Chapter 4

Overview: CMOST I/O Commands and CMFS Library Routines

The CMFS library routines and the CMOST I/O commands can operate on the SFS, CMFS, and UNIX files. This chapter provides an overview of this software's functionality.

4.1 The CMOST I/O Commands

The CMOST I/O commands, issued from within a shell, perform typical file or file system manipulation tasks, such as copying, moving, and deleting files, and building, deleting, and listing the contents of a directory. Table 4 lists all the CMOST I/O commands supported on the CM-5. Manual pages for the CMOST I/O commands are in Chapter 12 of this manual.

As the table shows, many of the CMOST I/O commands are simply UNIX commands with a "cm" prefix; in general, these CMOST I/O commands are comparable to the corresponding UNIX commands. The CMOST I/O commands printed in boldface in the table, however, provide either significantly greater functionality than their UNIX counterparts, or functionality that UNIX does not provide at all. Since these commands enhance CM-5 file system functionality and/or performance, you should take advantage of them even if you choose to use UNIX commands for the majority of CM-5 file system operations.

The CMOST I/O commands can operate on a file within a CMFS file system or an SFS file system (or other UNIX file system), depending on how the **`CMFS_PATHTYPE`** environment variable is set (see Section 1.4.1 of Chapter 1).

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Table 4. The CMOST I/O commands.

NOTE: The **CMFS_PATHTYPE** environment variable determines whether these commands operate on files within the CMFS file system, the SFS file system (or other UNIX file system), or both. The boldfaced commands provide either significantly greater functionality than their UNIX counterparts, or functionality that UNIX does not provide at all.

Command Name	Synopsis
cmchgrp	Changes the group ownership of a file.
cmchmod	Changes the permissions mode of a file.
cmchown	Changes the owner of a file.
cmcmp	Compares two files, byte by byte.
cmcp	Copies one or more CMFS, SFS, or UNIX files into another file or directory within that file system or a different one.
cmdd	Converts and copies files with various data formats.
cmdf	Displays free and used disk space for a file system.
cmdu	Summarizes disk usage for a file system.
cmdump	Archives files.
cmfind	Finds files.
cmglob	Prints the files that match the specified pattern(s), which enables wildcarding.
cmln	Makes links to files or directories.
cmls	Lists a file system directory's contents.
cmmkdir	Makes a file system directory.
cmmknod	Makes a CM character-special file.
cmmv	Moves (renames) a file or directory.
cmptruncate	Truncates or extends a file.
cmrestore	Extracts files from an archive made by **cmdump**.
cmrm	Removes (unlinks) a file or directory.
cmrmdir	Removes (unlinks) an empty file system directory.
cmstat	Prints information about a file, including its mode, size, and time of last access.
cmtar	Creates or extracts a tape archive.
cmtruncate	Truncates or extends a file.
copyfromdv	Copies a CMFS, SFS, or UNIX file into an SFS file (or other UNIX-system file).

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Table 4. The CMFS user commands *(continued).*

NOTE: The **CMFS_PATHTYPE** environment variable determines whether these commands operate on files within the CMFS file system, the SFS file system (or other UNIX file system), or both. The boldfaced commands provide either significantly greater functionality than their UNIX counterparts, or functionality that UNIX does not provide at all.

Command Name	Synopsis
copytodv	Copies an SFS file (or other UNIX-system file) to an SFS, CMFS, or UNIX file.
dvcp	Copies one or more CMFS, SFS, or UNIX files into another file or directory within that file system or another file system, using the CM-5 networks and PNs for performance enhancement.
ibmtape	Imports/exports IBM data sets to/from a file system.
itsdd†	Provides **cmdd** functionality for the ITS.
itsdump†	Provides **cmdump** functionality for the ITS.
itsibmtape†	Provides **ibmtape** functionality for the ITS.
itsrestore†	Provides **cmrestore** functionality for the ITS.
itstar†	Provides **cmtar** functionality for the ITS.
pcp	Copies one or more SFS or other UNIX-system files into another file or directory within that file system or another UNIX-compatible one. Supports symbolic link copying.

† These commands are not discussed in this manual; see the *ITS User's Guide*.

4.1.1 The CMFS Library Routines

The CM-5 CMFS library routines, listed in Table 5, enable you to manipulate directories, files, and their data from within a program. Most CMFS library routines have both a C-languages interface and a Fortran-languages interface:

- The C interface is used by programs written in C or C*.
- The Fortran interface is used by programs written in Fortran 90, Fortran 8x, FORTRAN 77, or CM Fortran.

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As the table shows, many of the CMFS routines are simply UNIX routines with a "CMFS" prefix; in general, these CMFS routines are comparable to the corresponding UNIX routines. The CMFS routines printed in boldface in the table, however, provide either significantly greater functionality than their UNIX counterparts, or functionality that UNIX does not provide. Since these routines enhance CM-5 file system functionality and/or performance, you should take advantage of them even if you choose to use UNIX routines for the majority of CM-5 file system operations.

The CMFS routines can operate on a file within a CMFS file system or an SFS file system or other UNIX file system, depending on how the **CMFS_PATHTYPE** environment variable is set.

Table 5. The CM-5 CMFS library routines.

NOTE: The **CMFS_PATHTYPE** environment variable determines whether these routines operate on files within the CMFS file system, the SFS file system (or other UNIX file system), or both. The boldfaced routines provide either significantly greater functionality than their UNIX counterparts, or functionality that UNIX does not provide at all.

Routine Name	Synopsis
CMFS_access	Determines the accessibility of a file.
CMFS_chdir	Changes the current working directory.
CMFS_[f]chmod	Changes a file's mode.
CMFS_[f]chown	Changes a file's owner and group.
CMFS_close	Closes a file.
CMFS_close_all_files	Closes all files; breaks TCP connections.
CMFS_closedir	Closes the directory and releases pointer.
CMFS_close_files_on_server	Closes server's files; breaks TCP connection.
CMFS_creat	Creates or recreates a file.
CMFS_errmessage	Stores the error message associated with the latest CMFS library error in a buffer.
CMFS_errno	Stores the last error's error number.
CMFS_fcntl	Controls various characteristics of a file.

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Table 5. The CM-5 CMFS library calls *(continued)***.**

NOTE: The **CMFS_PATHTYPE** environment variable determines whether these routines operate on files within the CMFS file system, the SFS file system (or other UNIX file system), or both. The boldfaced routines provide either significantly greater functionality than their UNIX counterparts, or functionality that UNIX does not provide at all.

Routine Name	Synopsis
CMFS_fdopen	Associates a CMFS file descriptor with a UNIX file descriptor.
CMFS_get_cmio_busid	Returns the current CMIO bus ID of the file's device.
CMFS_get_cmio_busids	Returns a list of CMIO bus IDs that connect the given file to the device that called the routine.
CMFS_getwd	Returns the current CMFS file system's current working directory.
CMFS_glob	Prints the files that match the specified pattern(s), which enables wildcarding.
CMFS_ioctl	Supports an I/O subsystem device driver.
CMFS_lseek	CM-5 version currently equivalent to **CMFS_serial_lseek** (preferred).
CMFS_mkdir	Makes a directory.
CMFS_mknod	Creates a CMFS character-special file.
CMFS_open	Opens or creates and opens a file.
CMFS_opendir	Opens a directory and returns an identifying pointer.
CMFS_perror	Interprets an error condition.
CMFS_physical_ftruncate	Truncates or extends an open file.
CMFS_physical_lseek	Moves the read/write pointer associated with an open file.
CMFS_physical_transfer_length	Returns the number of bytes that a call to **CMFS_read|write_file_physical** will transfer. Available from C* only.
CMFS_read_file	Same as **CMFS_read_file_always** (preferred).

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Table 5. The CM-5 CMFS library calls *(continued)*.

NOTE: The **CMFS_PATHTYPE** environment variable determines whether these routines operate on files within the CMFS file system, the SFS file system (or other UNIX file system), or both. The boldfaced routines provide either significantly greater functionality than their UNIX counterparts, or functionality that UNIX does not provide at all.

Routine Name	Synopsis
CMFS_read_file_always	Performs synchronous CM I/O (i.e., file to PNs). Available from a parallel language (C* or CM Fortran) only.
CMFS_read_file_physical	Performs synchronous CM I/O (i.e., file to PNs). This routine is faster but less flexible than **CMFS_read_file_always** and is available from C* only.
CMFS_readdir	Returns a pointer to the next directory entry.
CMFS_rename	Renames a file.
CMFS_rmdir	Removes a directory.
CMFS_scandir	Builds array of pointers to a directory's entries.
CMFS_seekdir	Sets position of the next directory read operation.
CMFS_serial_dftruncate_file	Truncates or extends an open file.
CMFS_serial_dlseek_file	Moves the pointer of an open file.
CMFS_serial_lseek	Moves the pointer of an open file.
CMFS_serial_lftruncate_file	Truncates or extends an open file.
CMFS_serial_llseek	Moves the pointer of an open file.
CMFS_serial_read_file	Reads into the memory of a client that is a serial computer.
CMFS_serial_[f]truncate_file	Truncates or extends an open file.
CMFS_serial_write_file	Writes from the memory of a client that is a serial computer.
CMFS_set_cmio_busid	Selects the CMIO bus that will be used in subsequent operations.
CMFS_set_debug_mode	Enables/disables automatic CMFS debug-message printing.

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Table 5. The CM-5 CMFS library calls *(continued)***.**

NOTE: The **CMFS_PATHTYPE** environment variable determines whether these routines operate on files within the CMFS file system, the SFS file system (or other UNIX file system), or both. The boldfaced routines provide either significantly greater functionality than their UNIX counterparts, or functionality that UNIX does not provide at all.

Routine Name	Synopsis
CMFS_[f]stat	Obtains file status information.
CMFS_statfs	Obtains file system statistics.
CMFS_sys_errlist	Returns an error message, given an index.
CMFS_sys_nerr	Returns the number of error messages provided for in the **sys_errlist** table.
CMFS_telldir	Returns a pointer to the current directory location.
CMFS_[f]truncate_file	Currently not supported on CM-5.
CMFS_unlink	Removes a file from its directory.
CMFS_utimes	Sets file times.
CMFS_vmeio_allocate	Allocates DRAM on a VMEIO host computer.
CMFS_vmeio_free	Frees a buffer on a VMEIO host computer.
CMFS_write_file	Same as **CMFS_write_file_always** (preferred).
CMFS_write_file_always	Performs synchronous CM I/O (i.e., PNs to file). Available from a parallel language (C* or CM Fortran) only.
CMFS_write_file_physical	Performs synchronous CM I/O (i.e., PNs to file). This routine is faster but less flexible than **CMFS_write_file_always** and is available from C* only.

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