

[DFSMShsm documentation updates for OA63126](#)

[z/OS DFSMShsm Data Areas GC14-7504](#)

z/OS DFSMShsm Data Areas GC14-7504 for V2R4 and higher has been updated for the below changes.

“Chapter 44. MCVT—Management Communication Vector Table” has a description of all MCVT fields. Updated the same with a new bit flag named MCVTF_CTL_FIXUFN at offset 591 (x'24F') to enable an enhancement to the BDELETE/EXPIREBV functions.

Offsets				
Decimal (Hex)	Type	Length	Name	Description
591 (24F)	BITSTRING	1	*	Flags.
1... ..	....		MCVTF_ALLOW_ARC1334	
.1... ..	....		MCVTF_SUPP_UNIX_ICH70001I	
..1... ..	....		MCVTF_ALLOW_ARC1426	
...1... ..	....		MCVTF_CLOUD_TRACE	
.... xx ..			Reserved	
.... .1 .			MCVTF_CTL_FIXUFN	Enhanced BDELETE/EXPIREBV
.... ...x			Reserved	

Under “Chapter 55. UFN—UNIX File Node Record” there is the record structure of Unix Filename records. Updated the same with a new bit flag named UFN_LSTNDE to indicate a logically invalid UFN record. IBM internally uses this bit. Also, updated the description of the existing bit flag UFN_INVALID for readability.

Offsets				
Actual / FIXCDS	Type	Length	Name	Description
240 (F0) 176 (B0)	BITSTRING	2	UFN_FLAGS	Record Flags
1... ..	....		UFN_FUP	UP HASH valid
.1... ..	....		UFN_FSIB	SIB HASH valid
..1... ..	....		UFN_FCHILD	CHILD HASH valid
...1... ..	....		UFN_FLCHILD	LAST CHILD hash valid
.... 1... ..	....		UFN_FACL_I	File ACL incomplete
.... .1... ..	....		UFN_FFILE	Entry has File backup
.... ..1... ..	....		UFN_FDIR	Entry has Dir backup
.... ...1			UFN_INVALID	Record Soft-Deleted
1... ..			UFN_FPSIB	PREV SIB HASH valid
.1... ..			UFN_LSTNDE	Logically Invalid

Also, updated the description of the existing field UFN_NMLEN for a better clarity as below.

310 (136) 246 (F6)	FIXED	2	UFN_NMLEN	<u>LENGTH OF UFN_NAME</u>
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[z/OS DFSMShsm Storage Administration SC23-6871](#)

z/OS DFSMShsm Storage Administration SC23-6871 for V2R4 and higher has been updated for the below changes.

Under “Part-1 Storage Administration Guide”, “Chapter 75. Using the AUDIT Command” has a section named “Using the AUDIT FILECONTROLS(BACKUP) command” that talks about the various checks performed by AUDIT FILECONTROLS on Unix Filename records in BCDS. Add the descriptions of the newly added messages following the description of the existing message *ERR 214.

If UFN record is not found, AUDIT reports *ERR 213.

If UFN record contains valid hash value for parent, child, sibling, or last child but UFN record is missing for it, AUDIT reports *ERR 214.

The FIX option in AUDIT FILECONTROLS has no effect with FILE and FILELEVEL keywords.

Note: When AUDIT FILECONTROLS runs, it is normal to see the messages such as *ERR 223, *ERR 224, *ERR 225, *ERR 228, and *ERR 229. Read the action needed for each of these messages below and take the actions accordingly. Also, it is unusual to see the messages *ERR 226 and *ERR 227. If found, take the right action as suggested.

When AUDIT FILECONTROLS is not running with FIX option (default is NOFIX) and it is found that a UFN record does not have the previous sibling key, then the audit issues *ERR 223 that contains a PATCH command to fix such nodes. The recommended way to fix such records is by running an AUDIT FILECONTROLS with FIX option. When the count of these error messages reaches a limit of 1000, then audit stops abruptly and issues *ERR 224. This is an indication that there are many UFN nodes without previous sibling reference and user may choose to re-run the AUDIT FILECONTROLS with FIX option.

When AUDIT FILECONTROLS or AUDITFILECONTROL FILELEVEL is not running with FIX option (default is NOFIX) and a UFN record is found in soft deleted state (UFN_INVALID = ON), the same is reported by the error message *ERR 225. When the count of these error messages reaches a limit of 1000, then audit stops abruptly and issues *ERR 224. In that case, it is recommended to run AUDIT FILECONTROLS with FIX option to clean-up such records from BCDS.

When the count of *ERR 223 or *ERR 225 messages reaches a limit of 1000, the audit stops abruptly and issues *ERR 224 message recommending AUDIT FILECONTROLS run with FIX option.

While deleting a UFN node, the node previous to it and the node next to it will be connected to each other. If there was a CDS update failure while establishing that link, such UFN records are identified during the AUDIT process and reported in the form of *ERR 226 error messages. The further Delete or Add (backup) requests for the Unix files associated to those UFN nodes are handled appropriately. No immediate action required by the user unless there are many such messages.

The *ERR 226 error messages are not usually expected as they indicate CDS update failures. If there are more than 50 such messages, then the audit reports *ERR 227 error messages. Once this condition is detected, Audit stops issuing *ERR 226 messages but instead, it continues to issue *ERR 227 messages. The count of *ERR 227 messages will be useful to know the number of such failures. Contact IBM support when *ERR 227 is detected.

When AUDIT FILECONTROLS runs with FIX option and updates a UFN record with its previous sibling reference, then the audit issues an informational message *ERR 228 to report the same to the user. The message text contains the key of UFN record that is updated.

When AUDIT FILECONTROLS runs with FIX option and removes a UFN record that was marked soft delete, the audit issues an informational message *ERR 229 to report the same to the user. The message text contains a 44-character UFN file / directory name (shortened if original name was more than 44 characters) associated to the UFN node that is now removed from BCDS.

Under “Part-1 Storage Administration Guide”, “Chapter 75. Using the AUDIT Command” has a section named “Error codes (*ERR) and diagnosis” that talks about various error codes used in AUDIT reports along with their ‘Repair Action’ and ‘Troubleshooting Hints’. Add the descriptions of the newly added messages following the description of the existing message *ERR 222.

Description	Repair Action	Troubleshooting hints
*ERR 222 P (MCP) RECORD FOR VOLUME volser WITH DUMP DATE dump_date AND DUMP TIME dump_time NOT FOUND, POSSIBLY ORPHANED G (DGN) RECORD		
DGN record exists with primary volume volser, but either MCP record for volser does not exist or the volume no longer has a valid dump generation associated with the DGN record.		For more information, use LIST PRIMARYVOLUME(srcvol) ALLDUMPS BCDS.

***ERR 223 FIXCDS 2 x'[UFN KEY]' PATCH(X'FC' x'[PREVIOUS SIBLING KEY']) PREVIOUS SIBLING KEY MISSING**

Previous sibling key is not updated on the UFN record being audited.	<p>If there are a very few such records, the above FIXCDS command can be a quick fix. If the count is too many to fix using FIXCDS commands, run the AUDIT FILECONTROLS function with FIX option.</p> <p>The recommended option is running AUDIT FILECONTROLS with FIX option.</p>	<p>User is running the AUDIT with NOFIX option. A limit of 1000 terminates the Audit and issues the message *ERR 224. The recommended way to fix then is to run AUDIT FILECONTROLS with FIX option.</p> <p>If these messages are recurring, this may indicate that the Unix file backups were done by turning off the PATCH bit MCVTF_CTL_FIXUFN.</p>
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*ERR 224 ERROR LIMIT HAS STOPPED THE AUDIT, RERUN THE AUDIT WITH FIX OPTION		
ERR 223 or ERR 225 have reached the preset limit of 1000.	Run the AUDIT FILECONTROLS with FIX option.	User is running the AUDIT with NOFIX option. Check if the PATCH bit MCVTF_CTL_FIXUFN is turned OFF which is recommended to be ON.

*ERR 225 x'[UFN KEY]' UFN NODE MARKED SOFT DELETE FOUND		
Indicates this UFN node on BCDS is soft deleted (UFN_INVALID=ON).	Run the AUDIT FILECONTROLS with FIX option.	<p>User is running the AUDIT with NOFIX option. A limit of 1000 terminates the Audit and issues the message *ERR 224. The recommended way to fix then is to run AUDIT FILECONTROLS with FIX option.</p> <p>If user wants to retain the UFN node, then back-up the associated file once again. That is going to turn OFF the soft delete flag (UFN_INVALID) and the new node will be added to the queue appropriately.</p>

*ERR226 x'[UFN KEY]' PREVIOUS SIBLING KEY UPDATED IN THE UFN RECORD IS INCORRECTLY REFERENCING A DIFFERENT NODE.		
The previous sibling of the record being audited is not referencing back to the node being audited.	If the number of messages exceeds 50, audit starts printing ERR 227 indicating exceeding the allowed limit for ERR 226. Audit continues. Contact IBM support when ERR 226 message is seen.	Contact IBM support for further investigation.

*ERR 227 MAX LIMIT OF ERR 226 MESSAGES REACHED		
The number of ERR 226 messages have reached a maximum limit of 50.	User has run the AUDIT FILECONTROLS with NOFIX option. It is an unusual case of too many logical errors. Contact IBM support for further investigation.	Contact IBM support for further investigation.

*ERR 228 INFO: PREVIOUS SIBLING REFERENCE FIXED FOR THE UFN RECORD [64-character UFN Key]		
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When AUDIT FILECONTROLS is run with FIX option, it has updated the previous sibling reference (UFN_PSIB) for the UFN record mentioned in the message text.	Not required. This message is informational.	Not required. This message is informational.
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*ERR 229 INFO: PREVIOUS SIBLING REFERENCE FIXED FOR THE UFN RECORD [64-character UFN Key]		
When AUDIT FILECONTROLS is run with FIX option, it has updated the previous sibling reference (UFN_PSIB) for the UFN record mentioned in the message text.	Not required. This message is informational.	Not required. This message is informational.

[z/OS DFSMSHsm Implementation and Customization Guide SC23-6869](#)

z/OS DFSMSHsm Implementation and Customization Guide SC23-6869 for V2R4 and higher has been updated for the below changes.

Under the Section *“Tuning Patches supported by DFSMSHsm”* of *“Chapter 17 Tuning DFSMSHsm”*, a new section entitled *“BDELETE/BIXPIREBV Enhancement”* has been added following the existing section entitled *“Controlling Cloud Migration copy cleanup wait interval”*.

BDELETE/EXPIREBV Enhancement

If you notice EXPIREBV/BDELETE is taking a long time to complete the processing, here is the new patch that helps resolving the problem. A new patch is provided for DFSMSHsm to enable a new method to expire the UNIX file backup records in the BCDS.

PATCH .ARCCVT.+24F BITS (. 1 .)

The suggested sequence of actions to use the New Function:

1. Place the PATCH command in the ARCCMDxx parmlib member to ensure it is retained between HSM Startups
2. Run the EXPIREBV and BDELETE functions as normal
3. At your earliest convenience, run the AUDIT FILECONTROLS function with the FIX option.

While the above is the suggested sequence, it is also acceptable to enable the patch and run AUDIT FILECONTROLS prior to running EXPIREBV. This order has the advantage of not leaving UFN records in the BCDS for DFSMSHsm to cleanup.

Note: When AUDIT FILECONTROLS runs with FIX option, there is a potential chance of filling the AUDIT Output Data Set (ODS). Hence, consider increasing the primary and secondary allocation of the output data set as described in the sections entitled *“Changing the primary space quantity”* and *“Changing the secondary space quantity”* under *“Chapter 17. Tuning DFSMSHsm”* of *“DFSMSHsm Implementation and Customization Guide”*.

When the patch is enabled, DFSMSHsm will process UNIX file BCDS records differently in the following ways:

- Enhances the processing of BDELETE and EXPIREBV functions. During the deletion of an MCB backup record, the associated UFN record will be marked "soft delete" instead of being deleted.
- Enhances the AUDIT FILECONTROLS function to correctly remove the soft deleted records when FIX is specified. When FIX is not specified (default is NOFIX), the soft deleted records are reported. The AUDIT FILECONTROLS will additionally correct the structure of existing UFN records so that, they will not be marked soft deleted during the delete processing.
- Sets the previous UFN pointer for backups of new UNIX files.

The BDELETE/EXPIREBV performance enhancement may be disabled with the following patch:

PATCH .ARCCVT.+24F BITS (. 0 .)

Note: If the Patch is disabled, EXPIREBV/BDELETE may take longer time to delete the Unix file backup records from BCDS.