[MS-CFB]: Compound File Binary File Format

Errata below are for Protocol Document Version V7.0 – 2017/12/01.

Errata Published*	Description
2017/12/11	In Section 2.6.3, Other Directory Entries, information about stream allocation has been clarified. Changed from: To determine the file location of actual stream data from a stream directory entry, it is necessary to determine whether the stream exists in the FAT or the mini FAT. Streams whose size is less than the Mini Sector Cutoff value (typically 4,096 bytes) for the file exist in the mini stream. The Starting Sector Location is used as an index into the mini FAT (which starts at mini FAT Starting Location) to track the chain of sectors through the mini stream. Streams whose size is greater than the Mini Sector Cutoff value for the file exist as standard streams. Their Starting Sector Location value is used as an index into the standard FAT, which describes the chain of full sectors containing their data. Changed to: To determine the file location of actual stream data from a stream directory entry, it is necessary to determine whether the stream exists as normal sectors allocated in the FAT or as mini sectors (from the mini stream) allocated in the mini FAT. Streams whose size is less than the Mini Stream Cutoff Size value (typically 4,096 bytes) for the file exist in the mini stream. The Starting Sector Location is used as an index into the mini FAT (which starts at mini FAT Starting Location) to track the chain of sectors through the mini stream. Streams whose size is greater than or equal to the Mini Stream Cutoff Size value for the file exist as standard streams. Their Starting Sector Location value is used as an index into the standard FAT, which describes the chain of full sectors containing their data. In Section 2.9, Compound File Size Limits, a reference was added for details about directory-entry size and directory-sector composition. Changed from: The maximum number of directory entries (storage objects and stream objects) is MAXREGSID (0xFFFFFFFA), roughly 4 billion. This corresponds to a maximum directory sector chain length of slightly less than 512 GB for a 4,096-byte sector compound file. Changed to: The maximum number of directory entries (storage objects and stream objects) is MAXREGSID (0xFFFFFFFA), roughly 4 billion. This corresponds to a maximum directory sector chain length of slightly less than 512 GB for a 4,096-byte sector compound file. (See section 2.6.1 for details about directory-entry size and directory-sector composition.)
2017/12/11	In Section 2.6.1, Compound File Directory Entry, various field descriptions have been clarified and corrected.

Errata Published*	Description
	Changed from: Child ID (4 bytes): This field contains the stream ID of a child object. If there is no child object, the field MUST be set to NOSTREAM (0xFFFFFFFF). … CLSID (16 bytes): This field contains an object class GUID, if this entry is a storage or root storage. If no object class GUID is set on this object, the field MUST be set to all zeroes. In a stream object, this field MUST be set to all zeroes. If not NULL, the object class GUID can be used as a parameter to start applications. <table><tr><td>Value</td><td>Meaning</td></tr><tr><td>0x00000000000000000000000000000000</td><td>If no object class GUID is set on this object.</td></tr></table> State Bits (4 bytes): This field contains the user-defined flags if this entry is a storage object or root storage object. If no state bits are set on the object, this field MUST be set to all zeroes. <table><tr><td>Value</td><td>Meaning</td></tr><tr><td>0x00000000</td><td>If no state bits are set on the object.</td></tr></table> Creation Time (8 bytes): This field contains the creation time for a storage object. The Windows FILETIME structure is used to represent this field in UTC. If no creation time is set on the object, this field MUST be all zeroes. For a root storage object, this field MUST be all zeroes, and the creation time is retrieved or set on the compound file itself. <table><tr><td>Value</td><td>Meaning</td></tr><tr><td>0x0000000000000000</td><td>If no creation time is set on the object or for a root storage object.</td></tr></table> Modified Time (8 bytes): This field contains the modification time for a storage object. The Windows FILETIME structure is used to represent this field in UTC. If no modified time is set on the object, this field MUST be all zeroes. For a root storage object, this field MUST be all zeroes, and the modified time is retrieved or set on the compound file itself. <table><tr><td>Value</td><td>Meaning</td></tr><tr><td>0x0000000000000000</td><td>If no modified time is set on the object or the object is a root storage object.</td></tr></table> Starting Sector Location (4 bytes): This field contains the first sector location if this is a stream object. For a root storage object, this field MUST contain the first sector of the mini stream, if the mini stream exists. Stream Size (8 bytes): This 64-bit integer field contains the size of the user-defined data, if this is a stream object. For a root storage object, this field contains the size of the mini stream. … Changed to:

Errata Published*	Description
	Child ID (4 bytes): This field contains the stream ID of a child object. If there is no child object, including all entries for stream objects, the field MUST be set to NOSTREAM (0xFFFFFFFF).
	…
	CLSID (16 bytes): This field contains an object class GUID, if this entry is for a storage object or root storage object. For a stream object, this field MUST be set to all zeroes. A value containing all zeroes in a storage or root storage directory entry is valid, and indicates that no object class is associated with the storage. If an implementation of the file format enables applications to create storage objects without explicitly setting an object class GUID, it MUST write all zeroes by default. If this value is not all zeroes, the object class GUID can be used as a parameter to start applications.

Value	Meaning
0x00000000000000000000000000000000	No object class is associated with the storage.

State Bits (4 bytes): This field contains the user-defined flags if this entry is for a storage object or root storage object. For a stream object, this field SHOULD be set to all zeroes because many implementations provide no way for applications to retrieve state bits from a stream object. If an implementation of the file format enables applications to create storage objects without explicitly setting state bits, it MUST write all zeroes by default.

Value	Meaning
0x00000000	Default value when no state bits are explicitly set on the object.

Creation Time (8 bytes): This field contains the creation time for a storage object, or all zeroes to indicate that the creation time of the storage object was not recorded. The Windows FILETIME structure is used to represent this field in UTC. For a stream object, this field MUST be all zeroes. For a root storage object, this field MUST be all zeroes, and the creation time is retrieved or set on the compound file itself.

Value	Meaning
0x0000000000000000	No creation time was recorded for the object.

Modified Time (8 bytes): This field contains the modification time for a storage object, or all zeroes to indicate that the modified time of the storage object was not recorded. The Windows FILETIME structure is used to represent this field in UTC. For a stream object, this field MUST be all zeroes. For a root storage object, this field MAY<2> be set to all zeroes, and the modified time is retrieved or set on the compound file itself.

Value	Meaning
0x0000000000000000	No modified time was recorded for the object.

<2> Section 2.6.1: When Windows sets the modified time of a root storage, it sets the modified time of the file in the file system (as described in section 2.6.2) and also sets the modified time in the root storage directory entry. When Windows retrieves the modified time of a root storage, it gets the modified time of the file in the filesystem but ignores the modified time in the root storage directory entry.

Errata Published*	Description
	Starting Sector Location (4 bytes): This field contains the first sector location if this is a stream object. For a root storage object, this field MUST contain the first sector of the mini stream, if the mini stream exists. For a storage object, this field MUST be set to all zeroes.
	Stream Size (8 bytes): This 64-bit integer field contains the size of the user-defined data, if this is a stream object. For a root storage object, this field contains the size of the mini stream. For a storage object, this field MUST be set to all zeroes.
	In Section 2.6.2, Root Directory Entry, processing rules for Modified Time were updated.
	Changed from:
	The Creation Time and modified time fields in the root storage directory entry MUST be all zeroes.
	Changed to:
	The Creation Time field in the root storage directory entry MUST be all zeroes. The Modified Time field in the root storage directory entry MAY be all zeroes.
	In Section 2.6.3, Other Directory Entries, composition of objects was clarified and corrected.
	Changed from:
	Storage objects MAY have CLSID, creation time, modified time, and Child Stream ID values. Stream objects MUST set these values to zero.
	Stream objects MAY have valid Starting Sector Location and Stream Size values, whereas these fields are set to zero for storage objects (except as noted for the root directory entry).
	Changed to:
	The CLSID, state bits, creation time, modified time, and Child ID values are meaningful in directory entries for storage objects but not for Stream objects.
	The Starting Sector Location and Stream Size values are meaningful in directory entries for stream objects but not for storage objects.
	In Section 3.3.1, Stream ID 0: Root Directory Entry, the names for State Bits and Modified Time were corrected, and the correct value for Modified Time was included.
	Changed from:

Byte offset	Field name	Field value
0x0400	Directory Entry Name	"Root Entry" (section 2.6.2)
…	…	…
0x0460	State Flags	0x00000000
0x0464	Creation Time	0x0000000000000000
0x046C	Modification Time	0x0000000000000000

Errata Published*	Description		
	…	…	…

Changed to:

Byte offset	Field name	Field value
0x0400	Directory Entry Name	"Root Entry" (section 2.6.2)
…	…	…
0x0460	State Bits	0x00000000
0x0464	Creation Time	0x0000000000000000
0x046C	Modified Time	0x01BAB44B13921E80 (11/16/1995 5:43:45 PM)
…	…	…

In Section 3.3.2, Stream ID 1: Storage 1, the names for State Bits and Modified Time were corrected, and the correct values for Creation Time and Modified Time were included.

Changed from:

Byte offset	Field name	Field value
0x0480	Directory Entry Name	"Storage 1"
…	…	…
0x04E0	State Flags	0x00000000
0x04E4	Creation Time	0x0000000000000000
0x04EC	Modification Time	0x0000000000000000
…	…	…

Changed to:

Byte offset	Field name	Field value
0x0480	Directory Entry Name	"Storage 1"
…	…	…
0x04E0	State Bits	0x00000000
0x04E4	Creation Time	0x01BAB44B12F98800 (11/16/1995 5:43:44 PM)
0x04EC	Modified Time	0x01BAB44B13921E80 (11/16/1995 5:43:45 PM)
…	…	…

Errata Published*	Description
	In Section 3.3.3, Stream ID 2: Stream 1 and Section 3.3.4, Stream ID 3: Unused, Free, the names for State Bits and Modified Time were corrected. Changed from: 	Byte offset	Field name	Field value
---	---	---
0x0500	Directory Entry Name	"Stream 1"
…	…	…
0x0560	State Flags	0x00000000
0x0564	Creation Time	0x0000000000000000
0x056C	Modification Time	0x0000000000000000
…	…	… | Changed to: | Byte offset	Field name	Field value
---	---	---
0x0500	Directory Entry Name	"Stream 1"
…	…	…
0x0560	State Bits	0x00000000
0x0564	Creation Time	0x0000000000000000
0x056C	Modified Time	0x0000000000000000
…	…	…	

*Date format: YYYY/MM/D