Windows Protocols Errata

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<td>

This topic lists the Errata found in the Windows Protocols Technical Specifications, Overview Documents, and Reference documents since they were last published. Since this topic is updated frequently, we recommend that you subscribe to these RSS or Atom feeds to receive update notifications.

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Errata are content issues in published versions of protocols documents that could impact an **implementation**. Examples of errata are errors or missing information in the normative sections of the Technical Specifications or in the use cases (examples) in the Technical Specifications and Overview Documents.

Content issues that don't impact an implementation, for example, editorial updates due to typos, formatting updates, and rewrites for readability and clarity, are **not** included in Errata.

The sections below list the Windows Protocols documents that contain active Errata (i.e., Errata not yet released with the documents on Docs.Microsoft.Com [DMC]) and provide links to archived Errata (i.e., Errata already released with the documents on DMC).

Protocols Documents with Active Errata

[MC-NBFX]: .NET Binary Format XML Data Structure

[MC-NMF]: .NET Message Framing Protocol

[MS-ADSC]: Active Directory Schema Classes

[MS-AZOD]: Authorization Protocols Overview

[MS-CIFS]: Common Internet File System (CIFS) Protocol

[MS-FSA]: File System Algorithms

[MS-LCID]: Windows Language Code Identifier (LCID) Reference

[MS-MDE2]: Mobile Device Enrollment Protocol Version 2

[MS-NNS]: .NET NegotiateStream Protocol

[MS-NRBF]: .NET Remoting: Binary Format Data Structure

[MS-NRPC]: Netlogon Remote Protocol

[MS-RDPEUDP2]: Remote Desktop Protocol UDP Transport Extension Version 2

[MS-SMB2]: Server Message Block (SMB) Protocol Versions 2 and 3

[MS-SSTP]: Secure Socket Tunneling Protocol (SSTP)

[MS-SSTR]: Smooth Streaming Protocol

[MS-TDS]: Tabular Data Stream Protocol

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[MC-DTCXA]: MSDTC Connection Manager OleTx XA Protocol

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June 1, 2017 - Download

[MC-NBFX]: .NET Binary Format XML Data Structure

Errata below are for Protocol Document Version V8.0 – 2019/03/13.

Errata Published*	Description
2019/12/09	In Section 2.2.3.30, QNameDictionaryTextRecord(0xBC), the length of the Name field was changed from 3 bytes to variable: Changed from: Name (3 bytes) Changed to: Name (variable) The packet diagram for the message was also changed to reflect the length.

*Date format: YYYY/MM/DD

[MC-NMF]: .NET Message Framing Protocol

Errata below are for Protocol Document Version V9.0 – 2018/03/16.

Errata Published*	Description
2018/07/02	In Section 2.2.6, Preamble Message, the field descriptions have been modified as follows and have been moved to follow the packet diagram. Changed from: The VersionRecord MUST be formatted as specified in section 2.2.3.1. The ModeRecord MUST be formatted as specified in section 2.2.3.2. The ViaRecord MUST be formatted as specified in section 2.2.3.3. The EnvelopeEncodingRecord MUST be formatted as specified in section 2.2.3.4 Changed to: VersionRecord (3 bytes): This field MUST be formatted as specified in section 2.2.3.1. ModeRecord (2 bytes): This field MUST be formatted as specified in section 2.2.3.2. ViaRecord (variable): This field MUST be formatted as specified in section 2.2.3.3. EnvelopeEncodingRecord (variable): This field MUST be formatted as specified in section 2.2.3.4

*Date format: YYYY/MM/DD

[MC-PRCR]: Peer Channel Custom Resolver Protocol

No errata are available for the latest version of this Windows Protocols document. To view a PDF file of the errata for the previous versions of this document, see the following ERRATA Archives:

September 15, 2017 - Download

[MS-ABTP]: Automatic Bluetooth Pairing Protocol

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[MS-ADA2]: Active Directory Schema Attributes M

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[MS-ADA3]: Active Directory Schema Attributes N-Z

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[MS-ADDM]: Active Directory Web Services: Data Model and Common Elements

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[MS-ADFSOAL]: Active Directory Federation Services OAuth Authorization Code Lookup Protocol

No errata are available for the latest version of this Windows Protocols document. To view a PDF file of the errata for the previous versions of this document, see the following ERRATA Archives:

July 18, 2016 - Download

[MS-ADFSPIP]: Active Directory Federation Services and Proxy Integration Protocol

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[MS-ADFSWAP]: Active Directory Federation Service (AD FS) Web Agent Protocol

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[MS-ADLS]: Active Directory Lightweight Directory Services Schema

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June 1, 2017 - Download

[MS-ADSC]: Active Directory Schema Classes

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Errata below are for Protocol Document Version V23.0 – 2018/03/16.

Errata Published*	Description

2019/09/16	In Section 2.243, Class samDomain, changed from:
	
	`(OA;CIOI;RPWP;3f78c3e5-f79a-46bd-a0b8-9d18116ddc79;;PS)`
	`S:(AU;SA;WDWOWP;;;WD)(AU;SA;CR;;;BA)(AU;SA;CR;;;DU)`
	
	Changed to:
	
	`(OA;CIOI;RPWP;3f78c3e5-f79a-46bd-a0b8-9d18116ddc79;;PS)`
	`(OA;CIIO;SW;9b026da6-0d3c-465c-8bee-5199d7165cba;bf967a86-0de6-11d0-a285-00aa003049e2;PS)`
	`(OA;CIIO;SW;9b026da6-0d3c-465c-8bee-5199d7165cba;bf967a86-0de6-11d0-a285-00aa003049e2;CO)`
	`S:(AU;SA;WDWOWP;;;WD)(AU;SA;CR;;;BA)(AU;SA;CR;;;DU)`

*Date format: YYYY/MM/DD

[MS-ADTS]: Active Directory Technical Specification

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[MS-AIPS]: Authenticated Internet Protocol

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[MS-APDS]: Authentication Protocol Domain Support

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[MS-AZOD]: Authorization Protocols Overview

To view a PDF file of the errata for the previous versions of this document, see the following ERRATA Archives:

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Errata below are for Protocol Document Version V4.0 - 2018/11/05

Errata Published*	Description
2021/01/11	In Section 1.1.1.3, Security Descriptor, the language describing how access is granted or denied has been updated. Changed from: "If an explicit deny is found, access is denied. Explicit deny ACEs are always applied, even if conflicting allow ACEs exist. Explicit allow ACEs are examined, as are inherited deny and allow ACEs. The ACEs that apply to the user are accumulated. Inherited deny ACEs overrule inherited allow ACEs but are overruled themselves by explicit allow permissions. If none of the user SIDs or group SIDs in the access token match the DACL, the user is denied access implicitly." Changed to: "The access check algorithm processes ACEs in the order in which they are present within the DACL in order to determine the appropriate access. A matching allow ACE will grant access for any access mask bits present in the ACE, while a matching deny ACE will deny access for any access mask bits in the ACE not already granted by an allow ACE (preventing those bits from being granted by a later allow ACE). As soon as access is granted by any one or more allow ACEs, processing will stop and access will be granted. If a specific desired access bit is denied by a deny ACE (and has not been already granted by an allow ACE) then processing will stop and access will be denied. Thus the recommendation is to always place deny ACEs at the beginning of the ACL followed by allow ACEs, if the deny ACEs should take precedence over the allow ACEs. If none of the user SIDs or group SIDs in the access token match the DACL, the user is denied access implicitly."

*Date format: YYYY/MM/DD

[MS-BKRP]: BackupKey Remote Protocol

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[MS-BKUP]: Microsoft NT Backup File Structure

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[MS-CAPR]: Central Access Policy Identifier (ID) Retrieval Protocol

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[MS-CDP]: Connected Devices Platform Protocol Version 3

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[MS-CHAP]: Extensible Authentication Protocol Method for Microsoft Challenge Handshake Authentication Protocol (CHAP)

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[MS-CFB]: Compound File Binary File Format

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[MS-CIFS]: Common Internet File System (CIFS) Protocol

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Errata below are for Protocol Document Version V30.0 - 2020/10/01

Errata Published*	Description
2021/01/11	In Section 6 Appendix A: Product Behavior, the following behavior notes have been updated: Changed from: <245> Section 3.3.5.5 ... AccessMode.SharingMode ShareAccess 0 Compatibility mode (see below) 1 0x0L (don't share, exclusive use) 2 FILE_SHARE_READ 3 FILE_SHARE_WRITE 4 FILE_SHARE_READ | FILE_SHARE_WRITE 0xFF FCB mode (see below) ● For Compatibility mode, special filename suffixes (after the '.' in the filename) are mapped

Errata Published*	Description
	to SharingMode 4. The special filename suffix set is: "EXE", "DLL", "SYM, "COM". All other file names are mapped to SharingMode 3.

● For FCB mode, if the file is already open on the server, the current sharing mode of the existing Open is preserved and a FID for the file is returned. If the file is not already open on the server, the server attempts to open the file using SharingMode 1.

...

Changed to:

...

AccessMode.SharingMode   ShareAccess

0   Compatibility mode (see below)

1   0x0L (don't share, exclusive use)

2   FILE_SHARE_READ

3   FILE_SHARE_WRITE

4   FILE_SHARE_READ | FILE_SHARE_WRITE

● For Compatibility mode, special filename suffixes (after the '.' in the filename) are mapped to SharingMode 4. The special filename suffix set is: "EXE", "DLL", "SYM", "COM". All other file names are mapped to SharingMode 3.

● If AccessMode field in the request is 0xFF, and the file is already open on the server, the current sharing mode of the existing Open is preserved and a FID for the file is returned. If the file is not already open on the server, the server attempts to open the file using SharingMode 1.

...

Changed from:

<297> Section 3.3.5.35

...

AccessMode.SharingMode   ShareAccess

0   Compatibility mode (see below)

1   0x0L (don't share, exclusive use)

2   FILE_SHARE_READ |

Errata Published*	Description
	3 FILE_SHARE_WRITE
	4 FILE_SHARE_READ | FILE_SHARE_WRITE
	0xFF FCB mode (see below)
	● For Compatibility mode, special filename suffixes (after the '.' in the filename) are mapped to SharingMode 4. The special filename suffix set is: "EXE", "DLL", "SYM", and "COM". All other file names are mapped to SharingMode 3.
	● For FCB mode, if the file is already open on the server, the current sharing mode of the existing Open is preserved, and a FID for the file is returned. If the file is not already open on the server, the server attempts to open the file using SharingMode 1.
	...
	Changed to:
	...
	AccessMode.SharingMode ShareAccess
	0 Compatibility mode (see below)
	1 0x0L (don't share, exclusive use)
	2 FILE_SHARE_READ
	3 FILE_SHARE_WRITE
	4 FILE_SHARE_READ | FILE_SHARE_WRITE
	● For Compatibility mode, special filename suffixes (after the '.' in the filename) are mapped to SharingMode 4. The special filename suffix set is: "EXE", "DLL", "SYM", and "COM". All other file names are mapped to SharingMode 3.
	● If AccessMode field in the request is 0xFF, and the file is already open on the server, the current sharing mode of the existing Open is preserved, and a FID for the file is returned. If the file is not already open on the server, the server attempts to open the file using SharingMode 1.
	...
	Changed from:
	<339> Section 3.3.5.58.2
	...

Errata Published*	Description
	AccessMode.SharingMode ShareAccess
	0 Compatibility mode (see following)
	1 0x0L (don't share, exclusive use)
	2 FILE_SHARE_READ
	3 FILE_SHARE_WRITE
	4 FILE_SHARE_READ | FILE_SHARE_WRITE
	0xFF FCB mode (see following)
	● For Compatibility mode, special filename suffixes (after the "." in the filename) are mapped to SharingMode 4. The special filename suffix set is: "EXE", "DLL", "SYM", "COM". All other file names are mapped to SharingMode 3.
	● For FCB mode, if the file is already open on the server, the current sharing mode of the existing Open is preserved, and a FID for the file is returned. If the file is not already open on the server, the server attempts to open the file using SharingMode 1.
	...
	Changed To:
	...
	AccessMode.SharingMode ShareAccess
	0 Compatibility mode (see following)
	1 0x0L (don't share, exclusive use)
	2 FILE_SHARE_READ
	3 FILE_SHARE_WRITE
	4 FILE_SHARE_READ | FILE_SHARE_WRITE
	● For Compatibility mode, special filename suffixes (after the "." in the filename) are mapped to SharingMode 4. The special filename suffix set is: "EXE", "DLL", "SYM", "COM". All other file names are mapped to SharingMode 3.
	● If AccessMode field in the request is 0xFF, and the file is already open on the server, the current sharing mode of the existing Open is preserved, and a FID for the file is returned. If the file is not already open on the server, the server attempts to open the file using SharingMode 1.

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[MS-CMRP]: Failover Cluster: Management API (ClusAPI) Protocol

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[MS-COMA]: Component Object Model Plus (COMplus) Remote Administration Protocol

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[MS-CRTD]: Certificate Templates Structure

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[MS-CSRA]: Certificate Services Remote Administration Protocol

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[MS-CSSP]: Credential Security Support Provider (CredSSP) Protocol

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[MS-CSVP]: Failover Cluster: Setup and Validation Protocol (ClusPrep)

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[MS-DCOM]: Distributed Component Object Model (DCOM) Remote Protocol

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[MS-DFSC]: Distributed File System (DFS) Referral Protocol

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[MS-DHCPE]: Dynamic Host Configuration Protocol (DHCP) Extensions

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[MS-DHCPM]: Microsoft Dynamic Host Configuration Protocol (DHCP) Server Management Protocol

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[MS-DNSP]: Domain Name Service (DNS) Server Management Protocol

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[MS-DPWSSN]: Devices Profile for Web Services (DPWS) Size Negotiation Extension

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[MS-DRSR]: Directory Replication Service (DRS) Remote Protocol

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[MS-DTCO]: MSDTC Connection Manager: OleTx Transaction Protocol

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[MS-DSCPM]: Desired State Configuration Pull Model Protocol

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[MS-DTYP]: Windows Data Types

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[MS-DVRD]: Device Registration Discovery Protocol

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[MS-DVRE]: Device Registration Enrollment Protocol

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[MS-DVRJ]: Device Registration Join Protocol

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[MS-ECS]: Enterprise Client Synchronization Protocol

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[MS-EFSR]: Encrypting File System Remote (EFSRPC) Protocol

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[MS-EMF]: Enhanced Metafile Format

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[MS-EMFPLUS]: Enhanced Metafile Format Plus Extensions

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[MS-EMFSPOOL]: Enhanced Metafile Spool Format

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[MS-ERREF]: Windows Error Codes

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[MS-EVEN]: EventLog Remoting Protocol

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[MS-EVEN6]: EventLog Remoting Protocol Version 6.0

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[MS-FASP]: Firewall and Advanced Security Protocol

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[MS-FAX]: Fax Server and Client Remote Protocol

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[MS-FRS2]: Distributed File System Replication Protocol

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[MS-FSA]: File System Algorithms

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Errata below are for Protocol Document Version V32.0 – 2021/04/07.

Errata Published*	Description
2021/05/03	In Section 2.1.5.9.19, FSCTL_MARK_HANDLE, updated the processing rules for when to return STATUS_INVALID_PARAMETER or STATUS_RESIDENT_FILE_NOT_SUPPORTED. Changed from: Upon completion, the object store MUST return: ● Status: An NTSTATUS code that specifies the result. Support for this operation is optional. If the object store does not implement this functionality, the operation MUST be failed with STATUS_INVALID_DEVICE_REQUEST. <94> Pseudocode for the operation is as follows: ● If InputBufferSize is less than the size of the MARK_HANDLE_INFO structure, the operation MUST be failed with STATUS_BUFFER_TOO_SMALL.

Errata Published*	Description
	● If Open.Stream.StreamType == DirectoryStream, the operation MUST be failed with STATUS_DIRECTORY_NOT_SUPPORTED. ● STATUS_INVALID_PARAMETER is returned if: … Changed to: Upon completion, the object store MUST return: ● Status: An NTSTATUS code that specifies the result. Support for this operation is optional. If the object store does not implement this functionality, the operation MUST be failed with STATUS_INVALID_DEVICE_REQUEST. If the object store supports FSCTL_MARK_HANDLE but does not support MARK_HANDLE_READ_COPY or MARK_HANDLE_NOT_READY_COPYT, then STATUS_INVALID_PARAMETER MUST be returned. <94> Pseudocode for the operation is as follows: ● If InputBufferSize is less than the size of the MARK_HANDLE_INFO structure, the operation MUST be failed with STATUS_BUFFER_TOO_SMALL. ● If Open.Stream.StreamType == DirectoryStream, the operation MUST be failed with STATUS_DIRECTORY_NOT_SUPPORTED.<95> ● If a file is resident the operation MUST be failed with STATUS_RESIDENT_FILE_NOT_SUPPORTED.<96> ● STATUS_INVALID_PARAMETER is returned if: … <95> Section 2.1.5.9.20: The ReFS file system returns STATUS_INVALID_PARAMETER for directory files. <96> Section 2.1.5.9.19: Only the NTFS file system supports the concept of resident files, and it is an implementation-specific concept to a given file system.

*Date format: YYYY/MM/DD

[MS-FSCC]: File System Control Codes

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[MS-FSRVP]: File Server Remote VSS Protocol

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[MS-FSVCA]: File Set Version Comparison Algorithms

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[MS-GPPREF]: Group Policy: Preferences Extension Data Structure

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[MS-GPSB]: Group Policy: Security Protocol Extension

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[MS-GPOL]: Group Policy: Core Protocol

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[MS-GPWL]: Group Policy: Wireless/Wired Protocol Extension

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[MS-GSSA]: Generic Security Service Algorithm for Secret Key Transaction Authentication for DNS (GSS-TSIG) Protocol Extension

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[MS-HGSA]: Host Guardian Service: Attestation Protocol

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[MS-HTTPE]: Hypertext Transfer Protocol (HTTP) Extensions

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[MS-HVRS]: Hyper-V Remote Storage Profile

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[MS-ICPR]: ICertPassage Remote Protocol

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[MS-IKEE]: Internet Key Exchange Protocol Extensions

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[MS-IPAMM2]: IP Address Management (IPAM) Management Protocol Version 2

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[MS-IPHTTPS]: IP over HTTPS (IP-HTTPS) Tunneling Protocol

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[MS-IRP]: Internet Information Services (IIS) Inetinfo Remote Protocol

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[MS-KILE]: Kerberos Protocol Extensions

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[MS-KPP]: Key Provisioning Protocol

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[MS-KPS]: Key Protection Service Protocol

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[MS-LCID]: Windows Language Code Identifier (LCID) Reference

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Errata below are for Protocol Document Version V14.1 - 2021/04/07

Errata Published*	Description
2021/05/03	In Section 2.2, LCID Structure, added locales without assigned LCIDs to the Language ID Table: Changed from: Values not listed in the table. Changed to: 0x0C00 Locale without assigned LCID if the current user default locale. See section 2.2.1. 0x1000 Locale without assigned LCID if the current user default locale. See section 2.2.1. 0x3000 Unassigned LCID locale temporarily assigned to LCID 0x3000. See section 2.2.1. 0x3400 Unassigned LCID locale temporarily assigned to LCID 0x3400. See section 2.2.1. 0x3800 Unassigned LCID locale temporarily assigned to LCID 0x3800. See section 2.2.1. 0x3C00 Unassigned LCID locale temporarily assigned to LCID 0x3C00. See section 2.2.1. 0x4000 Unassigned LCID locale temporarily assigned to LCID 0x4000. See section 2.2.1.

Errata Published*	Description
	0x4400 Unassigned LCID locale temporarily assigned to LCID 0x4400. See section 2.2.1. 0x4800 Unassigned LCID locale temporarily assigned to LCID 0x4800. See section 2.2.1. 0x4C00 Unassigned LCID locale temporarily assigned to LCID 0x4C00. See section 2.2.1. In Section 2.2.1, Locale Name without LCIDs, revised entire section Changed from: Locale names that are valid but not associated with a given LCID MAY be assigned the LCID Language ID 0x1000, if an LCID is requested by the application.<14> These include any valid [RFC5646] language tag. Locales for which Windows can provide specific data appear in the following table; however, any other name will be assigned the LCID Language ID 0x1000.<15> If the user has configured any of these locales without LCIDs in their Language Profile, then the system MAY assign them additional values to provide applications with temporary unique identifiers. Those temporary LCIDs can differ between processes, machines, users, and application instances. If a temporary LCID is assigned it will be dynamically assigned at runtime to be 0x2000, 0x2400, 0x2800, 0x2C00, 0x3000, 0x3400, 0x3800, 0x3C00, 0x4000, 0x4400, 0x4800, or 0x4C00, for the valid language-script-region tags not otherwise listed in this table.<16> Changed to: Every locale name without an assigned LCID MAY be temporarily given one of the LCIDs in the following table, if the application requests an LCID.<14> These locale names include any valid [RFC5646] language tag. Note: LCID assignments for Locale Names without LCIDs are temporary and are not suitable for use across a protocol, or for interchange between processes or machines. These temporary LCID assignments are also unsuitable for tagging persisted data as the meaning of the LCID assignment will change over time.

Name	Value	Conditions
OCALE_CUSTOM_USER_DEFAULT<15>	0x0C00	When an LCID without a permanent LCID assignment is also the current user locale, the protocol will respond with LOCALE_CUSTOM_USER_DEFAULT for that locale. This assignment persists until the user changes the locale. Because the meaning changes over time, applications are discouraged from persisting this data. Though this value will likely refer to the same locale for the lifetime of the current process, that is not guaranteed. This assignment is a 1-to-1 relationship between this LCID and the user's current default locale name.

Errata Published*	Description		
	Transient LCIDs<16>	0x3000, 0x3400, 0x3800, 0x3C00, 0x4000, 0x4400, 0x4800, 0x4C00	Some user configurations temporarily associate a locale without a permanent LCID assignment with one of these 8 transient LCIDs. This assignment is transient and it is not guaranteed; it will likely refer to the same locale for the lifetime of the process. However, this assignment will differ for other users on the machine, or other machines, and, as such, is unsuitable for use in protocols or persisted data. This assignment is a temporary 1-to-1 relationship between an LCID and a particular locale name and will round trip until that relationship changes.
	LOCALE_CUSTOM_UNSPECIFIED<17>	0x1000	When an LCID is requested for a locale without a permanent LCID assignment, nor a temporary assignment as above, the protocol will respond with LOCALE_CUSTOM_UNSPECIFIED for all such locales. Because this single value is used for numerous possible locale names, it is impossible to round trip this locale, even temporarily. Applications should discard this value as soon as possible and never persist it. If the system is forced to respond to a request for LCID_CUSTOM_UNSPECIFIED, it will fall back to the current user locale. This is often incorrect but may prevent an application or component from failing. As the meaning of this temporary LCID is unstable, it should never be used for interchange or persisted data. This is a 1-to-many relationship that is very unstable.

*Date format: YYYY/MM/DD

[MS-LSAD]: Local Security Authority (Domain Policy) Remote Protocol

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[MS-LSAT]: Local Security Authority (Translation Methods) Remote Protocol

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[MS-MDE]: Mobile Device Enrollment Protocol

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[MS-MDE2]: Mobile Device Enrollment Protocol Version 2

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Errata below are for Protocol Document Version V9.0 - 2019/03/13

Errata Published*	Description
2020/09/28	In Section 2.2.9.1, XML Provisioning Schema, the first example of XML code has been augmented with a second example showing the device context as well as the user context illustrated in the first example, and the surrounding language changed to reflect the two examples. See the attached diff pdf file for details. Changed from: The following schema is an example of the XML required for the provisioning document. The explanation for each field in the document appears inline in the example as XML comments. ... Changed to: The following schemas are examples of the XML required for the provisioning document. The explanation for each field in the document appears inline in the example as XML comments. The following XML is a provisioning example for Mobile Device Management (MDM) in user context. ... The following XML is a provisioning example for Mobile Device Management (MDM) in device context. ...

*Date format: YYYY/MM/DD

[MS-MDM]: Mobile Device Management Protocol

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[MS-MICE]: Miracast over infrastructure Connection Establishment Protocol

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[MS-MSSOD]: Media Streaming Server Protocols Overview

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[MS-MWBE]: Microsoft Web Browser Federated Sign-On Protocol Extensions

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[MS-MWBF]: Microsoft Web Browser Federated Sign-On Protocol

This topic lists the Errata found in [MS-MWBF] since it was last published. Since this topic is updated frequently, we recommend that you subscribe to these RSS or Atom feeds to receive update notifications.

Errata are subject to the same terms as the Open Specifications documentation referenced.

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[MS-NCNBI]: Network Controller Northbound Interface Specification

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[MS-NCT]: Network Cost Transfer Protocol

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[MS-NFPB]: Near Field Proximity Bidirectional Services Protocol

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[MS-NFPS]: Near Field Proximity Sharing Protocol

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[MS-NKPU]: Network Key Protector Unlock Protocol

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[MS-NLMP]: NT LAN Manager (NTLM) Authentication Protocol

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[MS-NMFMB]: .NET Message Framing MSMQ Binding Protocol

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[MS-NNS]: .NET NegotiateStream Protocol

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

Errata Published*	Description
2019/02/19	In Section 2.2.2, Data Message, the maximum size of the PayloadSize field has been changed from '0x0000FC00' to '0x0000FC30', to accommodate for both the application data size and the size increase that occurs when this protocol signs or encrypts the data to be transferred. Changed from: PayloadSize (4 bytes): The unsigned size, in bytes, of the Payload field. The maximum value for this field is 0x0000FC00 (that is, 63K, or 64,512). Changed to: PayloadSize (4 bytes): The unsigned size, in bytes, of the Payload field. The maximum value for this field is 0x0000FC30 (64,560).

*Date format: YYYY/MM/DD

[MS-NRBF]: .NET Remoting: Binary Format Data Structure

RSS

Atom

Errata below are for Protocol Document Version V12.0 – 2019/03/13.

Errata Published*	Description
2019/10/28	In Section 3.0, Structure Examples, in the logical Request message for dotNET_Framework 1.1, changed the BinaryMethodCall value from: BinaryMethodCall: RecordTypeEnum: BinaryMethodCall (0x21) MessageEnum: 00000014 Changed to: BinaryMethodCall: RecordTypeEnum: BinaryMethodCall (0x15) MessageEnum: 00000014

*Date format: YYYY/MM/DD

[MS-NRPC]: Netlogon Remote Protocol

This topic lists the Errata found in [MS-NRPC] since it was last published. Since this topic is updated frequently, we recommend that you subscribe to these RSS or Atom feeds to receive update notifications.

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Errata below are for Protocol Document Version V38.0 – 2021/04/07.

Errata Published*	Description
2021/05/03	In Section 3.5.4.5.1 NetrLogonSamLogonEx (Opnum 39), added behavior note about message fragmentation. Changed from: On receiving this call, the server MUST perform the following validation steps: Changed to: On receiving this call, the server MUST perform the following validation steps:<195> <195> Section 3.5.4.5.1: Windows will fragment a response that exceeds the maximum fragment size even if minor version is 0. If the RPC message is fragmented, operations are done on each message fragment. In Section 3.5.4.5.3 NetrLogonSamLogon (Opnum 2), added behavior note about message fragmentation. Changed from: Message processing is identical to NetrLogonSamLogonEx, as specified in section 3.5.4.5.1, except for the following: Changed to: Message processing<205> is identical to NetrLogonSamLogonEx, as specified in

Errata Published*	Description

	section 3.5.4.5.1, except for the following:
	
	 <205> Section 3.5.4.5.1: Windows will fragment a response that exceeds the maximum fragment size even if minor version is 0. If the RPC message is fragmented, operations are done on each message fragment.
	
	 In Section 4.1 NetrLogonSamLogon with Secure Channel, added text to include message fragmentation with reference to the RPC standard.
	
	 Changed from:
	
	 3. The client signs and encrypts the RPC message. The data is first passed to RPC, where it is formatted according to the RPC standard. . .
	
	    9. Encrypt the caller's message using the encryption key. . .
	
	 5. The server verifies the signature and decrypts the RPC message. The decryption of the RPC message includes the following steps: . . .
	
	    7. Decrypt the caller's message using the encryption key. . .
	
	 Changed to:
	
	 3. The client signs and encrypts the RPC message or each message fragment. If the RPC message is fragmented, operations are done on each message fragment. The data is first passed to RPC, where it is formatted according to the RPC standard ([C706], see section 12.6.2). . .
	
	    9. Encrypt the caller's message or message fragment using the encryption key. . .
	
	 5. The server verifies the signature and decrypts the RPC message or each message fragment. If the RPC message is fragmented, operations are done on each message fragment. The decryption of the RPC message includes the following steps: . . .
	
	    7. Decrypt the caller's message or message fragment using the encryption key. . .

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[MS-NSPI]: Name Service Provider Interface (NSPI) Protocol

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[MS-OAPX]: OAuth 2.0 Protocol Extensions

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[MS-OAPXBC]: OAuth 2.0 Protocol Extensions for Broker Clients

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[MS-OCSPA]: Microsoft OCSP Administration Protocol

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[MS-OIDCE]: OpenID Connect 1.0 Protocol Extensions

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[MS-OLEDS]: Object Linking and Embedding (OLE) Data Structures

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[MS-OLEPS]: Object Linking and Embedding (OLE) Property Set Data Structures

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[MS-OTPCE]: One-Time Password Certificate Enrollment Protocol

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[MS-PAC]: Privilege Attribute Certificate Data Structure

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[MS-PAR]: Print System Asynchronous Remote Protocol

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[MS-PEAP]: Protected Extensible Authentication Protocol (PEAP)

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[MS-PKAP]: Public Key Authentication Protocol

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[MS-PSRDP]: PowerShell Remote Debugging Protocol

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[MS-PSRP]: PowerShell Remoting Protocol

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[MS-RA]: Remote Assistance Protocol

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[MS-RAI]: Remote Assistance Initiation Protocol

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[MS-RDPADRV]: Remote Desktop Protocol Audio Level and Drive Letter Persistence Virtual Channel Extension

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[MS-RDPBCGR]: Remote Desktop Protocol: Basic Connectivity and Graphics Remoting

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[MS-RDPEA]: Remote Desktop Protocol: Audio Output Virtual Channel Extension

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[MS-RDPEAR]: Remote Desktop Protocol Authentication Redirection Virtual Channel

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[MS-RDPECLIP]: Remote Desktop Protocol: Clipboard Virtual Channel Extension

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[MS-RDPECAM]: Remote Desktop Protocol: Video Capture Virtual Channel Extension

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[MS-RDPEDISP]: Remote Desktop Protocol: Display Update Virtual Channel Extension

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[MS-RDPEDYC]: Remote Desktop Protocol: Dynamic Channel Virtual Channel Extension

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[MS-RDPEFS]: Remote Desktop Protocol: File System Virtual Channel Extension

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[MS-RDPEGDI]: Remote Desktop Protocol: Graphics Device Interface (GDI) Acceleration Extensions

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[MS-RDPEGFX]: Remote Desktop Protocol: Graphics Pipeline Extension

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[MS-RDPEGT]: Remote Desktop Protocol Geometry Tracking Virtual Channel Protocol Extension

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[MS-RDPEI]: Remote Desktop Protocol: Input Virtual Channel Extension

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[MS-RDPELE]: Remote Desktop Protocol: Licensing Extension

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[MS-RDPEMC]: Remote Desktop Protocol: Multiparty Virtual Channel Extension

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[MS-RDPEMT]: Remote Desktop Protocol: Multitransport Extension

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[MS-RDPEPC]: Remote Desktop Protocol: Print Virtual Channel Extension

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[MS-RDPEPNP]: Remote Desktop Protocol: Plug and Play Devices Virtual Channel Extension

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[MS-RDPERP]: Remote Desktop Protocol: Remote Programs Virtual Channel Extension

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[MS-RDPESC]: Remote Desktop Protocol: Smart Card Virtual Channel Extension

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[MS-RDPESP]: Remote Desktop Protocol: Serial and Parallel Port Virtual Channel Extension

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[MS-RDPEUDP]: Remote Desktop Protocol: UDP Transport Extension

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[MS-RDPEUDP2]: Remote Desktop Protocol: UDP Transport Extension Version 2

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March 13, 2019 - Download

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Errata below are for Protocol Document Version V4.0 – 2021/04/07.

Errata Published*	Description
2021/05/17	In Section 3.1.1.3 MTU Negotiation, corrected how the negotiated MTU is calculated. Changed from: Negotiated uUpStreamMtu = minimum (Advertised uUpStreamMtu, Received uDownStreamMtu, 1232) + Maximum size of the RDPUDP_ACK_OF_ACKVECTOR_HEADER Structure (section 2.2.2.6) Negotiated uDownStreamMtu = minimum (Advertised uDownstreamMtu, Received uUpStreamMtu, 1232) + Maximum size of the RDPUDP_ACK_OF_ACKVECTOR_HEADER Structure (section 2.2.2.6) Changed to: Negotiated uUpStreamMtu = minimum (Advertised uUpStreamMtu, Received uDownStreamMtu, 1232) + Maximum size of the RDPUDP_ACK_VECTOR_HEADER Structure (section 2.2.2.7) Negotiated uDownStreamMtu = minimum (Advertised uDownstreamMtu, Received uUpStreamMtu, 1232) + Maximum size of the RDPUDP_ACK_VECTOR_HEADER Structure (section 2.2.2.7)
2021/05/17	In Section 3.1.5.7 Acknowledgment Vector Payload, corrected the sequence numbers in Example 1. Changed from: Example 1: Assuming the base sequence number is 1000, then an ACK vector byte of 0x64 indicates that it is coded in the bit map mode, the sequence numbers 1000, 1001, 1003, 1004, and 1006 are still missing, and the sequence numbers 1002 and 1005 have been received. Changed to:

Errata Published*	Description
	Example 1: Assuming the base sequence number is 1000, then an ACK vector byte of 0x64 indicates that it is coded in the bit map mode, the sequence numbers 1000, 1001, 1003, and 1004 are still missing, and the sequence numbers 1002, 1005, and 1006 have been received.

*Date format: YYYY/MM/DD

[MS-RDPEV]: Remote Desktop Protocol: Video Redirection Virtual Channel Extension

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[MS-RDPEVOR]: Remote Desktop Protocol: Video Optimized Remoting Virtual Channel Extension

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[MS-RDPEXPS]: Remote Desktop Protocol: XML Paper Specification (XPS) Print Virtual Channel Extension

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[MS-RDPRFX]: Remote Desktop Protocol: RemoteFX Codec Extension

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[MS-RMPR]: Rights Management Services (RMS): Client-to-Server Protocol

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[MS-RMSOD]: Rights Management Services Protocols Overview

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[MS-RPCE]: Remote Procedure Call Protocol Extensions

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[MS-RPCH]: Remote Procedure Call over HTTP Protocol

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[MS-RPRN]: Print System Remote Protocol

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[MS-RRASM]: Routing and Remote Access Server (RRAS) Management Protocol

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[MS-RRP]: Windows Remote Registry Protocol

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[MS-RSMC]: Remote Session Monitoring and Control Protocol

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[MS-RSVD]: Remote Shared Virtual Disk Protocol

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[MS-SAMR]: Security Account Manager (SAM) Remote Protocol (Client-to-Server)

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[MS-SAMS]: Security Account Manager (SAM) Remote Protocol (Server-to-Server)

No errata are available for the latest version of this Windows Protocols document. To view a PDF file of the errata for the previous versions of this document, see the following ERRATA Archives:

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[MS-SCMR]: Service Control Manager Remote Protocol

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[MS-SHLLINK]: Shell Link (.LNK) Binary File Format

This topic lists the Errata found in [MS-SHLLINK] since it was last published. Since this topic is updated frequently, we recommend that you subscribe to these RSS or Atom feeds to receive update notifications.

Errata are subject to the same terms as the Open Specifications documentation referenced.

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No errata are available for the latest version of this Windows Protocols document. To view a PDF file of the errata for the previous versions of this document, see the following ERRATA Archives:

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[MS-SFMWA]: Server and File Management Web APIs

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[MS-SFU]: Kerberos Protocol Extensions Service for User and Constrained Delegation Protocol

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[MS-SMB]: Server Message Block (SMB) Protocol

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[MS-SMB2]: Server Message Block (SMB) Protocol Versions 2 and 3

To view a PDF file of the errata for the previous versions of this document, see the following ERRATA Archives:

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Errata below are for Protocol Document Version V62.0 – 2021/04/07.

Errata Published*	Description
2021/05/03	In Section 2.2.10 SMB2 TREE_CONNECT Response, added a behavior note for SMB2_SHAREFLAG_IDENTITY_REMOTING flag. Changed from: SMB2_SHAREFLAG_IDENTITY_REMOTING 0x00040000 The share supports identity remoting. The client can request remoted identity access for the share via the SMB2_REMOTED_IDENTITY_TREE_CONNECT context as specified in section 2.2.9.2.1. Changed to: SMB2_SHAREFLAG_IDENTITY_REMOTING 0x00040000 The share supports identity remoting. The client can request remoted identity access for the share via the SMB2_REMOTED_IDENTITY_TREE_CONNECT context as specified in section 2.2.9.2.1.<WBN> <WBN> Windows 10 v1703 and prior and Windows Server 2016 and prior do not send or process this flag.
2021/05/03	In 6 Appendix A: Product Behavior, section 6, the product behavior note was updated for the order of the algorithm initialization. Changed From: <120> Section 3.2.4.2.2.2: Windows 10 v1507 operating system through Windows 10 v2004 and Windows Server 2016 through Windows Server v2004 initialize with AES-128-GCM(0x0002) followed by AES-128-CCM(0x0001). Windows 10 v20H2 and Windows Server v20H2 initialize with AES-128-GCM(0x0002) followed by AES-128-CCM(0x0001) followed by AES-256-GCM(0x0004) followed by AES-256-

Errata Published*	Description
	CCM(0x0003).
	Changed to:
	<120> Section 3.2.4.2.2.2: Windows 10 v1507 operating system through Windows 10 v20H2 and Windows Server 2016 through Windows Server v20H2 initialize with AES-128-GCM(0x0002) followed by AES-128-CCM(0x0001).
	Windows 10 v21H1 and Windows Server v21H1 initialize with AES-128-GCM(0x0002) followed by AES-128-CCM(0x0001) followed by AES-256-GCM(0x0004) followed by AES-256-CCM(0x0003).

*Date format: YYYY/MM/DD

[MS-SMBD]: SMB2 Remote Direct Memory Access (RDMA) Transport Protocol

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[MS-SPNG]: Simple and Protected GSS-API Negotiation Mechanism (SPNEGO) Extension

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[MS-SQOS]: Storage Quality of Service Protocol

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[MS-SSTP]: Secure Socket Tunneling Protocol (SSTP)

To view a PDF file of the errata for the previous versions of this document, see the following ERRATA Archives:

July 18, 2016 - Download

Errata below are for Protocol Document Version V19.0 – 2021/04/07.

Errata Published*	Description
2021/05/17	In Section 3.2.5.2.2, Key Used in the Crypto Binding HMAC-SHA1-160 Operation, updated key generation description: Changed from: First, a 32-byte long string is generated from keys that are provided by the higher-layer PPP authentication method. This key is sent to the SSTP layer as part of the Inner Authentication Completed Event. If the higher-layer PPP authentication method generates Microsoft Point-to-Point Encryption (MPPE) keys, as specified in [RFC3079], then an implementation MUST obtain the HLAK by using the following method: ● For MS-CHAPv2, as specified in [RFC2759]: SSTP Client HLAK = MasterSendKey | MasterReceiveKey, and: SSTP Server HLAK = MasterReceiveKey | MasterSendKey, where | indicates concatenation of strings, and MasterSendKey and MasterReceiveKey are as specified in [RFC3079] section 3. ● For EAPTLS, as specified in [RFC2716]: SSTP Client HLAK = MasterSendKey | MasterReceiveKey, and: SSTP Server HLAK = MasterReceiveKey | MasterSendKey, where | indicates concatenation of strings and MasterSendKey and MasterReceiveKey are as specified in [RFC3079] section 4. ● For EAP (other than EAPTLS), as specified in [RFC2284]: SSTP Client HLAK = Client Master Session Key (MSK), as specified in [RFC3748], and: SSTP Server HLAK = Server Master Session Key (MSK), as specified in [RFC3748]. If the HLAK is more than 32 octets, then the first 32 octets form the HLAK. If the HLAK is less than 32 octets, then the string is padded with 0x00 at the end to obtain a total length of 32

Errata Published*	Description
	octets.

Changed to:

First, a 32-byte long string is generated from keys that are provided by the higher-layer PPP authentication method. This key is sent to the SSTP layer as part of the Inner Authentication Completed Event. This is also the case for EAP TLS.

If the higher-layer PPP authentication method generates Microsoft Point-to-Point Encryption (MPPE) keys, as specified in [RFC3079], then an implementation MUST obtain the HLAK by using the following method:

● For MS-CHAPv2, as specified in [RFC2759]:

SSTP Client HLAK = MasterSendKey | MasterReceiveKey, and:

SSTP Server HLAK = MasterReceiveKey | MasterSendKey,

where | indicates concatenation of strings, and MasterSendKey and MasterReceiveKey are as specified in [RFC3079] section 3.

● For EAP-TLS, as specified in [RFC5216]:<8>

SSTP Client HLAK = Client MasterSendKey, and:

SSTP Server HLAK = Client MasterReceiveKey,

where MasterSendKey and MasterReceiveKey are as specified in [RFC3079] section 4.

● For EAP (other than EAP-TLS), as specified in [RFC2284]:

SSTP Client HLAK = Client Master Session Key (MSK), as specified in [RFC3748], and:

SSTP Server HLAK = Server Master Session Key (MSK), as specified in [RFC3748].

If the HLAK is more than 32 octets, then the first 32 octets form the HLAK. Note that this covers EAP-TLS as well because the EAP TLK master session key is at least 64 bytes (see [RFC5247]). If the HLAK is less than 32 octets, then the string is padded with 0x00 at the end to obtain a total length of 32 octets.

In Section 3.2.5.2.4, Key Used in the Crypto Binding HMAC-SHA256-256 Operation, updated key generation description:

Changed from:

First, a 32-byte long string is generated from keys that are provided by the higher-layer PPP authentication method. This key is sent to the SSTP layer as part of the Inner Authentication Completed Event.-

If the higher-layer PPP authentication method generates Microsoft Point-to-Point Encryption (MPPE) keys, as specified in [RFC3079], then an implementation MUST obtain the HLAK using the following method:

● For MS-CHAPv2, as specified in [RFC2759]:

SSTP Client HLAK = MasterSendKey | MasterReceiveKey and: |

Errata Published*	Description
	SSTP Server HLAK = MasterReceiveKey | MasterSendKey,
	where | indicates concatenation of strings and MasterSendKey and MasterReceiveKey are as specified in [RFC3079] section 3.
	● For EAPTLS, as specified in [RFC2716]:
	SSTP Client HLAK = MasterSendKey | MasterReceiveKey and:
	SSTP Server HLAK = MasterReceiveKey | MasterSendKey,
	where MasterSendKey and MasterReceiveKey are as specified in [RFC3079] section 4 and where | indicates concatenation of strings.
	If the HLAK is more than 32 octets, then the first 32 octets form the HLAK. If the HLAK is less than 32 octets, then the string is padded with 0x00 at the end to obtain a total length of 32 octets.
	Changed to:
	First, a 32-byte long string is generated from keys that are provided by the higher-layer PPP authentication method. This key is sent to the SSTP layer as part of the Inner Authentication Completed Event. This is also the case for EAP-TLS.
	If the higher-layer PPP authentication method generates Microsoft Point-to-Point Encryption (MPPE) keys, as specified in [RFC3079], then an implementation MUST obtain the HLAK using the following method:
	● For MS-CHAPv2, as specified in [RFC2759]:
	SSTP Client HLAK = MasterSendKey | MasterReceiveKey and:
	SSTP Server HLAK = MasterReceiveKey | MasterSendKey,
	where | indicates concatenation of strings and MasterSendKey and MasterReceiveKey are as specified in [RFC3079] section 3.
	● For EAP-TLS, as specified in [RFC5216]:[9]
	SSTP Client HLAK = Client MasterSendKey, and:
	SSTP Server HLAK = Client MasterReceiveKey,
	where MasterSendKey and MasterReceiveKey are as specified in [RFC3079] section 4.
	If the HLAK is more than 32 octets, then the first 32 octets form the HLAK. Note that this covers EAP-TLS as well because, the EAP TLK master session key is at least 64 bytes (see [RFC5247]). If the HLAK is less than 32 octets, then the string is padded with 0x00 at the end to obtain a total length of 32 octets.

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[MS-SSTR]: Smooth Streaming Protocol

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March 16, 2018 - Download

Errata below are for Protocol Document Version V8.0 – 2019/03/13.

Errata Published*	Description
2020/07/06	In Section 1.5 Prerequisites/Preconditions, added reference to the amendment for HEVC. Changed from: It is also assumed that the client is integrated with a higher-layer implementation that supports any media formats that are used and can otherwise play the media that is transmitted by the server.<1> <1> Section 1.5: The Smooth Streaming Protocol is supported… Changed to: It is also assumed that the client is integrated with a higher-layer implementation that supports any media formats that are used and can otherwise play the media that is transmitted by the server.<1><2> <1> Section 1.5: For requirements to enable cloud-based Smooth Streaming of High Efficiency Video Coding (HEVC) encoded video see the amendment for HEVC [MSDOCS-SSTR-HEVC]. <2> Section 1.5: The Smooth Streaming Protocol is supported…

*Date format: YYYY/MM/DD

[MS-SWN]: Service Witness Protocol

No errata are available for the latest version of this Windows Protocols document. To view a PDF file of the errata for the previous versions of this document, see the following ERRATA Archives:

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[MS-TCC]: Tethering Control Channel Protocol

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[MS-TDS]: Tabular Data Stream Protocol

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Errata below are for Protocol Document Version V30.0 – 2020/10/01

Errata Published*	Description
2021/02/22	In section 2.2.7.4 COLMETADATA, the descriptions of EncryptionAlgo and AlgoName have been updated. Changed from: <table><tr><td>EncryptionAlgo</td><td>A byte that describes the encryption algorithm that is used. If EncryptionAlgo is set to 1, the algorithm that is used is AEAD_AES_256_CBC_HMAC_SHA512, as described in [IETF-AuthEncr] section 5.4. Other values are reserved for future use.</td></tr><tr><td>AlgoName</td><td>Reserved for future use.</td></tr></table> Changed to:

Errata Published*	Description	
	EncryptionAlgo	This byte describes the encryption algorithm that is used. For a custom encryption algorithm, the EncryptionAlgo value MUST be set to 0 and the actual encryption algorithm MUST be inferred from the AlgoName. For all other values, AlgoName MUST NOT be sent. If EncryptionAlgo is set to 1, the algorithm that is used is AEAD_AES_256_CBC_HMAC_SHA512, as described in [IETF-AuthEncr] section 5.4. If EncryptionAlgo is set to 2, the algorithm that is used is AEAD_AES_256_CBC_HMAC_SHA256. Other values are reserved for future use.
	AlgoName	Reserved for future use. Algorithm name literal that is used for encrypting the plaintext value. This is an optional field and MUST be sent when EncryptionAlgo = 0. For all other values of EncryptionAlgo, this field MUST NOT be sent.

*Date format: YYYY/MM/DD

[MS-TLSP]: Transport Layer Security (TLS) Profile

No errata are available for the latest version of this Windows Protocols document. To view a PDF file of the errata for the previous versions of this document, see the following ERRATA Archives:

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[MS-TPMVSC]: Trusted Platform Module (TPM) Virtual Smart Card Management Protocol

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[MS-TSCH]: Task Scheduler Service Remoting Protocol

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[MS-TSGU]: Terminal Services Gateway Server Protocol

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[MS-TSTS]: Terminal Services Terminal Server Runtime Interface Protocol

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[MS-TSWP]: Terminal Services Workspace Provisioning Protocol

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[MS-UAMG]: Update Agent Management Protocol

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[MS-UCODEREF]: Windows Protocols Unicode Reference

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[MS-VAPR]: Virtual Application Publication and Reporting (App-V) Protocol

This topic lists the Errata found in [MS-VAPR] since it was last published. Since this topic is updated frequently, we recommend that you subscribe to these RSS or Atom feeds to receive update notifications. **Errata are subject to the same terms as the Open Specifications documentation referenced.**	**RSS** **Atom**

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[MS-VHDX]: Virtual Hard Disk v2 (VHDX) File Format

This topic lists the Errata found in [MS-VHDX] since it was last published. Since this topic is updated frequently, we recommend that you subscribe to these RSS or Atom feeds to receive update notifications. **Errata are subject to the same terms as the Open Specifications documentation referenced.**	**RSS** **Atom**

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[MS-W32T]: W32Time Remote Protocol

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[MS-WCCE]: Windows Client Certificate Enrollment Protocol

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[MS-WCFESAN]: WCF-Based Encrypted Server Administration and Notification Protocol

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[MS-WDSMT]: Windows Deployment Services Multicast Transport Protocol

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[MS-WFDAA]: Wi-Fi Direct (WFD) Application to Application Protocol

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[MS-WFDPE]: Wi-Fi Display Protocol Extension

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[MS-WKST]: Workstation Service Remote Protocol

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[MS-WMIO]: Windows Management Instrumentation Encoding Version 1.0 Protocol

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[MS-WMF]: Windows Metafile Format

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[MS-WPO]: Windows Protocols Overview

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[MS-WSDS]: WS-Enumeration Directory Services Protocol Extensions

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[MS-WSMV]: Web Services Management Protocol Extensions for Windows Vista

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[MS-WSTEP]: WS-Trust X.509v3 Token Enrollment Extensions

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[MS-WSUSAR]: Windows Server Update Services: Administrative API Remoting Protocol

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[MS-WSUSOD]: Windows Server Update Services Protocols Overview

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[MS-WSUSSS]: Windows Update Services: Server-Server Protocol

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[MS-WUSP]: Windows Update Services: Client-Server Protocol

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[MS-XCA]: Xpress Compression Algorithm

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[MS-XCEP]: X.509 Certificate Enrollment Policy Protocol

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