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The "MFMT", "MFCT", and "MFF" Command Extensions for FTP
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MFMT MFCT and MFF commands for FTP

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Abstract

This document defines extensions to the FTP specification STD 9, [RFC 959](#), "FILE TRANSFER PROTOCOL (FTP)". These extensions provide the ability for a FTP Client to modify the last modification time, the creation time, or multiple facts (last modification time, creation time, operating system permissions, etc.) of an object in the server-FTP process NVFS. These extensions are implemented by three new optional commands: "MFMT" (Modify Fact: Modification Time), "MFCT" (Modify Fact: Creation Time), and "MFF" (Modify Fact: Facts).

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Comments

Comments are solicited and should be addressed to David Somers (dsomers@omz13.com).

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1. Introduction

The File Transfer Protocol (FTP) currently defined in STD 9, [RFC 959](#) [1], and in place on the Internet allows files to be transferred between a server-FTP and a user-FTP, and vice versa. When a file is transferred from the user-FTP to the server-FTP, the creation time, last modification time, and operating system facts (for example, file permissions) can not be specified. The NVFS typically sets these to default values.

This document defines extensions to the File Transfer Protocol, specifically three new optional commands: "MFMT", "MFCT", and "MFF".

The "MFMT" command allows the last modification time an object in the NVFS to be modified. This is an alternative to abusing "MDTM" (as defined in section 3 of [2]), which was only intended to read the modification time and not to set it as some implementations do.

The "MFCT" command allows the creation time an object in the NVFS to be modified.

The "MFF" command allows multiple facts of an object in the NVFS to be modified. The MFF command is complimentary to the MLSx commands as detailed in [2]. The MLSx commands provides a standardized way of retrieving facts for objects in the NVFS; the MFF command aims to standardize modifying (or setting) the facts for the objects in the NVFS.

[2.](#) Document Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [\[3\]](#)."

This document also uses notation defined in [\[1\]](#). In particular, the terms "reply", "user", "NVFS", "file", "pathname", "FTP commands", "DTP", "user-FTP process", "user-PI", "user-DTP", "server-FTP process", "server-PI", "server-DTP", "mode", "type", "NVT", "control connection", "data connection", and "ASCII", are all used here as defined there.

Syntax required is defined using the Augmented BNF defined in [\[4\]](#). Some general ABNF definitions are required throughout the document, those will be defined later in this section. At first reading, it may be wise to simply recall that these definitions exist here, and skip to the next section.

[2.1.](#) Basic Tokens

This document defines basic tokens in the same manner as that as

specified in section 2.1 of [\[2\]](#).

[2.2.](#) Pathnames

This document defines pathnames in the same manner as that specified in section 2.2 of [\[2\]](#).

[2.3.](#) Times

This document defines times in the same manner as that as specified in section 2.3 of [\[2\]](#).

[2.4.](#) Server Replies

This document defines server replies in the same manner as that specified in section 2.4 of [\[2\]](#).

[2.5.](#) Interpreting Examples

This document presents examples in the same manner as that specified in section 2.5 of [\[2\]](#).

[3.](#) Modify Fact: Modification Time (MFMT)

The FTP command, MODIFY FACT: MODIFICATION TIME (MFMT), is used to modify the last modification time of an object in the NVFS.

The ability to modify the last modification time MAY also be achieved, if supported by the server-PI, by using the "Modify" fact to the MFF command as detailed in [Section 5](#).

It should be noted that similar functionality has been implemented by some server-PIs as the command MDTM. However, the use of MDTM to modify the last modification time of an object conflicts with the use of the MDTM command to retrieve the last modification time of an object as defined in [\[2\]](#). It is RECOMMENDED that, if possible, client-PIs use the MFMT command instead of abusing the MDTM command

to change the modification time of an object in the NVFS.

If the client-PI wants to modify both the modification time and the creation time, it is RECOMMENDED that the MFF command, if supported by the server-PI, be used instead.

If the NVFS supports the concept of both creation times and modification times, it is RECOMMENDED that server-PI give priority to setting the modification time, even if it means that to set the modification time requested by the client-PI the server-PI must also change the creation time. An example of this prioritization is if the requested modification time is prior to the current creation time and the NVFS does not permit the modification time to be prior to the creation time; the only way to set the modification time in such a situation is for the server-PI to automagically change the creation time to a time before or of the same as the requested modification time. The rationale for this prioritization of modification over creation time is because, generally speaking, it is more important for the modification time to be more valid than the creation time as the modification time is typically used to perform object synchronization between hosts.

[3.1.](#) Syntax

The syntax of the MFMT command is:

```
mfmt = "MFMT" SP time-val SP pathname CRLF
```

As with all FTP commands, the "MFMT" command label is interpreted in a case insensitive manner.

The "time-val" specifies the last modification time to be applied to the object.

The "pathname" specifies an object in the NVFS.

The server-PI MUST respond to the MFMT command with a 213 reply, or an error response if the object does not exist, the last modification time could not be modified, or some other error has occurred.

```
mfmt-response = "213" SP "Modify=" time-val ";" SP pathname CRLF /  
error-response
```

The "time-val" in the response MUST be the modified last modification time of the object. This value MAY not be the same as that requested due to constraints of the NVFS to store the last modification time (for example, it may only have sufficient resolution to store the last modification time to the nearest minute instead of to the thousandths of a second that "time-val" MAY be specified to). It is RECOMMENDED that the client-PI parse the 213 response to determine what the modification time was actually modified to by the server-PI.

[3.2.](#) Error responses

Where the command is correctly parsed, but the pathname identifies no existing object, then a 550 reply SHOULD be sent. Where the command can not be correctly parsed, a 500 or 501 reply SHOULD be sent. If the date or time specified is invalid (for example, February 29 in a non-leap year), then a 501 reply MUST be sent. Various 4xy replies are also possible in appropriate circumstances.

[3.3.](#) FEAT response for MFMT

Where a server-FTP process supports the MFMT command, as specified here, it MUST include the response to the FEAT command [\[5\]](#):

```
mfmt-feat = SP "MFMT" CRLF
```

The initial space shown in the mfmt-feat response is that required by the FEAT command.

This string "MFMT" is not case sensitive, but SHOULD be transmitted in upper case. Where MFMT is not supported, the MFMT line MUST NOT be included in the FEAT response.

[3.3.1.](#) Example FEAT response

```
C> feat
S> 211- <any descriptive text>
S> ...
S> MFMT
S> ...
S> 211 end
```

The ellipses indicate place holders where other features may be included, and are not required. The one space indentation of the feature lines is mandatory [5].

[3.4.](#) MFMT Examples

To modify the last modification time of a file called "Fred.txt" to July 17, 2002 21:07:15,

```
C> MFMT 20020717210715 Fred.txt
S> 213 Modify=20020717210715; Fred.txt
```

[4.](#) Modify Fact: Creation Time (MFCT)

The FTP command, MODIFY FACT: CREATION TIME (MFCT), is used to modify the creation time of an object in the NVFS.

The ability to modify the creation time MAY also be achieved, if supported by the server-PI, by using the "Create" fact to the MFF command as detailed in [Section 5](#).

If the client-PI wants to modify both the modification time and the creation time, it is RECOMMENDED that the MFF command, if supported by the server-PI, be used instead.

[4.1.](#) Syntax

The syntax of the MFCT command is:

```
mfct = "MFCT" SP time-val SP pathname CRLF
```

As with all FTP commands, the "MFCT" command label is interpreted in a case insensitive manner.

The "time-val" specifies the creation time to be applied to the object.

The "pathname" specifies an object in the NVFS.

The server-PI MUST respond to the MFCT command with a 213 reply, or an error response if the object does not exist, the creation time could not be modified, or some other error has occurred.

```
mfct-response = "213" SP "Create=" time-val ";" SP pathname CRLF /  
                error-response
```

The "time-val" in the response MUST be the modified creation time of the object. This value MAY not be the same as that requested due to constraints of the NVFS to store the creation time (for example, it may only have sufficient resolution to store the creation time to the nearest minute instead of to the thousandths of a second that "time-val" MAY be specified to). It is RECOMMENDED that the client-PI parse the 213 response to determine what the creation time was actually modified to by the server-PI.

[4.2.](#) Error responses

Where the command is correctly parsed, but the pathname identifies no existing object, then a 550 reply SHOULD be sent. Where the command

can not be correctly parsed, a 500 or 501 reply SHOULD be sent. If the date or time specified is invalid (for example, February 29 in a

non-leap year), then a 501 reply MUST be sent. Various 4xy replies are also possible in appropriate circumstances.

[4.3.](#) FEAT response for MFCT

Where a server-FTP process supports the MFCT command, as specified here, it MUST include the response to the FEAT command [\[5\]](#):

```
mfct-feat = SP "MFCT" CRLF
```

The initial space shown in the mfct-feat response is that required by the FEAT command.

This string "MFCT" is not case sensitive, but SHOULD be transmitted in upper case. Where MFCT is not supported, the MFCT line MUST NOT be included in the FEAT response.

[4.3.1.](#) Example FEAT response

```
C> feat
S> 211- <any descriptive text>
S> ...
S> MFCT
S> ...
S> 211 end
```

The ellipses indicate place holders where other features may be included, and are not required. The one space indentation of the feature lines is mandatory [\[5\]](#).

[4.4.](#) MFCT Examples

To modify the creation time of a file called "Jim.txt" in the current directory to July 17, 2002 21:22:30,

```
C> MFCT 20020717212230 Jim.txt
S> 213 Create=20020717212230; Jim.txt
```

[5.](#) Modify Fact: Facts (MFF)

The FTP command, MODIFY FACT: FACTS (MFF), is used to modify one or more facts of an object in the NVFS. These facts are attributes such as creation time, last modification time, or operating system specific attributes such as access permissions.

The MFF command is complimentary to the MLSx commands as detailed in [\[2\]](#). The MLSx commands provides a standardized way of retrieving facts for objects in the NVFS; the MFF command aims to standardize modifying (or setting) the facts for the objects in the NVFS. The format of facts is identical to that specified in [\[2\]](#).

If the client-PI wants to modify only the modification time or only the creation time, it is RECOMMENDED that the MFCT (see [Section 4](#)) or MFMT (see [Section 3](#)) commands, if supported by the server-PI, be used respectively instead of the MFF command.

It MAY be possible for a client to attempt to set the modification time prior to the creation time; this situation may be nonsensical, but it may be necessary, and it is RECOMMENDED that it not be considered an error by the server-PI. If necessary, the server-PI SHOULD prioritize modifying the modification time, even if that means automagically changing the creation time (due to, for example, NVFS restrictions).

[5.1.](#) Syntax

The syntax of the MFF command is:

```
mff                = "MFF" [ mff-facts ] SP pathname CRLF
mff-facts          = 1*( mff-fact ";" )
```

```
mff-fact          = mff-standardfact / mff-osfact / mff-localfact
mff-standardfact = mff-create-fact / mff-modify-fact
mff-create-fact  = "Create" "=" time-val
mff-modify-fact  = "Modify" "=" time-val
mff-osfact       = <IANA assigned OS name> "." token "=" *SCHAR
mff-localfact    = "X." token "=" *SCHAR
```

As with all FTP commands, the "MFF" command label is interpreted in a case insensitive manner.

The "mff-facts" are a series of facts as keyword=value pairs each separated by a semi-colon (";") character. Fact keyword names are case-insensitive.

The "pathname" specifies an object in the NVFS.

The server-PI MUST respond to the MFF command with a 213 reply containing a list of the facts that MUST detail the values actually set for all the facts specified in the request (which MAY differ from that requested), or an error response.

```
mff-response = "213" SP 1*( mff-fact ";") SP pathname CRLF /
              error-response
```

The order of the "mff-fact" keyword=value pairs returned in the response MAY be in any order.

The "time-val" in the response MAY not be the same as that requested due to constraints of the NVFS to store such times (for example, it may only have sufficient resolution to store the last modification time to the nearest minute instead of to the thousandths of a second that "time-val" MAY be specified to).

The error response MUST be returned if any of the following conditions happen:

- o The object does not exist.
- o A fact could not be modified, for example due to insufficient access control permissions.

- o An unknown fact was specified.

When an error response is returned, the client-PI MUST make no assumptions about which, if any, facts have been modified. In other words, modifying facts is not an atomic operation. The client-PI can issue an MLST (if the server-PI supports the MLST command) to determine what attributes have, in fact, been modified.

[5.2.](#) Standard facts

This document defines the following standard facts for use by MFF:

- o Create
- o Modify

[5.2.1.](#) Create fact

The "Create" fact is used to modify the creation time of the object specified by "pathname".

Note that this is the same fact that can be read using the MLST and MLSN commands in [\[2\]](#), and is detailed in see [section 7.5.4](#) of the

aforementioned document.

[5.2.2.](#) Modify fact

The "Modify" fact is used to modify the last modification time of the object specified by "pathname".

Note that this is the same fact that can be read using the MLST and MLSN commands in [\[2\]](#), and is detailed in see [section 7.5.3](#) of the aforementioned document.

[5.3.](#) Operating System specific facts

Facts that are specific to an operating system, or file system, SHOULD be specified by keywords that are prefixed by an IANA operating system name [\[7\]](#).

Implementation Note: It is envisioned that the operating system

specific facts will be identical to those used by the MLSx command as detailed in [2]; implementers can then use the same logic to process facts whether for MLSx or MFF.

The specification of Operating Systems specific facts is explicitly outside the scope of this document. Such specifications SHOULD be documented elsewhere (that is, in an internet draft, RFC, etc.)

[5.3.1.](#) Example Operating System specific facts

The following examples are only indicative of how it is anticipated that some Operating System specific facts could be implemented.

```
UNIX.mode           -- Unix file mode (in octal)
UNIX.owner          -- Unix owner (as a decimal Uid or a username)
UNIX.group          -- Unix group (as a decimal Gid or a groupname)
WINDOWS-NT.SIS.Author -- Windows NT,
                    Summary Information Stream, Author property
```

[5.4.](#) Local/Experimental "X." facts

Implementations may define keywords for experimental, or private, use. All such keywords MUST begin with the two character sequence "X.". As fact names are case-insensitive, "X." and "x." are equivalent.

[5.5.](#) Error responses

Where the command is correctly parsed, but the pathname identifies no existing object, then a 550 reply SHOULD be sent. Where the command

can not be correctly parsed, a 500 or 501 reply SHOULD be sent. If the date or time specified for a Create or Modify fact is invalid (for example, February 29 in a non-leap year), then a 501 reply MUST be sent. If an unknown fact is provided, a 504 reply SHOULD be sent, and it is RECOMMENDED that the 504 reply indicate the name(s) of the unknown fact(s). Various 4xy replies are also possible in appropriate circumstances.

[5.6.](#) FEAT response for MFF

Where a server-FTP process supports the MFF command, as specified

here, it MUST include in the response to the FEAT command [5], a feature line containing the string "MFF". This string is not case sensitive, but SHOULD be transmitted in upper case. As well as indicating MFF support, the MFF feature line indicates, as a semi-colon delimited list, which MFF facts are available for modification by the server-FTP process. Where MFF is not supported, the MFF line MUST NOT be included in the FEAT response.

```
mff-feat = SP "MFF" SP factlist CRLF
factlist = 1*( factname ";" )
```

The initial space shown in the mff-feat response is that required by the FEAT command.

[5.6.1.](#) Example FEAT responses

```
C> feat
S> 211- <any descriptive text>
S> ...
S> MFF Modify;
S> ...
S> 211 end
```

This server-FTP process indicates that it supports the MFF command, and only supports modification of the modify fact of an object in the NVFS.

```
C> feat
S> 211- <any descriptive text>
S> ...
S> MFF Create;Modify;WINDOWS-NT.SIS.Author;
S> ...
S> 211 end
```

This server-FTP process indicates that it supports the MFF command, and supports modification of the create fact, modify fact, and an operating system specific fact called "WINDOWS-NT.SIS.Author" of an

object in the NVFS. Note that the "WINDOWS-NT.SIS.Author" fact is an example of what could be possible, not what is possible; such a fact may exist, but its definition is outside the scope of this document.

The ellipses indicate place holders where other features may be included, and are not required. The one space indentation of the feature lines is mandatory [5].

5.7. MFF Examples

Note that some of these examples refer to the UNIX.mode fact; whether such a fact exists or not is outside the scope of this document, and is used below only to show what could be possible and not what is possible.

To modify the creation time of a file called "Sheila.txt" to July 17, 2002 21:22:30,

```
C> MFF Create=20020717212230; Sheila.txt
S> 213 Create=20020717212230; Sheila.txt
```

Note that the above could also be achieved using the MFCT command, thus:

```
C> MFCT 20020717212230 Sheila.txt
S> 213 Create=20020717212230; Sheila.txt
```

To modify the permissions on a Unix-based NVFS for the file called "Bob.txt" to (octal) 777,

```
C> MFF UNIX.mode=777; Bob.txt
S> 213 UNIX.mode=777; Bob.txt
```

To modify the permissions on a Unix-based NVFS for the file called "Fred.txt" to (octal) 777, and the creation time to July 18, 2002 01:28:45,

```
C> MFF UNIX.mode=777;Create=20020718012845; Fred.txt
S> 213 Create=20020718012845;UNIX.mode=777; Fred.txt
```

If the same request was made to a server-FTP process that does not support the UNIX.mode fact,

```
C> MFF UNIX.mode=777;Create=20020718012845; Fred.txt
S> 504 Parameter Not Implemented (UNIX.mode)
```

The creation time may or may not have been modified by the server-PI before the server-PI determined that the UNIX.mode fact was not

implemented.

[6.](#) IANA Considerations

This specification makes use of some lists of values currently maintained by the IANA. It does not add any values to any existing registries.

[6.1.](#) The OS Specific fact registry

The MFF command reuses the OS Specific fact registry that is used by the MLSx commands as detailed in [\[2\]](#)

The OS names for the OS portion of the fact name must be taken from the IANA's list of registered OS names. To add a fact name to this OS specific registry of OS specific facts, an applicant must send to the IANA a request, in which is specified the OS name, the OS specific fact name, a definition of the syntax of the fact value, which must conform to the syntax of a token as given in this document, and a specification of the semantics to be associated with the particular fact and its values. Upon receipt of such an application, and if the combination of OS name and OS specific fact name has not been previously defined, the IANA will add the specification to the registry.

Any examples of OS specific facts found in this document are to be treated as examples of possible OS specific facts, and do not form a part of the IANA's registry merely because of being included in this document.

[7.](#) Security Considerations

No significant security issues, not already present in the FTP protocol, are believed to have been created by this extension.

A general discussion of issues related to the security of FTP can be found in [\[6\]](#).

[8.](#) References

[8.1.](#) Normative References

- [1] Postel, J. and J. Reynolds, "File Transfer Protocol", STD 9, [RFC 959](#), October 1985.
- [2] Hethmon, P., "Extensions to FTP", [RFC 3659](#), March 2007.
- [3] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [4] Crocker, D., Ed. and P. Overell, "Augmented BNF for Syntax Specifications: ABNF", [RFC 4234](#), October 2005.
- [5] Hethmon, P., "Feature negotiation mechanism for the File Transfer Protocol", [RFC 2389](#), August 1998.

[8.2.](#) Informative References

- [6] Allman, M. and S. Ostermann, "FTP Security Considerations", [RFC 2577](#), May 1999.

URIs

[7] <<ftp://ftp.iana.org/assignments/operating-system-names>>

[8] <<http://xml.resource.org>>

[Appendix A](#). Acknowledgements

Thank you to the authors and editors of [2] for the facts in their MLSx command which have been hijacked (in the nicest possible way) by the MFF command herein.

A big thanks to xml2rfc [8] which greatly aided in the production of this document.

Finally, many thanks to all who commented on drafts of this document and helped clarify and improve it, and an even bigger thanks to those who have implemented or who intend to implement the FTP commands

presented in this document.

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MFMT MFCT and MFF commands for FTP

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