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1 DFU

Disk and File Utilities (DFU) is a high performance utility developed to perform routine maintenance and special purpose operations on ODS-2 disk volumes, files and directories. The functionality offered by DFU is not or partly available through other DCL commands or VMS utilities. Minimal support for some ODS-5 file information is provided.

DFU has the following functions:

Command	Description
DEFRAGMENT	defragment individual files or an entire disk
DELETE	delete files by file-id, and delete directory(trees) efficiently
DIRECTORY	COMPRESS, DUMP or RECOVER directories, search directories for files with multiple versions, alias files, or empty directories
DO_TO_ALL_DISKS	execute a DCL command in parallel subprocesses one per mounted disk
FAST COPY, FAST COPY/DEVICE, FAST ERASE	faster file and device operations
INDEXF	analyze, defragment truncate and extend INDEXF.SYS
REPORT	reports disk fragmentation
REVERSION	reversions files back to starting at ;1
SEARCH	search for files
SET	set file attributes
UNDELETE	recover deleted files
VERIFY	analyze (and repair) the disk structure

restrictions

DFU has the following restrictions:

- ◆ DFU cannot handle volume sets with more than 32 disks.
 - ◆ DFU runs on Alpha, IA64, and x86 architectures, OpenVMS V7.3-2 or higher.
 - ◆ DFU handles files names as case-blind. There is no support for case-sensitive filenames.
-

DEFRAG

The defrag option is used to defragment a single file or files or an entire volume.

Format

DEFRAG file1,file2,...,@file3 (/DEVICE=device/BESTTRY)

PARAMETERS

file

Specify a file (or list of files) with a full file specification or a logical name. Also, indirect command file may be used, e.g.: DEFRAG @DEFRAG.COM(/DEVICE=device). Thus, it is possible to generate a list with SEARCH device/OUTPUT=file and use that file as input to the DEFRAG command. The list generated by DFU SEARCH will contain the device name in the file specification. If there is a list of file from another source which does not contain the device name, the /DEVICE qualifier must be used to append the device name to the file.

QUALIFIERS

/BESTTRY

This qualifier directs DFU to create a file using the contiguous-best-try method. Default DFU tries to make a completely contiguous file. On highly fragmented or used disks this may be impossible.

/DEVICE=device_name

Append the device-name to the filename.

/DISK

Defragment the specified device rather than a file.

The model used is based on a 4-pass strategy:

- ◆ Pass 1: for any non-contiguous files, attempt to defragment them into existing exactly sized free space (in other words, for a 500 block file, look for a 500 block free space).
- ◆ Pass 2: for any non-contiguous files, attempt to defragment them into a 'best fit' block of free space.
- ◆ Pass 3: consolidate free space by moving files out of the largest block of free space into other matching free space blocks.
- ◆ Pass 4: consolidate free space by moving files out of the largest block of free space into a 'best fit' block of free space.

/EXCLUDE

/EXCLUDE=(*<org[,org...]>*[FILE=(*fnm[,fnm...]*)] /EXCLUDE=(INDEXED | RELATIVE | SEQUENTIAL | DIRECT | SPECIAL | FILE=...)

When used with /DISK, allows files to be excluded from defragmentation operations based on organization or file name. Multiple file organizations may be specified. Files may be excluded by wildcarded name/type. Multiple names may be specified.

/LBN=<logical-block-number>

Move a single file to the target logical block number. This is faster than having the file system search for a new LBN location. Caution: Use this qualifier only for processing a single file, not a list of files. If there is not enough contiguous free space available at the target LBN, Defrag will fail with a DEVICEFULL error.

/MAXSIZE=n

Avoid moving files larger than n blocks. Requires /DISK.

/PASSES=number

Number of iterations for defragmenting with /DISK. Sequentially execute phases 1 through 4 the specified number of passes. Defaults to 1 pass. Requires /DISK.

/STATISTICS

/STATISTICS /NOSTATISTICS (default) Controls whether CPU and I/O consumption of the command are shown.

/UNTIL=<absolute-or-delta-time>

Controls whether the defragment operation will be terminated after the specified time. When the time period has been reached, the operation will terminate at the end of the file currently being defragmented (i.e., if the file takes 5 minutes to defragment, and the timer expires after one minute, the current file will complete and no further files will be defragmented). This is similar to how CTRL/C functions.

Absolute time includes a specific date or time of day. An absolute date/time has one of the following formats:

- ◆ dd-mmm-yyyy
- ◆ hh:mm:ss.cc
- ◆ dd-mmm-yyyy:hh:mm:ss.cc
- ◆ "dd-mmm-yyyy hh:mm:ss.cc"
- ◆ BOOT
- ◆ LOGIN
- ◆ TODAY
- ◆ TOMORROW

◆ YESTERDAY

You can omit any of the trailing fields in the date or time. You can omit any of the fields in the middle of the format as long as you specify the punctuation marks, for example, "-mmm-yyyy hh".

Delta time is an offset from the current time to a time in the future. Delta time has the following format:

◆ "+[dddd-][hh:mm:ss.cc]"

You can truncate delta time after the hour field. You can also omit any of the fields after the hour field format as long as you specify the punctuation marks.

Combination time consists of an absolute time value plus or minus a delta time value. Combination time can use either of the following formats:

◆ "[absolute time][+delta time]"

◆ "[absolute time][-delta time]"

You can omit the absolute time value. If you do, the delta time is offset from the current date and time. Whenever a plus sign (+) precedes the delta time value, enclose the entire time specification in quotation marks.

/WRITECHECK

/WRITECHECK /NOWRITECHECK (default) Performs a write check on the resultant file after the defragment operation.

DO_TO_ALL_DISKS

This command executes a DCL command in a subprocess for each mounted volume. Up to 32 simultaneous subprocesses (limited by available PRCLM) in parallel are executed. Within the command string, "<vol>" and "<dev>" are replaced by corresponding volume name or device name for each selected disk. The DO_TO_ALL_DISKS command waits until all spawned subprocesses have completed.

To be considered for use by the DO_TO_ALL_DISKS command, a disk volume must be:

- ◆ Mounted /SYSTEM
- ◆ Marked software valid
- ◆ Not allocated to a process
- ◆ Not dismount in progress state
- ◆ Not in any mount verification state
- ◆ Not timed out state
- ◆ Not mounted /FOREIGN
- ◆ Not a member of a host-based shadow set
- ◆ Not an DFS, NFS, or DNFS device

Syntax for the DO_TO_ALL_DISKS command requires that qualifiers /OUTPUT and /SUBPROCESS_LIMIT follow DO_TO_ALL_DISKS and precede [command-string]. "<vol>" and/or "<dev>" must exist in [command-string].

Requires enough deductible and pooled quotas (e.g. BYTLM, CPULM, ENQLM, FILLM, PGFLQUOTA, TQELM, PRCLM) to execute the command in up to 32 subprocesses.

Format

DO_TO_ALL_DISKS command-string

QUALIFIERS

/OUTPUT=file

/OUTPUT=file directs subprocesses to send output to the file specification. As each subprocess has its own output file, multiple subprocesses will write to multiple files of the same file name.

/SUBPROCESS_LIMIT=n

Limits the number of subprocesses. Minimized with 32 and available PRCLM. Maximized with 1. Setting /SUBPROCESS_LIMIT to 1 causes disks to be processed serially.

DELETE

The Delete command serves 2 purposes:

- ◆ Delete files by File-id
- ◆ Delete complete directories and directory trees very fast

Deleting files by file id's (with the /FILE qualifier) can be useful in removing files which are no longer in a directory (e.g. files marked for delete). Deleting a directory (with the /DIRECTORY qualifier) is many times faster than the normal DCL delete command, especially for large directories. The /TREE qualifier can be used to delete a complete directory tree with just one command. The /FILE and /DIRECTORY command cannot be combined.

Syntax :

- ◆ DELETE device/FILE=file-id
 - ◆ DELETE full-directory-file-name /DIRECTORY(/Qualifiers)
-

QUALIFIERS

/DIRECTORY

This qualifier directs DFU to delete the complete contents of the specified directory, followed by a delete of the directory file itself. See also the /TREE qualifier. The parameter must specify a full directory file name. Wildcards may be used. Examples :

```
DFU> DELETE mydisk:[000000]gone.dir/DIRECTORY
```

gone.dir will be deleted with its contents.

```
DFU> DELETE/DIRECTORY mydisk:[maindir.subdir]removethis.dir
```

removethis.dir will be deleted with its contents.

/FILE=file-id

The full 3 number file-id of the file to be deleted. In combination with the required device parameter this results in a unique file. To avoid possible errors a full file id is required. Example :

```
DFU> DELETE mydisk/FILE=(234,567,1)
```

/KEEP

/NOKEEP (default)

Used with DELETE/DIRECTORY(/TREE). This qualifier directs DFU to delete the contents of the directory(tree) but to preserve the directory files.

/LOG (default)

/NOLOG

This qualifier is used only with the /DIRECTORY qualifier. Default DFU will report each deleted file. This can be suppressed with /NOLOG.

/NOREMOVE

/REMOVE (default)

This qualifier can only be used with /FILE. Default DFU will also try to remove the file from the parent directory. For lost or marked-for-delete files this is not possible, and the DELETE command will probably fail. The /NOREMOVE qualifier will override the default behavior.

/STATISTICS

/NOSTATISTICS (default)

Controls whether CPU and I/O consumption of the command are shown.

/TREE

This qualifier is only used in combination with /DIRECTORY. Starting with the specified directory all (sub)directory contents and all (sub)directory files will be deleted.

DIRECTORY

The DIRECTORY command provides 7 different functions depending on the qualifiers used.

- ◆ DIRECTORY/COMPRESS file – Compresses one or more directories
- ◆ DIRECTORY/DUMP file – Provides a block level dump of a directory
- ◆ DIRECTORY/REBUILD_MFD device – Recovers a corrupted MFD directory (000000.DIR)
- ◆ DIRECTORY/RECOVER file – Recovers a corrupted directory
- ◆ DIRECTORY/ALIAS device – Searches all directories on the device for alias file entries
- ◆ DIRECTORY/EMPTY device – Searches the disk for empty directories
- ◆ DIRECTORY/VERSION=n device – Searches all directories on the device for files which have at least n versions
- ◆ DIRECTORY/FILES=n device – Searches all directories on the device that have at least n file entries

Qualifiers /ALIAS, /EMPTY, and /VERSION can be combined in one command. Other combinations of qualifiers are not possible.

PARAMETERS

file,(@file)

The /COMPRESS , /DUMP and /RECOVER qualifier require a directory-file name as a parameter. A logical name or an indirect command file can also be used as a parameter e.g.: DIR/COMPRESS @DIR.COM . Thus, it is possible to generate a list with SEARCH device/OUTPUT=file and use that file as input to the DIRECTORY command. The list generated by DFU SEARCH will contain the device name in the file specification. If a list of files is used from another source which does not contain the device name, the /DEVICE must be used to append the device name to the file.

device

The /ALIAS, /EMPTY , /REBUILD_MFD and /VERSION qualifier require a device name as a parameter.

QUALIFIERS

/ALIAS

Scan all directories on a disk for alias files.

/COMPRESS

Recreates and compresses the directory. Because directories are alphabetically sorted files, deleting and entering files randomly will create 'holes' in directory files. /COMPRESS will remove these holes by rebuilding and truncating the directory.

/DEVICE=device-name

Append the device name to the directory-file name. Can only be used with /COMPRESS or /DUMP

/DISPLAY_NAME

Changes output format for a directory from a directory specification (e.g. DEV:[FOO.BAR]) to a directory file name (e.g. DEV:[FOO]BAR.DIR;1). Has an effect on a subset of the DIRECTORY functions.

/DUMP

Produces a dump of the directory file block by block. This command may be useful for debugging corrupted or suspected directories.

/EMPTY

Scan the disk for empty directories.

/FILES=n

Searches all directories on the device that have at least n file entries.

/FILL_FACTOR

/FILL_FACTOR=percentage This qualifier is only valid in combination with /COMPRESS. Default behavior for DFU is to compress a directory as tight as possible; this is equivalent to /FILL_FACTOR=100. By choosing a lower fill factor value DFU will leave some free space in each directory block. /FILL_FACTOR may be between 50 and 100 %. Caution : choosing a fill factor value lower than 100% may fail if the directory file is not large enough. In that case DFU will signal an error and advise using a higher fill factor value.

/FORMAT

/FORMAT=format_string Used with /VERSION and /OUTPUT. Create an output file using the format as described in format_string. The format string MUST contain the !AS directive; DFU fills in the resultant file there. Example :

```
DFU> DIR/VERSION=3/OUT=P.COM/FORMAT="$purge !AS"
```

/OUTPUT

/OUTPUT=filename This qualifier redirects the output from DFU to an output file.

/REBUILD_MFD

Rebuilds the disk's 000000.DIR directory and makes sure the file backlinks to itself.

/RECOVER

Rebuilds a corrupted directory file. Do not use this command on critical (system)directories!

/STATISTICS

/NOSTATISTICS (default)

Controls whether CPU and I/O consumption of the command are shown.

/TEST

This qualifier can be used only in conjunction with /COMPRESS. When /TEST is specified DFU will show the results of a directory compression without actually performing a compress operation.

/TRUNCATE

/TRUNCATE(=n) This qualifier is only valid in combination with /COMPRESS. After compressing a directory DFU will NOT truncate the empty blocks at the end of the directory, unless /TRUNCATE is specified. A number 'n' may be specified to let DFU truncate no further than 'n' blocks ('n' will be rounded up to a multiple of the disks cluster size). Example: a 60 block directory A.DIR can be compressed to 20 blocks. The results are:

- ◆ DIR/COMPRESS --> A.DIR size 20/60 blocks
- ◆ DIR/COMPRESS/TRUNCATE --> A.DIR size 20/20 blocks
- ◆ DIR/COMPRESS/TRUNCATE=40 --> A.DIR size 20/40 blocks

/VERSION

/VERSION=n Scan all directories of a given device for files which have at least 'n' versions.

FAST COPY

Local disk device or file copy using buffer objects and fast IO system services. Often much faster than BACKUP, COPY, CONVERT, etc. for moving files from one location to another. Input and output must be disk base devices or files. Requires process hold the identifier VMS\$BUFFER_OBJECT_USER.

Format

FAST COPY input output

PARAMETERS

input

Specifies the name of an existing file or device to be copied.

For files, the asterisk (*) and the percent sign (%) wildcard characters are allowed for files. For files, if you do not specify the device or directory, the COPY command uses your current default device and directory.

For devices, the input device must be mounted.

output

Specifies the name of the output file or device into which the input is copied.

For files, you must specify at least one field in the output file specification. If you do not specify the device or directory, the COPY command uses your current default device and directory. The COPY command replaces any other missing fields (file name, file type, version number) with the corresponding field of the input file specification. If you specify more than one input file, the COPY command generally uses the fields from the first input file to determine any missing fields in the output file.

For devices, the target output device must be mounted /FOREIGN and allocated to the current process. The output device will be overwritten.

QUALIFIERS

/BLOCKS=n

This qualifier specifies the number of disk blocks per IO. Default is 256. Minimum is 1, maximum is 2048.

/BUFFERS=n

This qualifier specifies the number of IO buffers for the input stream and for the output stream. Default is 8. Minimum is 1, maximum is 32. This value also represents outstanding read IO count and outstanding write IO count.

/CACHE

For files, this qualifier directs DFU to perform IO operations that may read-from or write-through the XFC cache. By default, DFU will avoid the XFC cache by specifying the flag `IO$M_NOVCACHE` on IO read and write IO requests. Specifying `/CACHE` removes the flag.

/DELETE

For files, this qualifier directs DFU to delete input file(s) after they are copied. Default `NODELETE`.

/DEVICE

Indicates that the fast copy operation is for a physical device to a physical device. Destroys prior content of output device.

Intended to be used as a faster and more efficient alternative to using a shadow copy or `BACKUP /PHYSICAL`. Useful for doing a physical device replication prior to adding as a new shadow set member. By default (re)initializes target device with random label to ensure it doesn't appear to be a good shadow member.

Requires `LOG_IO` privilege. Requires that the input device is mounted. Requires that the output device is mounted `/FOREIGN` and allocated to the current process. Copies the lesser of the input device size and the output device size. The target device is dismounted at the end of the copy (before the initialize).

/EXPEDITE

This qualifier directs DFU to specify the `FIO$M_EXPEDITE` flag to potentially cause IO read and write requests to be placed ahead of existing read or write IO requests from other processes. By default, DFU does not use the `FIO$M_EXPEDITE` flag.

/INTERLOCK

For files, by default, DFU opens input files with `"fab$b_shr = FAB$M_SHRGET"`. If `/NOINTERLOCK` is specified, DFU opens input files with `"fab$b_shr = FAB$M_SHRGET | FAB$M_SHRPUT | FAB$M_SHRDEL | FAB$M_SHRUPD | FAB$M_UPI"` such that this program can read the file (presumably an RMS indexed file) without any locking taking place. If the file is opened by the other process with `"fab$b_shr = FAB$M_NIL"`, then DFU is still not able to open it.

/FIRSTBLOCK=n

For devices, specifies the lowest logical block number to copy. Defaults as zero (the first block of the device).

/LASTBLOCK=n

For devices, specifies the highest logical block number to copy. Defaults as the lesser of the input device size and the output device size.

/INITIALIZE

For devices, indicates that after copying all blocks, the target device is initialized with a random volume label string to assist in prevention of errant shadow operations. The default is to initialize.

FAST ERASE

Local file erasure using buffer objects and fast IO system services. Often much faster than alternatives to erase the content of on-disk files filling with either zeros or random data. Output must be local disk based files. Requires process hold the identifier VMS\$BUFFER_OBJECT_USER.

Format

FAST ERASE output

PARAMETERS

output

Specifies the name of the output file(s) to be erased.

You must specify at least one field in the output file specification. If you do not specify the device or directory, the ERASE command uses your current default device and directory.

QUALIFIERS

/BLOCKS=n

This qualifier specifies the number of disk blocks per IO. Default is 256. Minimum is 1, maximum is 2048.

/BUFFERS=n

This qualifier specifies the number of IO buffers for the output stream. Default is 8. Minimum is 1, maximum is 32. This value also represents outstanding write IO count.

/CACHE

For files, this qualifier directs DFU to perform IO operations that may write-through the XFC cache. By default, DFU will avoid the XFC cache by specifying the flag IO\$M_NOVCACHE on IO read and write IO requests. Specifying /CACHE removes the flag.

/DELETE

For files, this qualifier directs DFU to delete input file(s) after they are erased. Default NODELETE.

/EXPEDITE

This qualifier directs DFU to specify the FIO\$M_EXPEDITE flag to potentially cause IO write requests to be placed ahead of existing read or write IO requests from other processes. By default, DFU does not use the FIO\$M_EXPEDITE flag.

EXIT

Leave DFU (return to DCL)

HELP

Displays this text

INDEXF

The INDEXF command is used to analyze, defragment, truncate or extend the INDEXF.SYS file. The analyze option reports the current fragmentation state, whereas the defragment and extend option allows defragmentation or pre-extending of INDEXF.SYS. Truncate is an option which trims down INDEXF.SYS to the end-of-file size. To perform a defragment truncate or extend operation the disk must be completely dismounted. Defragment truncate and extend require VOLPRO privilege. Defragment truncate and extend can not be done on the system disk.

Syntax :

INDEXF device/Qualifiers

QUALIFIERS

/ANALYZE

Displays information about the number of fragments in INDEXF.SYS and the largest contiguous free space. If INDEXF.SYS can not be defragmented a "%DFU-W-NOOPT" message will be displayed.

/DEFRAG

Starts a defragment operation on INDEXF.SYS. The disk must be dismounted cluster-wide before starting a defragment operation.

/EXTEND

/EXTEND=n (number of blocks)

Extends INDEXF.SYS with 'n' blocks in 1 new fragment. This is equivalent to 'n' extra file headers. The disk must be dismounted cluster-wide before starting an extend operation. The 'n' value will be rounded up to be a multiple of the device cluster size.

/SHADOW_MEMBER

/SHADOW_MEMBER=device:

The physical member of the shadowset on which to perform an EXTEND or DEFRAG operation. This qualifier is only required in combination with /DEFRAG and /EXTEND.
Example : DFU> INDEXF/DEFRAG DSA0:/SHADOW_MEMBER=\$1\$DUA104:

/SHOW_POINTERS

Displays all mapping pointer information during the analyze phase.

/STATISTICS

/NOSTATISTICS (default)

Controls whether CPU and I/O consumption of the command are shown.

/TRUNCATE

If possible, the INDEXF.SYS file will be truncated back to the end-of-file size. The disk must be dismounted to perform this operation.

REPORT

The report option generates a file and free space report of the disk. Also, a graph table is made which gives a quick overview on the free space distribution of the disk. DFU creates a number of DCL symbols corresponding to the output of the report.

Format

REPORT device

QUALIFIERS

/APPEND

/APPEND=filename

Same as /OUTPUT, but the output will be appended to the file if it already exists. Thus, output from multiple DFU commands can be put in the same output file. If the file does not exist it will be created.

/GRAPH

/NOGRAPH (default)

This qualifier enables the graph output of the free space distribution for the disk. The default behavior is not to display the graph output.

/OUTPUT

/OUTPUT=filename This qualifier redirects the output from DFU to an output file.

/NOBITMAP

Skip the bitmap statistics report.

/NOFILE

Skip the file statistics report.

/NOVOLUME

Skip the volume info report.

/STATISTICS

/NOSTATISTICS (default)

Controls whether CPU and I/O consumption of the command are shown.

/UNIT

/UNIT=BYTES or BLOCKS

Report sizes in units of bytes or blocks. The default behavior is to report sizes as block units.

/USAGE(=uic or identifier)

Generate a diskblock usage report. DFU will report per UIC/Identifier the blocks used/allocated, and the number of file headers used. If diskquota is enabled a third column will be added to the report with the blocks used according to QUOTA.SYS. If an UIC or Identifier is entered then only that UIC will be reported. The diskquota used must satisfy the rule :

QUOTA used = blocks allocated + # of file headers.

Symbols The following symbols are created. The names should be reasonably self explanatory. The values shown here are examples to demonstrate the expected format.

- ◆ DFU\$AVERAGE_EXTENT_SIZE = "289574"
- ◆ DFU\$AVERAGE_SIZE_PER_FRAGMENT = "1348"
- ◆ DFU\$AVG_FRAGMENTS_PER_FILE = "1.017"
- ◆ DFU\$BLOCKS_MARKED_FOR_DELETE = "502560"
- ◆ DFU\$CLUSTER_SIZE = "80"
- ◆ DFU\$CONTIGUOUS_FILES = "212712"
- ◆ DFU\$DEVICE_NAME = "\$1\$DGA5:"
- ◆ DFU\$DIRECTORY_FILES = "6484"
- ◆ DFU\$EMPTY_FILES = "955"
- ◆ DFU\$ERASE_ON_DELETE = "FALSE"
- ◆ DFU\$FILES_MARKED_FOR_DELETE = "37"
- ◆ DFU\$FILES_WITH_ALLOCATION = "212803"
- ◆ DFU\$FILES_WITH_EXTENSION_HEADERS = "193"
- ◆ DFU\$FILE_FRAGMENTATION_INDEX = "0.067"
- ◆ DFU\$FILE_FRAGMENTATION_INDEX_RATING = "excellent"
- ◆ DFU\$FIRST_HEADER_VBN = "429"
- ◆ DFU\$FRAGMENTS = "216378"
- ◆ DFU\$FREEBLOCKS_DRIFT = "6160"
- ◆ DFU\$FREE_BLOCKS = "98744960"
- ◆ DFU\$FREE_HEADERS = "15059"
- ◆ DFU\$FREE_SPACE_FRAGMENTATION_INDEX = "0.000"
- ◆ DFU\$FREE_SPACE_FRAGMENTATION_INDEX_RATING = "excellent"
- ◆ DFU\$HEADERS = "213973"
- ◆ DFU\$HEADER_COUNT = "229052"
- ◆ DFU\$HIGHWATER_MARK = "FALSE"

- ◆ DFU\$LARGEST_DIRECTORY_FILE = "[USERS.FOO]SCA.DIR;1"
- ◆ DFU\$LARGEST_FREE_EXTENT = "21140000"
- ◆ DFU\$MAX_FILES = "439092"
- ◆ DFU\$MOST_FRAGMENTED_FILE = "[USERS.FOO]BAR.LOG;8"
- ◆ DFU\$MOST_FRAGMENTED_FILE_FRAGMENTS = "406"
- ◆ DFU\$PERCENTAGE_FREE = "0.000"
- ◆ DFU\$TOTAL_ALLOCATED_SIZE = "291879840"
- ◆ DFU\$TOTAL_BLOCKS = "390624768"
- ◆ DFU\$TOTAL_FILES = "213758"
- ◆ DFU\$TOTAL_FILES_ODS2 = "41965"
- ◆ DFU\$TOTAL_FILES_ODS5 = "171793"
- ◆ DFU\$TOTAL_FREE_EXTENTS = "341"
- ◆ DFU\$TOTAL_USED_SIZE = "260158290"
- ◆ DFU\$VOLUME_NAME = "USER "
- ◆ DFU\$VOLUME_OWNER = " "
- ◆ DFU\$VOLUME_SET_NAME = " "

REVERSION

Reversions files back to starting at ;1.

Format

REVERSION filespec [,filespec]

DESCRIPTION

The REVERSION command accepts one or more file specifications including wild cards. Reversions files back to starting at ;1. Version numbers are removed from the input file specifications.

QUALIFIERS

/LOG

Controls whether the REVERSION command displays the file specification of each file after the modification is made.

SEARCH

The SEARCH option searches for specific files on a device. Syntax :

SEARCH device/Qualifiers

QUALIFIERS

/ACCESS

/ACCESS=keyword(=value)

This qualifier is used in combination with 3 possible keywords : BEFORE=date, SINCE=date or NONE. The last access date is used for selecting files. Use SINCE and BEFORE or NONE , but not both. The NONE keyword returns files which don't have a last access date set.

Examples :

- ◆ /ACCESS=BEFORE=date
- ◆ /ACCESS=(BEFORE=date,SINCE=anotherdate)
- ◆ /ACCESS=NONE

/ACE

/ACE=identifier Searches for files containing an ACL list with an ACE for this identifier.

/ACTION

Performs an action on resultant files. Disallowed with /FULL, /PAGE, /HOME, /SUMMARY, /FORMAT, /OUTPUT, or /APPEND. Actions can be one of:

- ◆ DELETE Delete each matching file. When specified an implicit reverse sort is performed such that directory file shuffle operations are minimized.
- ◆ COMPRESS Compress directory files. Requires
/CHARACTERISTICS=DIRECTORY such that only directory files are
located/processed.

/ALLOCATED

When using the /SIZE qualifier, the default size used for comparison is the actual file size. Use /ALLOCATED to force DFU to use the allocated filesize for comparison.

/APPEND

/APPEND=filename Same as /OUTPUT, but the output will be appended to the file if it already exists. Thus, output from multiple DFU commands can be put in the same output file. If the file does not exist it will be created.

/ATTRIBUTE

/ATTRIBUTE=keyword(=value) This qualifier is used in combination with 3 possible keywords : BEFORE=date, SINCE=date or NONE. The last attribute change date is used in for selecting files. Use SINCE and BEFORE or NONE , but not both. The NONE keyword returns files which don't have a last attribute change date set. Examples :

- ◆ **/ATTRIBUTE=BEFORE=date**
- ◆ **/ATTRIBUTE=(BEFORE=date,SINCE=anotherdate)**
- ◆ **/ATTRIBUTE=NONE**

/BACKUP

/BACKUP=keyword(=value) This qualifier is used in combination with 3 possible keywords : BEFORE=date, SINCE=date or NONE. The backup date is used in for selecting files. Use SINCE and BEFORE or NONE, but not both. The NONE keyword returns files which don't have a backup date recorded. Examples :

- ◆ **/BACKUP=BEFORE=date**
- ◆ **/BACKUP=(BEFORE=date,SINCE=anotherdate)**
- ◆ **/BACKUP=NONE**

/BAKFID

/BAKFID=backlink-file-id Use this qualifier to look for a file with a specific backlink. Only the first part of the file id must be specified, that is, if the File id is (x,y,z) one must specify 'x' as the file-id. Use this qualifier to get files from a specific directory. If **/BAKFID=0** is used, DFU returns files not belonging to a directory (often temporary files).

/CHARACTERISTICS

/CHARACTERISTICS=(characteristic,...)

This qualifier is used to select files by their characteristics. The possible characteristics are :

- ◆ **BADACL** : files marked with a bad ACL list
- ◆ **BADBLOCK** : files marked with Bad Blocks
- ◆ **BESTTRY** : files marked contiguous-best-try
- ◆ **CONTIGUOUS** : files which are contiguous
- ◆ **DIRECTORY** : files marked as a directory file
- ◆ **ERASE** : erase file before deletion
- ◆ **LOCKED** : files with the deaccess lock bit set
- ◆ **MARKED** : files marked for deletion
- ◆ **NOBACKUP** : files marked as NoBackup
- ◆ **NOCHARGE** : files marked as NOCHARGE
- ◆ **NOMOVE** : files marked as NOMOVE
- ◆ **SPOOL** : spool files
- ◆ **SCRATCH** : files marked as scratch files
- ◆ **NOSHELVBABLE**: files marked a noshelvable
- ◆ **ISSHELVED** : files which are shelved

DFU will use a logical AND to select files, that is if several characteristics are specified DFU will only return files which have all these characteristics set. To overrule this, use the

MATCH=OR keyword, e.g.:

SEARCH device/CHAR=(DIRECTORY,NOBACKUP,MATCH=OR)

/CREATED

/CREATED=keyword=value This qualifier is used in combination with 2 possible keywords : BEFORE=date or SINCE=date. The creation date is used in for selecting files. Examples:

- ◆ /CREATED=BEFORE=date
- ◆ /CREATED=(BEFORE=date,SINCE=anotherdate)

/DENSE

When /DENSE is specified, output lines are compressed of multiple whitespace. Intended to move the file size closer to the file name and to reduce the overall output length. Not allowed with /FULL, /HOME or /SUMMARY.

/DISPLAY_FIRST=n

Use this qualifier to limit the number of output files displayed to the specified value. When used with an implicit or explicit sort, all names are sorted and then the first n are displayed. When there is no implicit or explicit sort, the first n files found are displayed (effectivity in FID order).

/EXCLUDE

/EXCLUDE=filename Use this qualifier to exclude filenames from the selection. E.g.:
/EXCLUDE=*.SYS will force DFU to not select filenames matching *.SYS.

/EXPIRED

/EXPIRED=keyword(=value) This qualifier is used in combination with 3 possible keywords BEFORE=date, SINCE=date or NONE. The expiration date is used in for selecting files. Either use SINCE and BEFORE or NONE , but not both. The NONE keyword returns files which don't have a expiration date recorded. Examples:

- ◆ /EXPIRED=BEFORE=date
- ◆ /EXPIRED=(BEFORE=date,SINCE=anotherdate)
- ◆ /EXPIRED=NONE

/FID

/FID=file-id Use this qualifier to look for a specific file. Only the first part of the file id must be specified, that is , if the File id is (x,y,z) one must specify 'x' as the file-id. If this qualifier is used, DFU does not scan INDEXF.SYS but just looks up the specific file header. Therefore, this qualifier can not be combined with other search qualifiers such as /SIZE or /FILE.

/FILE

/FILE=filename DFU selects only file names which match the 'filename'. Wildcards may be used, e.g.: /FILE=*.SYS or /FILE=LOGIN.*.

/FORMAT

/FORMAT=format_string Used with /OUTPUT. Create an output file using the format as described in formatstring. The format string **MUST** contains the !AS directive; DFU fills in the resultant file there. Example : DFU>

SEARCH/FILE=*.TMP/FORMAT="\$delete/confirm !AS"

/FRAGMENT

/FRAGMENT [=option]

Shows the numbers of headers/fragments of the file. Available options:

- ◆ /FRAGMENT Don't select files, but show fragmentation info
- ◆ /FRAGMENT=MINIMUM=fragments DFU selects files with at least 'fragments' fragments
- ◆ /FRAGMENT=MAXIMUM=fragments DFU selects files with at most 'fragments' fragments

Both options can be combined, e.g.: /FRAGMENT=(MIN=4,MAX=10) will select all files with between 4 and 10 fragments.

When /SORT is used with /FRAGMENT, output is sorted by file allocation size or fragment count largest to smallest. /SORT with /FRAGMENT accepts either ALLOCATION or FRAGMENTS as a keyword (/SORT=ALLOCATION or /SORT=FRAGMENTS) to adjust the sort field.

/FULL

Gives a full output for each found file. The output contains directory, filename, File ID, Virtual Block Number within INDEXF.SYS, filesize, owner, creation date, revision date. Note that default is to produce a 'short' output.

/HOME

Displays information about the home block of the disk. DFU uses the home block to calculate the actual used and free file headers in INDEXF.SYS.

/GLOBAL_BUFFER_COUNT

The following options exist:

- ◆ /GLOBAL_BUFFER_COUNT=MINIMUM=buffercount DFU selects files with at least buffercount global buffers

- ◆ /GLOBAL_BUFFER_COUNT=MAXIMUM=blocksize DFU selects files with at most buffercount global buffers.

Both options can be combined, e.g. /GLOBAL_BUFFER_COUNT=(MIN=1000,MAX=10000) will select all files between 1000 and 10000 global buffers set in the file attributes.

/IDENT

/IDENT=identifier /NOIDENT=identifier DFU Selects files owned by this identifier. Another way is to use the /OWNER=uic qualifier. /IDENT and /UIC can not be used in the same DFU command. Using /NOIDENT causes DFU to search for all files NOT owned by this identifier.

/LBN

/LBN=logical-block-number The /LBN option is a special qualifier which allows locating a file which contains a specific logical block number. Note that this qualifier cannot be combined with other search qualifiers (such as /FILE=).

/LIMIT

/LIMIT=(minimum=n,maximum=m) Searches all directory files for a default version limit between 'n' and 'm'.

/NAME_TYPE

/NAME_TYPE=ODS2 or ISL1 or UCS2 Searches for files with ODS2 (classic VMS), Iso-Latin1 or Unicode name type. This command is only meaningful for ODS5 disks.

/NOSEARCH

Do not search the volume. This qualifier can only be used with /HOME. It is used to display only the home block info of the device.

/NOVOLSET

The /NOVOLSET qualifier overrides default Volume set processing by DFU. This is useful e.g. when doing a /LBN search on a specific disk.

/MODIFIED

/MODIFIED=keyword=value This qualifier is used in combination with 2 possible keywords : BEFORE=date or SINCE=date. The revision date is used for selecting files. Examples :

- ◆ /MODIFIED=BEFORE=date
- ◆ /MODIFIED=(BEFORE=date,SINCE=anotherdate)

/MULTIPLE

This qualifier displays files which have extension headers. This gives an indication about possible fragmentation of the disk. Note that these headers can also be a result of large ACL lists.

/ORGANIZATION

/ORGANIZATION=INDEXED or RELATIVE or SEQUENTIAL or DIRECT This qualifier searches for files with the specified RMS file organization

/OUTPUT

/OUTPUT=filename This qualifier redirects the output from DFU about all found files to an output file.

/OVER_ALLOCATED

/OVER_ALLOCATED=n Select files for which the difference between blocks used and allocated is greater than or equal to 'n' blocks.

/OWNER

/OWNER=uic /NOOWNER=uic Selects all files owned by the specified uic. This qualifier cannot be used in combination with /IDENT. The uic must be specified in a standard [grp,mem] format. Using /NOOWNER causes DFU to search for all files NOT owned by this uic.

/PLACED

Checks for placed files.

/RETURN_LIMIT

/RETURN_LIMIT=n restricts the number of file names returned to the user.

/NORVNFID

/[NO]RVNFID=rvn Use this qualifier to look for files with or without a specific RVN FID. If the File id is (x,y,z) one must specify 'z' as the RVN. Use this qualifier to get files from a specific volume.

/SIZE

/SIZE=option The following options exist:

- ◆ /SIZE=MINIMUM=blocksize DFU selects files at least blocksize blocks in size
- ◆ /SIZE=MAXIMUM=blocksize DFU selects files at most blocksize blocks in size.

Both options can be combined, e.g.: /SIZE=(MIN=1000,MAX=10000) will select all files between 1000 and 10000 blocks in size.

/SORT

/SORT=ALLOCATION or /SORT=FRAGMENTS when used with /FRAGMENT This qualifier will sort the results of DFU to the output file specified in /OUTPUT. By default, file names are sorted. When /SORT is used with /FRAGMENT, output is sorted by file allocation size or fragment count largest to smallest (). /SORT can not be used with /FULL or /SUMMARY.

/SPECIFICATION_MATCH=filename

The specified filename matching pattern string (allowing wildcards) is matched against each resultant file specification returned from the search. This can be utilized to further filter a returned specification. Leading and trailing * may be required to match the returned device and file name components. For example: /SPECIFICATION_MATCH=*[SMITH.*.LOGS]*

/STATISTICS

/STATISTICS /NOSTATISTICS (default) Controls whether CPU and I/O consumption of the command are shown.

/SUMMARY

Gives a summary of the total number of files found, and the number of blocks occupied by these files.

/TYPE

/TYPE=ODS2 or ODS5 Searches for files with ODS2 or ODS5 file headers. Only useful on ODS5 disks.

/UNIT

/UNIT=BYTES | BLOCKS /UNIT=BLOCKS (default) Report sizes in units of bytes. The default behavior is to report sizes as block units.

/VERSION_NUMBER

/VERSION_NUMBER=option Use at least one of the following options:

- ◆ /VERSION_NUMBER=MINIMUM=file_version DFU selects files whose version number in the file name is at least 'file_version'
- ◆ /VERSION_NUMBER=MAXIMUM=file_version DFU selects files whose version number in the file name is at most 'file_version'

Both options can be combined, e.g.: /VERSION=(MIN=1000,MAX=10000) will select all files with a version_number between 1000 and 10000 inclusive.

SET

Modifies the characteristics of one or more files. It handles all attributes which 'SET FILE' can't handle.

Format

SET file-spec[,...],@file

PARAMETERS

file-spec[,...],@file

Specifies one or more files to be modified. If two or more files are specified, separate them with commas. A list of files may be used by specifying @file. Thus, an output file generated by a DFU SEARCH command can be used to be processed with SET. Wildcard characters are allowed in the file specifications.

QUALIFIERS

/ACCESS_DATE

/ACCESS_DATE=date /NOACCESS_DATE Controls whether a new file access date is assigned to the specified files. Specify the date according to the rules described in Chapter 1 of the VMS DCL Concepts Manual. Absolute date keywords are allowed.

/ATTRIBUTE_DATE

/ATTRIBUTE_DATE=date /NOATTRIBUTE_DATE Controls whether a new attribute change date is assigned to the specified files. Specify the date according to the rules described in Chapter 1 of the VMS DCL Concepts Manual. Absolute date keywords are allowed.

/BACKUP_DATE

/BACKUP_DATE=date /NOBACKUP_DATE Controls whether a new backup date is assigned to the specified files. Specify the date according to the rules described in Chapter 1 of the VMS DCL Concepts Manual. Absolute date keywords are allowed. Use of this qualifier requires ownership of the file or access control.

/BADACL

/BADACL /NOBADACL Sets or resets the 'BAD ACL' flag in the file header. This enables deletion of a file with a corrupted ACL.

/BCK

/BCK /NOBCK Clears or sets the file's nobackup bit. (/BCK clears the bit, /NOBCK sets the bit).

/BUCKETSIZE

/BUCKETSIZE=size Sets a new value for the bucket size in the file header.

/CONFIRM

/CONFIRM /NOCONFIRM (default) Controls whether a request is issued before each individual SET operation to confirm that the operation should be performed on that file. When the system issues the prompt, issue any of the following responses: YES NO QUIT TRUE FALSE (CTRL/Z) 1 0 ALL <RET>

/CONTIGUOUS_BEST_TRY

/CONTIGUOUS_BEST_TRY /NOCONTIGUOUS_BEST_TRY Sets or resets the 'CONTIGUOUS_BEST_TRY' bit in the file header.

/CREATION_DATE

/CREATION_DATE=date /NOCREATION_DATE Controls whether a new creation date is assigned to the specified files. Specify the date according to the rules described in Chapter 1 of the VMS DCL Concepts Manual. Absolute date keywords are allowed. Use of this qualifier requires ownership of the file or access control.

/DIRECTORY

/DIRECTORY /NODIRECTORY Sets or resets the directory attribute of a file. This qualifier allows to set the directory bit of a file which was mistakenly reset by the 'SET FILE/NODIRECTORY' command. If it is done on a non- directory file, then access to that directory will give a 'BADIRECTORY' error.

/EBLOCK

/EBLOCK[=block] This qualifier will reset the end-of-file mark to the highest block allocated if no block has been specified. Otherwise the end-of-file mark will be set to the specified block.

/EBYTE

/EBYTE[=byte] This qualifier will set the end-of-file byte mark to the highest byte if it has not been specified. Otherwise, the end-of-file byte mark will be set to the specified byte.

/EXPIRATION_DATE

/EXPIRATION_DATE=date **/NOEXPIRATION_DATE** Controls whether an expiration date is assigned to the specified files. Specify the date according to the rules described in Chapter 1 of the VMS DCL Concepts Manual. Absolute date keywords are allowed. Use of this qualifier requires ownership of the file or access control.

/IDENT

/IDENT=identifier or UIC Modifies the file-owner. This command can also be used on open files (such as INDEXF.SYS). **/IDENT** cannot be combined with **/OWNER_UIC**

/IGNORE

/IGNORE=INTERLOCK Set the file attributes even if the file is open or locked.

/LOCKED

/LOCKED /NOLOCKED This qualifier will lock a file for future use. Nothing else can then be done with the file, until it is unlocked (which can also be done with the VMS 'UNLOCK' command).

/LOG

/LOG (default) /NOLOG Controls whether the SET command displays the file specification of each file after the modification is made.

/MAXREC

/MAXREC=record Sets a new value for the maximum record number in the file header.

/NOMOVE

/NOMOVE /NONOMOVE Disables or enables the MoveFile attribute.

/ORGANIZATION

/ORGANIZATION=keyword The following keywords are used as parameters for the ORGANIZATION qualifier: DIRECT, INDEXED, RELATIVE and SEQUENTIAL. This will allow to modify the file organization type in the file header. Of course this won't change the real organization of the file.

/OWNER_UIC

/OWNER_UIC=uic or identifier Modifies the file-owner. This command can also be used on open files (such as INDEXF.SYS). **/OWNER_UIC** can not be combined with **/IDENT**.

/RECATtributes

/RECATtributes=keyword The following keywords are used as parameters for the RECATtributes qualifier: NONE, FORTRAN, IMPLIED, PRINT and NOSPAN. This will allow to modify the file's record attributes in the file header. NONE, FORTRAN, IMPLIED and PRINT are mutually exclusive, but can be used in combination with NOSPAN. When NOSPAN is omitted SPAN is assumed (the default is to allow records to cross block boundaries).

/RECSIZE

/RECSIZE=size Sets a new value for the record size in the file header.

/RECTYPE

/RECTYPE=keyword The following keywords are used as parameters for the RECTYPE qualifier: FIXED, STREAM, STREAMCR, STREAMLF, UNDEFINED, VARIABLE and VFC. This will allow to modify the file's record type in the file header.

/REVISION_DATE

/REVISION_DATE=date /NOREVISION_DATE Controls whether a revision date is assigned to the specified files. Specify the date according to the rules described in Chapter 1 of the VMS DCL Concepts Manual. Absolute date keywords are allowed. Use of this qualifier requires ownership of the file or access control.

/RVCOUNT

/RVCOUNT=count Sets a new value for the revision count in the file header.

/UPDATE

/UPDATE /NOUPDATE (default) Normally the file's revision date will be updated after any modification to it. SET however disables this update (otherwise, the REVISION date could not be set). Specify this qualifier if the revision date must be updated.

/VERSION_LIMIT

/VERSION_LIMIT=limit Change the file's version limit. Can be used with **/IGNORE=INTERLOCK** to change the version limit of an open file. However: this will only work when the filename specified is the highest existing version of that file (this will be automatic when the version limit is not specified on the command line). The specified version limit must be between 0 and 32767. This command has no effect on directory files.

/VFCSIZE

/VFCSIZE=size Sets a new value for the VFC size in the file header. This value will only be used with the VFC record type.

SPAWN

Spawns a subprocess.

UNDELETE

The Undelete command recovers deleted files. It is done as safely as possible. If undelete discovers that the file header or blocks of the deleted file have been reused, the undelete process will stop. The /FILE, /IDENTIFIER or /OWNER qualifier can be used to select specific files. The /LIST qualifier can be used to generate a list of recoverable files without actually undeleting files.

If a matching filename is found undelete will ask for a confirmation before undeleting the file. Multiple files can be undeleted with just one UNDELETE command. After a successful undelete the file will be entered in the original directory if possible or in the [SYSLOST] directory.

The volume (set) will be locked for other users during the undelete command unless the /LIST qualifier is used.

Format

UNDELETE device

QUALIFIERS

/IDENT=identifier

Select file by identifier. This qualifier cannot be used in conjunction with /OWNER.

/FILE=filename

Select file by filename. Wildcards may be used in the filename. If the /FILE qualifier is omitted DFU will use *.*;* as the filename.

/LIST(=output_file)

Generate a list of recoverable files. This command will not lock the volume, and will not undelete any file.

/MARKED

Select only files marked for delete.

/OWNER=uic

Select file by owner uic. This qualifier cannot be used in conjunction with /IDENT.

/STATISTICS

/STATISTICS /NOSTATISTICS (default) Controls whether CPU and I/O consumption of the command are shown.

VERIFY

The Verify option provides a function equivalent to ANALYZE/DISK, but many times faster. Verify will report files with invalid backlinks, lost files, and blocks which are allocated by more than 1 file. Also, the BITMAP and QUOTA files are checked. The /FIX qualifier allows some basic repair actions without locking the disk. The /REBUILD qualifier will rebuild INDEXF.SYS, BITMAP.SYS and QUOTA.SYS if necessary. Note that /REBUILD will lock the disk for a short period of time.

Format

VERIFY device

QUALIFIERS

/APPEND

/APPEND=filename Same as /OUTPUT, but the output will be appended to the file if it already exists. Thus, output from multiple DFU commands can be put in the same output file. If the file does not exist it will be created.

/DIRECTORY_SCAN

This optional qualifier directs DFU to make a full directory scan. This allows better detection of some cases of lost files, and detection of some directory corruptions. Use /FIX to repair such errors. Warning: using /DIRECTORY_SCAN can take several minutes

/FIX

/FIX /NOFIX (default) This qualifier repairs the following errors:

- ◆ Deletes files marked for delete
- ◆ Moves lost files and directories to [SYSLOST]
- ◆ Repairs a wrong backlink for VMSS\$COMMON.DIR on system disk

The /FIX qualifier does not lock the disk!

/LOCK

/LOCK /NOLOCK (default) Locks the volume for allocation. To get a consistent view of the disk one must stall all allocation changes of the disk. Otherwise VERIFY may report errors which are caused by concurrent disk activity during execution of the VERIFY command. A tradeoff is that the disk is locked for the duration of the VERIFY command.

/OUTPUT

Redirects the output from verify to a file.

/REBUILD

/REBUILD /NOREBUILD (default) This qualifier repairs structure errors and mismatches in INDEXF.SYS, BITMAP.SYS and QUOTA.SYS. Note that /REBUILD will temporarily lock the device for other users.

/STATISTICS

/STATISTICS /NOSTATISTICS (default) Controls whether CPU and I/O consumption of the command are shown.

Screen_Management

This version of DFU optionally uses Screen Management (SMG) routines to perform output. DFU will automatically select line mode unless the logical DFUSMG is defined and the terminal does not have SMG capabilities, if DFU is executed in a batch job or if the logical DFU\$NOSMG is defined. In any of these 3 cases DFU will switch to normal line oriented output. The default is line mode.

DFU can be forced to SMG (full display) mode by defining the logical DFU\$SMG to any value. DFU can be forced to line mode output by defining the logical DFU\$NOSMG to any value.

In SMG mode the /PAGE qualifier will present output page by page. This may be handy for some commands which produce a large amount of output (SEARCH, REPORT).

In SMG mode the following keys perform special functions (Keys between () are keys on a PC keyboard) :

- CTRL/W : Redraws the screen
 - HELP or PF2 (/) : Invokes the help facility
 - PF4 (-) : Dumps the screen contents to file DFU_SCREEN.TXT
 - PREV_SCREEN (PageUp) : Scrolls the output window back (one screen)
 - NEXT_SCREEN (PageDown): Scrolls the output window forward (one screen)
 - INSERTHERE (Insert) : Scrolls the output window back (one line)
 - REMOVE (Delete) : Scrolls the output window forward (one line)
 - SELECT (End) : Toggle between 80/132 columns
 - UP/DOWN : Recall command buffer
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