co:Z SFTP enhancements and fixes:

- Fixed a problem where MicroFocus style RDW record lengths (fromdsn and todsn "mfrdw" line separator option) were being calculated incorrectly.
- Fixed a problem where submitting a job to the internal reader failed if the lrecl and/or recfm options were set. Job submission relies solely on the values (or default settings) of jeslrecl, jesrecfm and jesblksize (which is a new option added in this release). All other BPXWDYN options are ignored.
- Fixed a problem where the values accepted for dataclas, mgmtclas and storclas were too restrictive. The change allows any alpha or national as the first character and any alphanumeric or national as characters 2-8.
- Fixed a problem where a member might not be selected on a get command when the current directory is a PDS and another dataset exists whose name is pdsname.member.
- Increased the performance of dataset name lookups in some cases.
- Updated the following section of the Co:Z SFTP User's Guide: *Client Authentication Mechanisms*.

Co:Z Launcher User's Guide significant updates:

- Updated the *Client Authentication Mechanisms* section.
- Updated the *Windows Target System Installation* section.

Co:Z Toolkit 2.1.3 - July 20, 2012 (not released - items below are included in all subsequent releases)

Co:Z SFTP enhancements and fixes:

- Changed the cozsftp client to report an error if it is run in batch mode (via the -b switch) and no commands are found on STDIN. This fix is intended to work around an issue with IBM's handling of shell "here documents" when no temp space is available.
- Changed log message to report the actual, rather than relative name when a GDG is written.
- Added z/OS support for the SFTP fstat and fsetstat functions. Previously, only stat/lstat and setstat were supported.

Co:Z Toolkit 2.1.2 - July 12, 2012 (not released - items below are included in all subsequent releases)

Co:Z SFTP enhancements and fixes:

- Added the option maxcsent to provide a way to increase/decrease the number of CatalogSearch entries returned for a given dataset level search. The default is 2000.
- Fixed a problem in file pattern matching related to data set names: The DSN pattern is now automatically folded to uppercase and patterns without a // prefix are ignored.
- Added an informational level message to report the amount of time spent in the child SSH process.

Co:Z Toolkit 2.1.1 - March 16, 2012

This release makes the following enhancements and fixes:

- Added two new dspipes commands **fromfile** and **tofile**. See the [Co:Z user's guide for more information](#).
- Added the `-x` option to the **catsearch** which sets the exit code based on the number of entries found: (0=no entries, 1=one entry, 2=more than one entry).
- Changed the saf-ssh-agent utility to respect digital certificate expiration. Note that this change may cause existing Co:Z programs to fail if the certificates used for authentication have expired. The old behavior can be retained by setting the environment variable `COZ_STRICT_CERT_CHECK=false`. The default is true.
- Added a man page has been added for the **cozclient** command.
- Extended the use of the `technique` option (for Unicode Services codepage translation) to the dataset pipes commands **fromdsn**, **fromfile**, **todsn**, and **tofile**. The technique option was added to Co:Z SFTP in release 1.10.0
- Added `pattern-get:` and `pattern-put:` sections to the config files to provide directional control over file transfer.
- Fixed a problem where **ssh-socket-info** might not run correctly when called from COZBATCH. A workaround (for the previous release) is to `export _BPX_SHAREAS=YES` to your script or profile.
- Fixed a problem where config file patterns were not always matching PDS member names correctly.
- Modified the Co:Z SFTP server subsystem `sftp-server.sh` script to `export _BPXK_JOBLOG=STDERR` which provides additional logging information when certain errors occur.
- Changed the `sftp_batch` sample scripts (`sftp_connect.sh`, `sftp_get.sh`, `sftp_put.sh`, etc.) to `export LC_ALL=C` to ensure proper shell script and C runtime library behavior. Please note that this change will cause the default client code page (for `cozsftp`) and server code page (for `sftp-server`) to the z/OS platform default of IBM-1047. To set a different default codepage for file transfers, place the desired codepage in the `default:` section of `cozsftp_config` and/or `cozsftp_server_config` files respectively. See the ["Session Config Files" appendix of the SFTP user's guide](#) for more information.
- Changed the `sftp_opts` settings in the SFTPIIND sample JCL member to set defaults for `ConnectTimeout` and `ServerAliveInterval`

Co:Z Target System Toolkit 1.1.0 - March 16, 2012

This release makes the following enhancements and fixes:

- Added remote support for the new dspipes **fromfile** and **tofile** commands. *Note:* To use these commands, the Co:Z Toolkit for z/OS version 2.1.1 or later must be installed.
- Added new local command **toasa** which converts POSIX files to ASA carriage control format. This command is useful for converting files with ASCII form feed characters into a dataset RECFM=A format.
- Fixed a problem where logging is not properly set up when using the `COZ_SSH_OPTS` environment variable in place of the `-ssh` command line option.

Co:Z Toolkit 2.1.0 - January 24, 2012

This release makes the following enhancements and fixes:

- Added two new dspipes commands **fromfile** and **tofile**. See the user's guide for more information.
- Changed the Co:Z Launcher to allow different DD names for SYSOUT (Co:Z Log messages) and SYSPRINT (Co:Z Agent output). In the new sample JCL (COZPROC), these are now named COZLOG and COZOUT respectively.

Co:Z Toolkit 2.0.1 - January 14, 2012

This release makes the following minor changes to the 2.0.0 (Beta) release, and is no longer considered "Beta".

- Fixed a problem in Co:Z SFTP JES support - jobs submitted to `//-JES.INTRDR` may now be listed after they are submitted.
- Corrected an issue in Co:Z SFTP where writing to a z/OS dataset using a source file with a line longer than 128K would fail with an error "InputBuffer will not hold xxxxx bytes of new data".
- Enhanced the sample `sftp_batch` scripts to support SAF keyrings with private keys stored in hardware. See the comments in `sample/scripts/sftp_batch/sftp_connect.sh` for more information.

Co:Z Toolkit 2.0.0 (Beta) - December 1, 2011

Note: We recommend that you use this release if you are evaluating or testing Co:Z outside of a production environment. We expect to provide production support for this release level within 60 days. If you are a commercial customer and have specific support requirements, please contact us. This release makes the following enhancements and fixes:

- Extended Access Volume (EAV) support has been added to Co:Z SFTP.
- Enhanced the Co:Z SFTP client and server to write log message records (INFO level and above) to SMF 119, using new subtypes 192 (client) and 193 (server).
- Added a utility program `ssh-socket-info` which is invoked by the Co:Z SFTP client to get more accurate socket information for SMF records. This program uses the IBM EZBNMIFR network management API, which requires the `ssh-socket-info` program to be APF authorized. The Co:Z installer will attempt to set the "+a" extattr bit on this program, but will only succeed if the installing userid has READ access to the BPX.FILEATTR.APF SAF resource. If for some reason, this program is not APF authorized, Co:Z SFTP will operate properly, but the SMF socket information is not guaranteed to be accurate.
- Support for hex pad characters has been added to Co:Z SFTP.
- Changed the `catsearch` utility to automatically show user catalog entries. Added an option (`-e`) to allow for a custom selection of entry types.

Co:Z Toolkit 1.10.1 - November 7, 2011

This release makes the following enhancements and fixes:

- The Co:Z Launcher now makes the SYSIN DD available for application use.
- Added several sample shell scripts and JCL to simplify the use of `cozsftp` in batch jobs. See the `$/COZHOME/sample/scripts/sftp_batch` and the new SFTPPROC, SFTPIND, and SFTPSAMP JCL members in the installation's SAMPJCL PDS.

- Changed the Co:Z SFTP server to provide FTP style confidence indicator in the CZPOSTPR exit.
- Fixed a problem in the `cozsftp` shell script where command line arguments were not being transparently passed to the Co:Z SFTP client. This problem could affect the use of the `-oIdentityKeyRingLabel` option, which requires quoting. This bug was introduced in release 1.9.0. Contact us if you would like a local fix for releases 1.9.0 through 1.10.0.
- Fixed a problem where BPXWDYN dataset options were not being properly overridden when associated with a file pattern.
- Fixed a problem in dataset code where a read error might not be detected.
- The LOGNAME feature introduced in the previous release was not working properly. This has been fixed.

Co:Z Toolkit 1.10.0 - September 15, 2011

This release makes the following enhancements and fixes:

- Added a feature to Co:Z SFTP that allows file transfer settings to be associated with POSIX filename and z/OS Dataset patterns. See the updated Co:Z SFTP documentation for details
- Added the `technique` option to Co:Z SFTP. This option is used to specify the Unicode System Services Technique used when translating between the client and server codepages
- Co:Z Batch now automatically sets the LOGNAME environment variable to the current z/OS userid. This is in addition to the existing behavior of setting the HOME environment variable to the current user's home directory.
- Co:Z Launcher now automatically sets the LOGNAME and HOME environment variables.
- The `pdsdir` command has been enhanced (via the `-n` option) to display only member names.
- Fixed a problem with dataset pipes handling of hex character line terminators (0xnnnn).
- Fixed a problem with `cozsftp` where a non latin locale caused the client to not work properly.
- Added the sample program `CoZSmfServer` which demonstrates how SMF records may be received in real time from Co:Z client and server. See the documentation and build instructions in `COZ_HOME/samples/smfapi/CoZSmfServer.C`

Co:Z Target System Toolkit 1.0.14 - June 7, 2011

Enhanced Co:Z Agent to track the parent `sshd` process and detect if it has terminated abnormally (e.g. due to the Job Step being cancelled by the operator). If this condition is detected, the Co:Z Agent will terminate its process group, which will prevent orphaned processes from continuing to run on the target system.

Co:Z Toolkit 1.9.0 - May 16, 2011

This release makes the following enhancements and fixes:

- Co:Z SFTP now returns the "last referred date" (midnight) from the VTOC for datasets as last changed time. While not accurate, this is a reasonable substitute and better than the base UNIX epoch date of 1969-12-31
- The `cozsftp` command is now a shell script. The executable has been renamed to `cozsftp_cmd`. This should be a transparent change to existing jobs. However, it adds a new capability to allow customization of

the **cozsftp** command line arguments. See [*cozsftp_client.rc*](#) for more information.

- Fixed a problem with long (>256) character unix file paths in Co:Z SFTP
- Cleaned up formatting of long dataset name listings in Co:Z SFTP
- Fixed a problem where `disp=mod` was incorrectly being added to `bpxwdyn` allocations of new datasets in Co:Z SFTP
- Fixed a problem with the `-p` option on the **get** subcommand of **cozsftp**.
- Added subcommands **ascii** and **binary** to **cozsftp**. These operate as synonyms to the option settings **lzopts mode=text** and **lzopts mode=binary** respectively.
- Added a new option `-N` to COZBATCH to respect digits in columns 73-80 in STDIN rather than stripping them out, which is the default behavior.

Co:Z Toolkit 1.8.0 - February 3, 2011

This release makes the following enhancements and fixes:

- A new Co:Z SFTP client option **ssh-le-options** can be used to set LE options for IBM Ported Tools OpenSSH. This option can be set in `/etc/ssh/cozsftp_config` to simplify the process of implementing IBM APAR OA34819.
- The **ssh-le-options** settings in the sample configuration files for both Co:Z Launcher and the Co:Z SFTP client were updated to reflect IBM APAR OA34819.
- A new configuration option **properties-exit** was added to the Co:Z Launcher which allows properties to be dynamically provided by a user-supplied exit program or script.T
- Fixed a bug in Co:Z SFTP that can cause an OC4 when querying JES spool jobs using a jobname or owner longer than 8 characters.
- Fixed a bug in Co:Z SFTP that caused the "mode=text" setting to be treated as binary if "mode=TEXT" was given.

Co:Z Toolkit 1.7.8 - January 17, 2011

This release fixes a potential OC4 exception when the 'noreplace' option is used.

Co:Z Toolkit 1.7.7 - January 14, 2011

This release fixes several problems:

- In Co:Z SFTP, listing dataset levels that contain GDGs may cause a loop/hang condition.
- An OC4 exception can occur in Co:Z SFTP if there is an open error on a z/OS dataset.
- In Co:Z SFTP, a z/OS-formatted dataset listing displays January "Last Referred" dates with a day that is one less than the actual LastReferred date.
- A debug-level log message was added to Co:Z SFTP client and server to print out the requested and actual REGION size.

Co:Z Toolkit 1.7.5 - December 13, 2010

In addition to the changes made in the 1.7.4 beta release, the following enhancements and minor fixes are included in this production release:

- A memory leak was fixed in Co:Z SFTP that caused out-of-memory errors if many Unix files were transferred using a small REGION size.
- A fix to Co:Z SFTP job submission which sometimes prevented the display of job handles if multiple jobs were submitted in the same session.
- The `read_passwd_dsn_sh` script was changed to allocate the dataset with DISP=SHR.
- The `lsjes` z/OS Unix command was added to Dataset Pipes to support listing the status of jobs and spool files. Thanks to John McKown for the utility name and the idea of offering this feature as a standalone utility.
- The Dataset Pipes `fromdsn` command was enhanced to support reading JES spool files.
- The Co:Z `safauth` has been enhanced to add DSA key support.
- Some of the JCL members in the SAMPJCL PDS have been renamed for clarity. See the @@README member for details.

Co:Z Target System Toolkit 1.0.11 - December 13,2010

Production version of the previous (beta) 1.0.9 release. This version has a minor change to the target program child I/O process wait / cleanup.

Co:Z Target System Toolkit 1.0.9 - September 30,2010 (Beta Release)

Note: This release of the Co:Z Target System Toolkit should only be used with version 1.7.4 or later of the z/OS Co:Z Launcher. Previous versions are still compatible with Co:Z Launcher 1.7.4.

- CoZAgent changed to emit a "Waiting for completion..." message every five minutes. This may be helpful to keep the ssh session alive in some environments where the connection may otherwise timeout.
- CoZAgent changed to detect cleanup errors with the stdin/stdout/stderr handlers and to exit with RC=103 if one of these child processes did not complete successfully.
- CoZClient and the fromdsn/todsn clients changed to support a new environment variable: `COZ_SSH_OPTS`. This environment variable can be set in a client-initiated ssh connection to set `user@host` and any other ssh option defaults. This variable should not be set when running under the Co:Z Launcher.

Co:Z Toolkit 1.7.4 - September 28, 2010 (Beta Release)

- Co:Z SFTP - significant enhancements to JES support:
 - Support for submitting jobs to internal reader A handle/name can be used to refer to submitted jobs. New settings `jesrecfm` and `jeslrecl` can be used to control format of internal reader dataset.
 - A new setting `jesjobwait` allows for waiting for job completion before listing or downloading spool files.
 - Support for downloading concatenated spool files for a job.
 - Selection of spool files by either dsid or [step.[procstep.]]ddname.

- New setting **jesstatus** can be used to filter job listing by status.
- `sftp-server.sh` changed to remove empty log files on completion.
- Fixed bug where fixed options could be overridden.
- Co:Z Launcher
 - Added `ssh-le-options` to property to allow setting of RUNOPTS for ssh child process. Set the default in COZCFGD so to set the initial HEAP size for Ported Tools OpenSSH to avoid storage allocation problem.
 - Fixed a timing bug that sometimes results in not cleaning up child processes. Before this fix, target fromdsn/todsn commands occasionally do not get cleaned up properly.
- Enhanced to **safauth** command to allow **volser** option.
- Fixed bug in **genlines** command in processing **-l rdw** option.

1.7.2 - July 23, 2010

- Made the Co:Z toolkit compatible with IBM Ported Tools for z/OS version 1.2. Specifically, components in the toolkit that spawn the ssh client have been changed to spawn with a default setting of `_BPX_SHAREAS=YES` (the old default value was `MUST`). This accomodates IBM's change to ssh that requires it to run in a separate address space.
- Added `create-symlinks.sh` script in the Co:Z install directory. This script can be used to add or replace the symbolic links to the commonly used Co:Z executables.

1.7.1 - <not released - items below are included in all subsequent releases>

- Added new option (no)replace.
- Changed the way the sftp-server log filenames are calculated to eliminate a potential race condition on the name.

1.7.0 - June 8, 2010

- Added support for new `/etc/ssh/cozsftp_config` and `/etc/ssh/cozsftp_server_config` site configuration files.
- Fixed a problem traversing from `/+` to its parent (root).
- Enhanced `sftp-server.sh` to write a message to the console if the log file or `/tmp` is full.
- Sample configuration and `.rc` files are now packaged in a `samples` directory.
- Changed product to use a more corporate-friendly free *Community License* and made Co:Z FTP-SSH Proxy an add-on component. See the *FAQ* for more information.

1.6.1 - April 16, 2010

- Fixed a problem in Co:Z SFTP server where certain options set via the SFTP_ZOS_OPTIONS environment variable can cause a loop.
- Fixed a problem in Co:Z SFTP client and server where SMF records were not being cut for transfers to SYSOUT datasets.

1.6.0 - March 30, 2010

- Fixed a problem in the Co:Z SFTP where dataset write errors might not be reported correctly.
- Fixed a problem in the Co:Z SFTP server where no error was being reported if too many catalog search entries were being read during a client listing request. The client will now report a directory read error and the error log will contain a message.
- Fixed a problem in the Co:Z SFTP server which can prevent uploading to a SYSOUT dataset.
- Fixed saf-ssh-agent so that it reports the exit code of the command run under the -c option. Also fixed a potential race condition where the agent might not start in time for the ssh client to use it.
- Changed cozsftp and CozClient to retry fork() when receiving EAGAIN on z/OS. This is in response to IBM USS DOC APAR OA30943 (Problem #1).
- Added a new z/OS shell command "safauth" which can be used to check the current user's authorization for a SAF resource.

1.5.3 - January 19, 2010

- Enhanced saf-ssh-agent with a new option (-c) that accepts a command (such as ssh) to run as a child process so that it can authenticate via SAF RACDCERT digital certificates.
- Enhanced Co:Z SFTP to provide an interface to z/OS JES job status and spool files. Future releases of Co:Z will also support enhanced job submit, cancel, and purge facilities

1.5.2 - December 8, 2009

- Minor fix to Co:Z SFTP for the `space=blk` setting. This will cause the BPXWDYN keyword `block(n)` to be used, where `n` is either the value on the `blksize` keyword or 0 if the `blksize` keyword is not set.

1.5.1 - December 2, 2009

- Minor fix to Co:Z SFTP FTP-compatible user exit support so that check-command exits are properly called when setting the `unit` and `ucount` options.

1.5.0 - November 2009

- Support added to enable the use of RACF RSA Digital Certificates for OpenSSH client authentication. This feature can be exploited by both the Co:Z Launcher and the z/OS SFTP client (`cozsftp`).
- Co:Z Launcher MVS console communication has been enhanced to automatically fold input to lower case. The underscore ('_') escape character can be used to force the character that follows to upper case.
- The `todsn` command `-x` option has been enhanced to allow the BPXWDYN `DD` or `FI` keyword to allow the

use to specify a specific DD name to dynamically allocate rather than using a default system-assigned DD name.

- Fixed a problem in `cozsftp` with large buffers (-B option) that was causing hangs and or poor throughput.
- Fixed a problem in Co:Z SFTP so that when processing HFS/zFS files, ASCII linefeed characters (x'0a) are properly substituted for ASCII NEL characters (x'85'). This problem had affected some users who requested `linerule=crlf` with codepages that by default converted EBCDIC linefeed to ASCII NEL (x'85').

1.4.1 - October 2009

This release includes the following changes to Co:Z SFTP from the prior GA release:

- Support for IBM FTP compatible user exits.
- minor bug fixes to several fields in SMF 119 records that were not produced the same as IBM FTP.
- the `CONDDISP=DELETE` option will now delete MVS datasets or HFS/zFS files that are being written to by either the SFTP client or server in the case of an incomplete or interrupted file exchange.
- Corrected MVS dataset name handling with respect to `"/` and `"/` appearing in file names.
- Corrected an 0C7 that occurred when processing PDS directories with old SPF format statistics

1.3.2 - July 2009

- Reworked Target System Toolkit to build on more *nix platforms, including FreeBSD.
- Added a new dataset prefix `///xxx.yyy` which forces the dataset `xxx.yyy` to be treated as a dataset rather than a "directory" even if datasets `xxx.yyy.zzz` exist.
- Fixed dataset estimated size calculation so as to avoid under estimating, which could cause performance problems with some SFTP clients.
- The file permissions for non-resident datasets were being reported as 000. This has been fixed so that these datasets have a mode of 0666.

1.3.0 - June 2009

- Co:Z SFTP has been enhanced to allow for an initial directory (or dataset qualifier) to be configured.
- SMF 119 records with failure codes are written when `cozsftp` or `sftp-server` terminates unexpectedly during file transfer.
- The software license has been simplified. The Co:Z components available in source form are now distributed under a more permissive license (no longer GPL).
- In some cases, dataset estimated size was not being properly estimated. This has been corrected.
- The `allowmount` keyword has been renamed `mount` to be consistent with current `BPXWDYN` implementations.

1.2.5 - April 2009

- Co:Z SFTP has been enhanced to allow for the recall of migrated datasets.
- DTLSPAWN has been improved and renamed COZBATCH.

1.2.4 - March 2009

- The Co:Z Launcher can now launch process on not only Windows, *nix, etc, but also another z/OS machine. The target z/OS must also have the z/OS toolkit installed. A new "-local" option is available on the z/OS fromdsn and todsn commands that allows a remotely launches z/OS process to use local dataset I/O.
- Co:Z SFTP has been corrected to allow group and generic unit names on the BPXWDYN "unit=" setting.

1.2.1 - January 2009

This release has some minor fixes to Co:Z SFTP.

- Navigating alias dataset levels as a "directory" now works better.
- SMF recording can be completely disabled by setting the "nosmf" option in the SFTP_ZOS_OPTIONS environment variable.
- fixed a problem with date formatting in long directory listings while using certain locales.

1.2.0 - December 2008

- Co:Z SFTP added to the Co:Z Toolkit.
- A Beta release of Co:Z FTP-SSH Proxy has been added.

1.0.8 - June 2008

- Changed todsn command so that binary or unterminated source lines properly flow to fill up output records to their maximum size. Previously, short records could result on 128kb boundaries when the output records were variable length.
- Change the todsn command so that the fopen() option "recfm=*" is added if recfm is not specified. This causes the DCB parameters on existing output datasets to be used if not explicitly overridden.

1.0.7 - May 2008

- Changed CoZLauncher to terminate app when STOP command received.
- Changed todsn and fromdsn to honor switches that override -b.
- Changed CoZLauncher and DTLSPAWN to report region size with DEBUG level logging.
- Added the ssh-shareas property to allow the ssh client to be spawned in a separate address space if desired.

1.0.6 - March 2008

- Added the server environment variable COZ_FORCE_ICONV to force the use of iconv for translation, even if Unicode System Services is available.
- Increased performance of single byte character set translations.

1.0.5 - February 2008

Changed the -b option on fromdsn/todsn to disable all translation, even if a source or target codepage was specified.

1.0.0 - December 2007

Co:Z Toolkit initial release

1. Introduction

The Co:Z Co-Processing Toolkit for z/OS consists of the following components:

- **Co:Z SFTP:** OpenSSH SFTP extended to support Datasets, SMF logging, FTP compatible user exits, and SAF/RACF Digital Certificate authentication. See the [Co:Z SFTP User's Guide](#).
- **Co:Z Batch:** An improved replacement for BPXBATCH. This utility is often used in conjunction with Co:Z Dataset Pipes, Co:Z z/OS Utilities or Co:Z SFTP. See the [Co:Z Batch User's Guide](#).
- **Co:Z Dataset Pipes:** The Dataset Pipes commands provide flexible conversion between z/OS data sets and byte streams. These commands may be used locally or over an ssh connection. See the [Co:Z Dataset Pipes User's Guide](#).
- **Co:Z Launcher:** The Launcher is a batch utility which remotely launches a process on a distributed system, redirecting input and output from that process to traditional z/OS datasets or spool files. Remote processes are securely launched using proven SSH (Secure Shell) technology to the target platform, which may be Linux, AIX, or other Unix/POSIX environments. See the [Co:Z Launcher User's Guide](#).
- **Co:Z z/OS Utilities:** The Co:Z z/OS Utilities are z/OS Unix System Services commands that can be used to access a variety of z/OS artifacts and services. See the [Co:Z z/OS Utilities User's Guide](#).

1.1 Packaging

The Co:Z Toolkit consists of two packages:

Co:Z Toolkit for z/OS

- **Installed package elements:**
 - Co:Z install directory (zFS - 20MB)
 - Co:Z SFTP (client and server)
 - Co:Z Dataset Pipes
 - Co:Z z/OS Utilities
 - Sample scripts
 - man pages
 - Co:Z LOADLIB (PDSE - 3 cyl)
 - Co:Z Batch
 - Co:Z Launcher
 - Co:Z SAMPJCL (PDS - 1 cyl)
 - Sample JCL and PROC
- **z/OS Host requirements:**
 - V2R2 or later, with a minimum machine architecture of z10 and above
 - z/OS OpenSSH

See our [z/OS OpenSSH - Quick Install Guide](#) for additional information.

Co:Z Target System Toolkit



Note

The Target system toolkit is only required by the Co:Z Launcher and / or remote Dataset Pipes components. All other toolkit components (e.g. Co:Z SFTP) run on z/OS and do not require target system toolkit installation.

The Co:Z Target System Toolkit is supported on a wide variety of distributed platforms, including Linux, AIX, and other Unix/Posix platforms.

- **Package Contents:**

- Co:Z Launcher Agent
- Co:Z Dataset Pipes client commands

- **Target System Toolkit requirements:**

- OpenSSH sshd
- `sshd_config AllowTcpForwarding=yes` for target userid
- Source code is available for the traditional `configure, make, make install` process.

2. Installation

2.1 Co:Z Toolkit for z/OS

This section explains how to install the Co:Z Toolkit on z/OS. Once the toolkit is installed, individual components can be configured for use. For component configuration details, consult the user's guides (referenced in [Chapter 1, Introduction](#)).

For questions, please visit the [Dovetailed Technologies Co:Z Forum](#)

1. Download the Co:Z z/OS self-extracting installer file (download available from coztoolkit.com).
2. Upload `coz-vv.rr.mml.bin` file to the z/OS zFS file system. Make sure you transfer the file with a binary mode transfer option.
3. In a z/OS UNIX shell, verify that the `cksum` command (`cksum coz-vv.rr.mml.bin`) results match the checksum values provided.
4. The installation script requires a small amount of temporary space to run successfully. Ensure that your `/tmp` file system is not full.
5. The installing userid should be either `UID=0` or have `BPX.SUPERUSER` authority or have both `BPX.FILEATTR.APF` and `BPX.FILEATTR.PROGCTL` authority. These permissions are required in order to enable APF authorization on the `ssh-socket-info` utility and to mark Co:Z SFTP programs as **program controlled**. If these permissions are not available during installation, the product will still install but may not work properly if SMF recording is enabled. See the [Enabling SMF recording](#) section in the Co:Z SFTP User's Guide for additional information.
6. Make the installer file executable:

```
$ chmod +x coz-vv.rr.mml.bin
```

7. Run the installer:

```
$ ./coz-vv.rr.mml.bin
```

```
This software is licensed under the Co:Z Community License Agreement available for review at https://coztoolkit.com/docs/coz/licenses.html or as part of this install package in file LICENSE (the "License").
```

```
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```

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of an outsourcing customer or other third party? (yes or no)
no
Will an outsourcer or other third party be installing, managing, operating, or
supporting this software on your behalf? (yes or no)
no
Do you agree to the above terms and the License? (yes or no)
yes
Enter home directory (/usr/local/coz) : ❶
(Enter)
/usr/local/coz is not an existing directory, create it? (y/n) :
Y
Enter new or existing target PDSE load module library name (SYS1.COZ.LOADLIB): ❷
(Enter)
The PDSE load module library 'SYS1.COZ.LOADLIB' does not exist, create it? (y):
Y
/usr/local/coz/loadmodules/COZBATCH -> //'SYS1.COZ.LOADLIB(COZBATCH)': executable
/usr/local/coz/loadmodules/COZLNCH -> //'SYS1.COZ.LOADLIB(COZLNCH)': executable

Enter new or existing PDS for Co:Z Sample JCL and PROCs (SYS1.COZ.SAMPJCL): ❸
(Enter)
The PDS 'SYS1.COZ.SAMPJCL' does not exist, create it? (y):
Y
/usr/local/coz/sampjcl/@@README -> //'SYS1.COZ.SAMPJCL(@@README)': text
/usr/local/coz/sampjcl/COZCFGD -> //'SYS1.COZ.SAMPJCL(COZCFGD)': text
/usr/local/coz/sampjcl/COZPROC -> //'SYS1.COZ.SAMPJCL(COZPROC)': text
...

Enter PATH directory in which to create command symlinks or 'none' (/usr/local/bin): ❹
(Enter)
created symlink /usr/local/bin/catsearch -> /usr/local/coz/bin/catsearch
created symlink /usr/local/bin/cozserver -> /usr/local/coz/bin/cozserver
created symlink /usr/local/bin/cozsftp -> /usr/local/coz/bin/cozsftp
created symlink /usr/local/bin/fromdsn -> /usr/local/coz/bin/fromdsn
created symlink /usr/local/bin/pdsdir -> /usr/local/coz/bin/pdsdir
created symlink /usr/local/bin/read_passwd_dsn.sh
        -> /usr/local/coz/bin/read_passwd_dsn.sh
created symlink /usr/local/bin/saf-ssh-agent -> /usr/local/coz/bin/saf-ssh-agent
created symlink /usr/local/bin/safauth -> /usr/local/coz/bin/safauth
created symlink /usr/local/bin/todsn -> /usr/local/coz/bin/todsn
created symlink /usr/local/bin/zsym -> /usr/local/coz/bin/zsym

FOMF0303I /usr/local/bin/ssh-socket-info: chattr() error: rv=-1, errno=8B, rsn=0924041A ❺
***
Unable to set extended attributes for program bin/ssh-socket-info
- see installation guide for more information
***

You should update user profiles so that MANPATH contains: /usr/local/coz/doc/man

*** Co:Z Installation complete ****
(see README and LICENSE in install root directory for more information)

```

- ❶ Enter the name of a new or existing zFS or HFS directory that will become the top-level "home" directory for the Co:Z Toolkit installation. This directory must be in a filesystem that is writable by the installing user and contains 12MB of free space. If you supply the name of an existing directory that is not empty, you will be prompted to continue, as it is not generally advisable to overlay an existing installation with a new version.
- ❷ The fully-qualified name of the PDSE library to contain the Co:Z Launcher and Co:Z Batch program objects. If this dataset exists, it must be a PDSE and existing Co:Z load modules will be replaced.

- ③ The fully-qualified name of the PDS library to contain sample JCL for the Co:Z Toolkit. If this dataset exists, it must be RECFM=FB,LRECL=80 and existing members with the same names will be replaced.
- ④ Several Co:Z Toolkit Unix commands, such as **cozsftp**, **fromdsn**, **todsn**, etc. should be made available in user's PATH. One option is to customize /etc/profile to add <COZ_HOME>/bin to the PATH, but an alternative is to create symbolic links in an existing PATH directory to the Co:Z user commands in <COZ_HOME>/bin.

To have the installation script create symbolic links, enter the name of the existing directory in which to create the links, or none to skip. When creating symlinks, this script will prompt you before replacing existing symlinks or files.

The <COZ_HOME>/install/create-symlinks.sh script can be used to create these links at a later time, or to replace links to one Co:Z home directory (version) with links to another. See the comments in this script for more information and example usage.

- ⑤ These messages will appear if the installing userid does not have READ access to the BPX.FILEATTR.APF SAF resource. Co:Z will install properly and can be used, but the SMF socket information is not guaranteed to be accurate. A similar error will occur if BPX.FILEATTR.PROGCTL permission is not available to mark Co:Z SFTP programs as "program controlled"
8. z/OS OpenSSH is a prerequisite for Co:Z. Proper configuration and tuning of z/OS OpenSSH can greatly improve overall performance, specifically for z/OS ssh client startup times. See our [IBM z/OS OpenSSH - Quick Install Guide](#) for additional information.
 9. Review the @@README member of the PDS containing Co:Z Sample JCL and PROCS. Review the following component specific members ensuring that they have been correctly tailored for your configuration by the installation process:
 - **Co:Z Launcher and Dataset Pipes:** COZPROC and COZCFGD
 - The RUNLNCH, RUNLNCHK, and RUNLNCHP are basic Co:Z Launcher samples using different authentication methods. Additional [examples](#) can be found in the User's Guide.
 - **Co:Z SFTP:** SFTPPROC and SFTPIND
 - While other samples are provided, the SFTPSAMP member contains sample JCL for the preferred method of using the Co:Z SFTP client in batch. These samples use the Co:Z SFTP batch scripts installed in <COZ_HOME>/samples/sftp_batch. See [Using the Co:Z SFTP client in batch](#) in the User's Guide for additional information.
 10. For additional configuration and usage information, refer to the individual component User's Guides:
 - [Co:Z SFTP User's Guide](#)
 - [Co:Z Batch User's Guide](#)
 - [Co:Z Dataset Pipes User's Guide](#)
 - [Co:Z Launcher User's Guide](#)
 - [Co:Z z/OS Utilities User's Guide](#)

2.2 Co:Z Target System Toolkit



Note

These steps are required only if you wish to use POSIX as a Target system for the Co:Z Launcher or the Dataset Pipes commands remotely. *You do not need to install Co:Z on a remote system in order to use Co:Z SFTP.*

Configure and test sshd

Most Linux and Unix distributions include *OpenSSH*. Follow the instructions for your operating system for installing and configuring the OpenSSH server (sshd) on your system.

1. Test logging into ssh locally

```
linux$ ssh <userid>@localhost
The authenticity of host 'localhost (127.0.0.1)' can't be established.
RSA key fingerprint is cc:7c:3d:b5:3e:43:5a:6f:12:e2:1a:af:80:45:ae:fa.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'localhost' (RSA) to the list of known hosts.
<userid>@localhost's password: *****

linux$ logout
Connection to localhost closed.
```

2. Test Linux ssh from z/OS:

Repeat the above test from your z/OS userid to confirm that there are no firewall issues.

```
ZOS$ ssh -p <port> <userid>@linux_host
```

Build and Install Co:Z Target System Toolkit

Note: These sources have been tested on a variety of POSIX systems, but we offer no guarantees for your particular system. If you have difficulty building, please feel free to contact us regarding our testing and certification schedule.

1. Transfer (in binary) the Co:Z Target System Toolkit source tarball `coz-toolkit-v.r.m.tar.gz` from the website [downloads page](#) to your target system.
2. Extract the source:

```
$ tar -xzvf ../coz.v.r.m-src.tar.gz
```

3. Build:

AIX Note: If you wish to build with x1C, you will need to export `CXX=x1C` and export `CXXFLAGS=-qarch=pwr5` prior to the following steps.

```
$ cd coz-toolkit-v.r.m
$ ./configure
$ make
```

4. Install:

Note: root access will be required to install at the default location, which is `/opt/dovetail/coz`

```
# make install
```

Note: the installation directory must be in the default `PATH` used when logging into `sshd`. On some some distros, you may need to update `/etc/profile` to add these binaries to `PATH`.

Appendix A. Setting up a test OpenSSH system on z/OS

It's sometimes convenient to create your own z/OS SSHD server on an alternate port for testing purposes. You can do this without any special privileges, and the SSHD server will run fine, except that it will only allow logins for the userid that it is running under.

This is especially handy if your Systems Programmer doesn't understand immediately that adding an SSH user subsystem doesn't introduce any new security risks.

Procedure A.1. General outline for adding a test SSHD server

1. Create your own ssh directory, say `~/sshd`, and copy the file `/etc/ssh/sshd_config` into it:

```
zos$ mkdir ~/sshd
zos$ cp /etc/ssh/sshd_config ~/sshd
```

2. In this directory, generate your host keys, as directed in the z/OS OpenSSH User's Guide.

If you can copy the keys in `/etc/ssh` directory, then you will avoid "host key" mismatch problems if you switch your SSH client from the production to the test server. If you do copy the production host keys, make sure that you change the file permissions to `600` so that they can't be read by others.

3. Edit your copy of `sshd_config`:

- a. Uncomment the `Port` line and set it to an available port
- b. Uncomment / add the following lines (to use the private keys generated in the previous step):

```
HostKey ./ssh_host_rsa_key
HostKey ./ssh_host_dsa_key
```

4. From a z/OS shell, change to the directory that you created and start your copy of SSHD:

```
/usr/sbin/sshd -e -D -f ./sshd_config
```

Note: If you are unable to execute `/usr/sbin/sshd`, you may be able to copy it to your local directory, add the execute bit (`chmod +x ~/sshd/sshd`) and run the above command using this local copy.

5. To connect to your test SSHD server from a client, don't forget to use the `-ssh -p port` SSH option on your ssh commands.

Appendix B. License

The Co:Z Co-Processing Toolkit for z/OS, comprised of Co:Z Launcher, Co:Z Dataset Pipes, Co:Z SFTP, Co:Z Batch, Co:Z Utilities and Co:Z Target System Toolkit (in object code form only) is distributed under the Co:Z Community License Agreement (see below). *Note:* This community license is superseded for Co:Z Toolkit Enterprise License and Support customers. All components are distributed in binary form.

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Dovetailed Technologies, LLC
305 Willowpointe Drive
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1)
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```

```
[Tatu continues]
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```

```
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```

```
[The licence continues]
```

```
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*
* Optimised ANSI C code for the Rijndael cipher (now AES)
*
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* @author Antoon Bosselaers <antoon.bosselaers@esat.kuleuven.ac.be>
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