

## [MS-FSCC]: File System Control Codes

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Errata Published*	Description
2023/02/14	<p>In MS-FSCC, added a new section documenting the FSCTL_VIRTUAL_STORAGE_QUERY_PROPERTY:</p> <p>Changed to:</p> <p>2.3.91 FSCTL_VIRTUAL_STORAGE_QUERY_PROPERTY Request</p> <p>This request contains a message with the same structure as the IOCTL_STORAGE_QUERY_PROPERTY request (section 2.8.1) with the following values:</p> <p>PropertyId (4 bytes): 0x00000004</p> <p>QueryType (4 bytes): 0x00000000</p> <p>Remote servers SHOULD ignore this request.&lt;86&gt;</p>

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	<86> Section 2.3.91: All Windows Server versions return STATUS_NOT_IMPLEMENTED.																								
2023/01/30	<p>In section 2.4.7, revised behavior notes 97 through 100 to indicate the responses to a -2 value for certain attributes on different file systems.</p> <p>Changed from:</p> <p>&lt;97&gt; Section 2.4.7: The file system updates the values of the <b>LastAccessTime</b>, <b>LastWriteTime</b>, and <b>ChangeTime</b> members as appropriate after an I/O operation is performed on a file. However, a driver or application can request that the file system not update one or more of these members for I/O operations that are performed on the caller's file handle by setting the appropriate members to -1. A driver or application can subsequently request that the file system resume updating one or more of these members for I/O operations that are performed on the caller's file handle by setting the appropriate members to -2. The caller can set one, all, or any other combination of these three members to -1 and/or -2. Only the members that are set to -1 will be unaffected by I/O operations on the file handle; the other members will be updated as appropriate. This behavior is consistent across all file system types. Note that even though -1 and -2 can be used with the <b>CreationTime</b> field, they have no effect because file creation time is never updated in response to file system calls such as read and write.</p> <table border="1" data-bbox="386 720 1421 1220"> <thead> <tr> <th>File system</th> <th>Support value of -2</th> </tr> </thead> <tbody> <tr> <td>FAT</td> <td>No</td> </tr> <tr> <td>EXFAT</td> <td>No</td> </tr> <tr> <td>FAT32</td> <td>No</td> </tr> <tr> <td>Cdfs</td> <td>No</td> </tr> <tr> <td>UDFS</td> <td>No</td> </tr> <tr> <td>NTFS</td> <td>Windows 8.1 and later, Windows Server 2012 R2 and later, and Windows Server v1709 operating system and later</td> </tr> <tr> <td>ReFS</td> <td>Windows 10 v1507 operating system and later, Windows Server 2016 and later, and Windows Server v1709 and later</td> </tr> </tbody> </table> <p>&lt;98&gt; Section 2.4.7: The file system updates the values of the <b>LastAccessTime</b>, <b>LastWriteTime</b>, and <b>ChangeTime</b> members as appropriate after an I/O operation is performed on a file. However, a driver or application can request that the file system not update one or more of these members for I/O operations that are performed on the caller's file handle by setting the appropriate members to -1. A driver or application can subsequently request that the file system resume updating one or more of these members for I/O operations that are performed on the caller's file handle by setting the appropriate members to -2. The caller can set one, all, or any other combination of these three members to -1 and/or -2. Only the members that are set to -1 will be unaffected by I/O operations on the file handle; the other members will be updated as appropriate. This behavior is consistent across all file system types. Note that even though -1 and -2 can be used with the <b>CreationTime</b> field, they have no effect because file creation time is never updated in response to file system calls such as read and write.</p> <table border="1" data-bbox="386 1583 1421 1772"> <thead> <tr> <th>File system</th> <th>Support value of -2</th> </tr> </thead> <tbody> <tr> <td>FAT</td> <td>No</td> </tr> <tr> <td>EXFAT</td> <td>No</td> </tr> <tr> <td>FAT32</td> <td>No</td> </tr> </tbody> </table>	File system	Support value of -2	FAT	No	EXFAT	No	FAT32	No	Cdfs	No	UDFS	No	NTFS	Windows 8.1 and later, Windows Server 2012 R2 and later, and Windows Server v1709 operating system and later	ReFS	Windows 10 v1507 operating system and later, Windows Server 2016 and later, and Windows Server v1709 and later	File system	Support value of -2	FAT	No	EXFAT	No	FAT32	No
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2023/01/10	<p>In section 2.3.74, FSCTL_SET_INTEGRITY_INFORMATION Reply, added STATUS_NOT_SUPPORTED to the error codes list:            Changed from:</p> <table border="1" data-bbox="386 892 1421 1344"> <thead> <tr> <th data-bbox="386 892 816 945">Error code</th> <th data-bbox="816 892 1421 945">Meaning</th> </tr> </thead> <tbody> <tr> <td data-bbox="386 945 816 1176">STATUS_INVALID_PARAMETER 0xC000000D</td> <td data-bbox="816 945 1421 1176">The input buffer length is less than the size, in bytes, of the FSCTL_SET_INTEGRITY_INFORMATION_BUFFER element; the handle is not to a file or directory; or the requested ChecksumAlgorithm field is not one of the values listed in the table for the ChecksumAlgorithm field in the FSCTL_SET_INTEGRITY_INFORMATION Request.</td> </tr> <tr> <td data-bbox="386 1176 816 1260">STATUS_INVALID_DEVICE_REQUEST 0xC0000010</td> <td data-bbox="816 1176 1421 1260">The volume does not support integrity.</td> </tr> <tr> <td data-bbox="386 1260 816 1344">STATUS_DISK_FULL 0xC000007F</td> <td data-bbox="816 1260 1421 1344">The disk is full.</td> </tr> </tbody> </table> <p>Changed to:</p> <table border="1" data-bbox="386 1417 1421 1785"> <thead> <tr> <th data-bbox="386 1417 816 1470">Error code</th> <th data-bbox="816 1417 1421 1470">Meaning</th> </tr> </thead> <tbody> <tr> <td data-bbox="386 1470 816 1701">STATUS_INVALID_PARAMETER 0xC000000D</td> <td data-bbox="816 1470 1421 1701">The input buffer length is less than the size, in bytes, of the FSCTL_SET_INTEGRITY_INFORMATION_BUFFER element; the handle is not to a file or directory; or the requested ChecksumAlgorithm field is not one of the values listed in the table for the ChecksumAlgorithm field in the FSCTL_SET_INTEGRITY_INFORMATION Request.</td> </tr> <tr> <td data-bbox="386 1701 816 1785">STATUS_INVALID_DEVICE_REQUEST 0xC0000010</td> <td data-bbox="816 1701 1421 1785">The volume does not support integrity.</td> </tr> </tbody> </table>	Error code	Meaning	STATUS_INVALID_PARAMETER 0xC000000D	The input buffer length is less than the size, in bytes, of the FSCTL_SET_INTEGRITY_INFORMATION_BUFFER element; the handle is not to a file or directory; or the requested ChecksumAlgorithm field is not one of the values listed in the table for the ChecksumAlgorithm field in the FSCTL_SET_INTEGRITY_INFORMATION Request.	STATUS_INVALID_DEVICE_REQUEST 0xC0000010	The volume does not support integrity.	STATUS_DISK_FULL 0xC000007F	The disk is full.	Error code	Meaning	STATUS_INVALID_PARAMETER 0xC000000D	The input buffer length is less than the size, in bytes, of the FSCTL_SET_INTEGRITY_INFORMATION_BUFFER element; the handle is not to a file or directory; or the requested ChecksumAlgorithm field is not one of the values listed in the table for the ChecksumAlgorithm field in the FSCTL_SET_INTEGRITY_INFORMATION Request.	STATUS_INVALID_DEVICE_REQUEST 0xC0000010	The volume does not support integrity.		
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	STATUS_NOT_SUPPORTED 0xC00000BB	The file has been ghosted (allocation blocks are being shared).												
	<p>In section 2.3.75, FSCTL_SET_INTEGRITY_INFORMATION_EX Request, revised note &lt;76&gt; to indicate which versions support this request:</p> <p>Changed from:</p> <p>&lt;76&gt; Section 2.3.75: The FSCTL_SET_INTEGRITY_INFORMATION_EX Request message is supported only by the ReFS file system v3.2 or higher (Windows 10 v1507 operating system or higher). FSCTL_SET_INTEGRITY_INFORMATION_EX is processed as described on systems updated with <a href="#">[MSKB-5014019]</a>, <a href="#">[MSKB-5014021]</a>, <a href="#">[MSKB-5014022]</a>, <a href="#">[MSKB-5014023]</a>, <a href="#">[MSKB-5014701]</a>, <a href="#">[MSKB-5014702]</a>, or <a href="#">[MSKB-5014710]</a>.</p> <p>Changed to:</p> <p>&lt;76&gt; Section 2.3.75: The FSCTL_SET_INTEGRITY_INFORMATION_EX Request message is supported only by Windows Server 2022 and higher, and Windows 11, version 22H2 operating system and higher. FSCTL_SET_INTEGRITY_INFORMATION_EX is processed as described on systems updated with <a href="#">[MSKB-5014019]</a>, <a href="#">[MSKB-5014021]</a>, <a href="#">[MSKB-5014022]</a>, <a href="#">[MSKB-5014023]</a>, <a href="#">[MSKB-5014701]</a>, <a href="#">[MSKB-5014702]</a>, or <a href="#">[MSKB-5014710]</a>.</p> <p>In section 2.3.76, FSCTL_SET_INTEGRITY_INFORMATION_EX Reply, added STATUS_NOT_SUPPORTED to the error codes list:</p> <p>Changed from:</p> <table border="1" data-bbox="386 1098 1429 1472"> <thead> <tr> <th>Error code</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>STATUS_INVALID_PARAMETER 0xC000000D</td> <td>The input buffer length is less than the size, in bytes, of the FSCTL_SET_INTEGRITY_INFORMATION_BUFFER_EX element; the handle is not to a file or directory; or Version is not equal to 1.</td> </tr> <tr> <td>STATUS_INVALID_DEVICE_REQUEST 0xC0000010</td> <td>The volume does not support integrity.</td> </tr> <tr> <td>STATUS_DISK_FULL 0xC000007F</td> <td>The disk is full.</td> </tr> </tbody> </table> <p>Changed to:</p> <table border="1" data-bbox="386 1581 1429 1787"> <thead> <tr> <th>Error code</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>STATUS_INVALID_PARAMETER 0xC000000D</td> <td>The input buffer length is less than the size, in bytes, of the FSCTL_SET_INTEGRITY_INFORMATION_BUFFER_EX element; the handle is not to a file or directory; or Version is not equal to 1.</td> </tr> </tbody> </table>		Error code	Meaning	STATUS_INVALID_PARAMETER 0xC000000D	The input buffer length is less than the size, in bytes, of the FSCTL_SET_INTEGRITY_INFORMATION_BUFFER_EX element; the handle is not to a file or directory; or Version is not equal to 1.	STATUS_INVALID_DEVICE_REQUEST 0xC0000010	The volume does not support integrity.	STATUS_DISK_FULL 0xC000007F	The disk is full.	Error code	Meaning	STATUS_INVALID_PARAMETER 0xC000000D	The input buffer length is less than the size, in bytes, of the FSCTL_SET_INTEGRITY_INFORMATION_BUFFER_EX element; the handle is not to a file or directory; or Version is not equal to 1.
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2022/08/09	<p>In section 2.7.1, FILE_NOTIFY_INFORMATION, revised descriptions of the values in the Action field.</p> <p>Changed from:</p> <table border="1"> <thead> <tr> <th data-bbox="386 615 683 667">Value</th> <th data-bbox="683 615 1421 667">Meaning</th> </tr> </thead> <tbody> <tr> <td data-bbox="386 667 683 751">FILE_ACTION_ADDED 0x00000001</td> <td data-bbox="683 667 1421 751">The file was added to the directory.</td> </tr> <tr> <td data-bbox="386 751 683 856">FILE_ACTION_REMOVED 0x00000002</td> <td data-bbox="683 751 1421 856">The file was removed from the directory. When a file is renamed to a different directory the client will receive this notification along with FILE_ACTION_MODIFIED.</td> </tr> <tr> <td data-bbox="386 856 683 982">FILE_ACTION_MODIFIED 0x00000003</td> <td data-bbox="683 856 1421 982">The file was modified. This can be a change to the data or attributes of the file. When a file is renamed to a different directory the client will receive this notification along with FILE_ACTION_REMOVED.</td> </tr> </tbody> </table> <p>Changed to:</p> <table border="1"> <thead> <tr> <th data-bbox="386 1056 683 1108">Value</th> <th data-bbox="683 1056 1421 1108">Meaning</th> </tr> </thead> <tbody> <tr> <td data-bbox="386 1108 683 1266">FILE_ACTION_ADDED 0x00000001</td> <td data-bbox="683 1108 1421 1266">The file was renamed, and <b>FileName</b> contains the new name. This notification is only sent when the rename operation changes the directory the file resides in. The client will also receive a FILE_ACTION_REMOVED notification. This notification will not be received if the file is renamed within a directory.</td> </tr> <tr> <td data-bbox="386 1266 683 1413">FILE_ACTION_REMOVED 0x00000002</td> <td data-bbox="683 1266 1421 1413">The file was renamed, and <b>FileName</b> contains the old name. This notification is only sent when the rename operation changes the directory the file resides in. The client will also receive a FILE_ACTION_ADDED notification. This notification will not be received if the file is renamed within a directory.</td> </tr> <tr> <td data-bbox="386 1413 683 1497">FILE_ACTION_MODIFIED 0x00000003</td> <td data-bbox="683 1413 1421 1497">The file was modified. This can be a change to the data or attributes of the file.</td> </tr> </tbody> </table>	Value	Meaning	FILE_ACTION_ADDED 0x00000001	The file was added to the directory.	FILE_ACTION_REMOVED 0x00000002	The file was removed from the directory. When a file is renamed to a different directory the client will receive this notification along with FILE_ACTION_MODIFIED.	FILE_ACTION_MODIFIED 0x00000003	The file was modified. This can be a change to the data or attributes of the file. When a file is renamed to a different directory the client will receive this notification along with FILE_ACTION_REMOVED.	Value	Meaning	FILE_ACTION_ADDED 0x00000001	The file was renamed, and <b>FileName</b> contains the new name. This notification is only sent when the rename operation changes the directory the file resides in. The client will also receive a FILE_ACTION_REMOVED notification. This notification will not be received if the file is renamed within a directory.	FILE_ACTION_REMOVED 0x00000002	The file was renamed, and <b>FileName</b> contains the old name. This notification is only sent when the rename operation changes the directory the file resides in. The client will also receive a FILE_ACTION_ADDED notification. This notification will not be received if the file is renamed within a directory.	FILE_ACTION_MODIFIED 0x00000003	The file was modified. This can be a change to the data or attributes of the file.
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2022/05/27	<p>In section 2.3.75, FSCTL_SET_INTEGRITY_INFORMATION_EX Request, updated list of applicable updates.</p> <p>Changed from:</p> <p>&lt;76&gt; Section 2.3.75: The FSCTL_SET_INTEGRITY_INFORMATION_EX Request message is supported only by the ReFS file system v3.2 or higher (Windows 10 v1507 operating system or higher). FSCTL_SET_INTEGRITY_INFORMATION_EX is processed as described on systems updated with [MSKB-5014019], [MSKB-5014021], [MSKB-5014022], or [MSKB-5014023].</p> <p>Changed to:</p>																



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2022/05/02	<p>In Section 2.1.5.9.34, FSCTL_SET_INTEGRITY_INFORMATION_EX, updated processing rules for system versions.</p> <p>Changed from:</p> <p>The server provides:&lt;127&gt;</p> <p>&lt;127&gt; Section 2.1.5.9.34: The FSCTL_SET_INTEGRITY_INFORMATION_EX operation is supported only by the ReFS file system v3.2 or higher (Windows 10 v1507 operating system or higher).</p> <p>Changed to:</p> <p>The server provides:&lt;127&gt;</p> <p>&lt;127&gt; Section 2.1.5.9.34: The FSCTL_SET_INTEGRITY_INFORMATION_EX operation is supported only by the ReFS file system v3.2 or higher (Windows 10 v1507 operating system or higher). FSCTL_SET_INTEGRITY_INFORMATION_EX is handled following the process in this section on systems updated with [MSKB-5014019], [MSKB-5014021], [MSKB-5014022], or [MSKB-5014023].</p>