

Windows Protocols Errata

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](https://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](#)

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

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

[\[MS-CRTD\]: Certificate Templates Structure](#)

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

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

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

[\[MS-EVEN\]: EventLog Remoting Protocol](#)

[\[MS-EVEN6\]: EventLog Remoting Protocol Version 6.0](#)

[\[MS-FSA\]: File System Algorithms](#)

[\[MS-MDE2\]: Mobile Device Enrollment Protocol Version 2](#)

[\[MS-NNS\]: .NET NegotiateStream Protocol](#)

[\[MS-NRBF\]: .NET Remoting: Binary Format Data Structure](#)

[\[MS-OAPXBC\]: OAuth 2.0 Protocol Extensions for Broker Clients](#)

[\[MS-OIDCE\]: OpenID Connect 1.0 Protocol Extensions](#)

[\[MS-PKCA\]: Public Key Cryptography for Initial Authentication \(PKINIT\) in Kerberos Protocol](#)

[\[MS-RDPEAR\]: Remote Desktop Protocol Authentication Redirection Virtual Channel](#)

[\[MS-RDPEUDP2\]: Remote Desktop Protocol UDP Transport Extension Version 2](#)

[\[MS-RPRN\]: Print System Remote Protocol](#)

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

[\[MS-SFU\]: Kerberos Protocol Extensions Service for User and Constrained Delegation Protocol](#)

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

[\[MS-SSTR\]: Smooth Streaming Protocol](#)

[\[MS-WCCE\]: Windows Client Certificate Enrollment Protocol](#)

[\[MS-WSTEP\]: WS-Trust X.509v3 Token Enrollment Extensions](#)

[\[MS-WUSP\]: Windows Update Services Client-Server Protocol](#)

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

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

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Errata below are for Protocol Document Version [V8.0 - 2019/03/13](#).

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

*Date format: YYYY/MM/DD

[MC-NMF]: .NET Message Framing Protocol

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Errata below are for Protocol Document Version [V9.0 - 2018/03/16](#).

Errata Published*	Description
2018/07/02	<p>In Section 2.2.6, Preamble Message, the field descriptions have been modified as follows and have been moved to follow the packet diagram.</p> <p>Changed from:</p> <p>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</p> <p>Changed to:</p> <p>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</p>

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[MC-PRCR]: Peer Channel Custom Resolver Protocol

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[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

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[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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[MS-ADSC]: Active Directory Schema Classes

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Errata Published*	Description
2019/09/16	<p>In Section 2.243, Class samDomain, changed from:</p> <p>(OA; CIOI; RPWP; 3f78c3e5-f79a-46bd-a0b8-9d18116ddc79;; PS) S: (AU; SA; WDWOWP;;; WD) (AU; SA; CR;;; BA) (AU; SA; CR;;; DU)</p> <p>Changed to:</p> <p>(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)</p>

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[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

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[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	<p>In Section 6 Appendix A: Product Behavior, the following behavior notes have been updated:</p> <p>Changed from:</p> <p><245> Section 3.3.5.5</p> <p>...</p> <p>AccessMode.SharingMode ShareAccess</p> <p>0 Compatibility mode (see below)</p> <p>1 0x0L (don't share, exclusive use)</p> <p>2 FILE_SHARE_READ</p> <p>3 FILE_SHARE_WRITE</p> <p>4 FILE_SHARE_READ FILE_SHARE_WRITE</p> <p>0xFF FCB mode (see below)</p> <ul style="list-style-type: none">For Compatibility mode, special filename suffixes (after the '.' in the filename) are mapped

Errata Published*	Description
	<p>to SharingMode 4. The special filename suffix set is: "EXE", "DLL", "SYM", "COM". All other file names are mapped to SharingMode 3.</p> <ul style="list-style-type: none"> 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. <p>...</p> <p>Changed to:</p> <p>...</p> <p>AccessMode.SharingMode ShareAccess</p> <p>0 Compatibility mode (see below)</p> <p>1 0x0L (don't share, exclusive use)</p> <p>2 FILE_SHARE_READ</p> <p>3 FILE_SHARE_WRITE</p> <p>4 FILE_SHARE_READ FILE_SHARE_WRITE</p> <ul style="list-style-type: none"> 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. <p>...</p> <p>Changed from:</p> <p><297> Section 3.3.5.35</p> <p>...</p> <p>AccessMode.SharingMode ShareAccess</p> <p>0 Compatibility mode (see below)</p> <p>1 0x0L (don't share, exclusive use)</p> <p>2 FILE_SHARE_READ</p>

Errata Published*	Description
	<p>3 FILE_SHARE_WRITE</p> <p>4 FILE_SHARE_READ FILE_SHARE_WRITE</p> <p>0xFF FCB mode (see below)</p> <ul style="list-style-type: none"> 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. <p>...</p> <p>Changed to:</p> <p>...</p> <p>AccessMode.SharingMode ShareAccess</p> <p>0 Compatibility mode (see below)</p> <p>1 0x0L (don't share, exclusive use)</p> <p>2 FILE_SHARE_READ</p> <p>3 FILE_SHARE_WRITE</p> <p>4 FILE_SHARE_READ FILE_SHARE_WRITE</p> <ul style="list-style-type: none"> 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. <p>...</p> <p>Changed from:</p> <p><339> Section 3.3.5.58.2</p> <p>...</p>

Errata Published*	Description
	<p>AccessMode.SharingMode ShareAccess</p> <p>0 Compatibility mode (see following)</p> <p>1 0x0L (don't share, exclusive use)</p> <p>2 FILE_SHARE_READ</p> <p>3 FILE_SHARE_WRITE</p> <p>4 FILE_SHARE_READ FILE_SHARE_WRITE</p> <p>0xFF FCB mode (see following)</p> <ul style="list-style-type: none"> 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. <p>...</p> <p>Changed To:</p> <p>...</p> <p>AccessMode.SharingMode ShareAccess</p> <p>0 Compatibility mode (see following)</p> <p>1 0x0L (don't share, exclusive use)</p> <p>2 FILE_SHARE_READ</p> <p>3 FILE_SHARE_WRITE</p> <p>4 FILE_SHARE_READ FILE_SHARE_WRITE</p> <ul style="list-style-type: none"> 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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Errata below are for Protocol Document Version [V40.0 - 2021/06/25](#).

Errata Published*	Description
2021/09/07	<p>In Section 3.1.1.1.3 Resource Type, Removed internal code</p> <p>Changed from:</p> <p>The resource type is part of the configuration of a resource and is thus included in nonvolatile cluster state. A resource type can have certain requirements for proper operation. These are referred to as its characteristics and they convey the following requirements to the cluster:</p> <ul style="list-style-type: none">• Only one instance of this resource type is allowed in the cluster.• Only one instance of this resource type is allowed in a group.• The CLUSCTL_RESOURCE_DELETE resource control is sent to every active node.• All configured nodes need to be active in order to delete the resource. <p>Changed to:</p> <p>The resource type is part of the configuration of a resource and is thus included in nonvolatile cluster state. A resource type can have certain requirements for proper operation. These are referred to as its characteristics and they convey the following requirements to the cluster:</p> <ul style="list-style-type: none">• Only one instance of this resource type is allowed in the cluster.• Only one instance of this resource type is allowed in a group.• The deletion of a resource type is sent to every active node.• All configured nodes need to be active in order to delete the resource.

Errata Published*	Description
	<p>In Section 3.1.4.2.126 <code>ApiPauseNodeWithDrainTarget</code> (Opnum 127), Corrected typo</p> <p>Changed from:</p> <p>The server MUST fail this method with <code>ERROR_HOST_NODE_NOT_AVAILABLE</code> (0x0000138D) if the node designated by the <code>hNodeEvacuationTarget</code> parameter is not in the <code>ClusterNodeUp</code> state as specified in section 3.1.4.2.69.</p> <p><code>hNodeDrainTarget</code>: An <code>HNODE_RPC</code> context handle to the destination node, obtained in a previous call to <code>ApiOpenNode</code> (section 3.1.4.1.67) or <code>ApiOpenNodeEx</code> (section 3.1.4.2.117). The <code>hNodeDrainWithDrainTarget</code> parameter MUST NOT specify the same node as the <code>hNode</code> parameter.</p> <p>Changed to:</p> <p>The server MUST fail this method with <code>ERROR_HOST_NODE_NOT_AVAILABLE</code> (0x0000138D) if the node designated by the <code>hNodeDrainTarget</code> parameter is not in the <code>ClusterNodeUp</code> state as specified in section 3.1.4.2.69</p> <p><code>hNodeDrainTarget</code>: An <code>HNODE_RPC</code> context handle to the destination node, obtained in a previous call to <code>ApiOpenNode</code> (section 3.1.4.1.67) or <code>ApiOpenNodeEx</code> (section 3.1.4.2.117). The <code>hNodeDrainTarget</code> parameter MUST NOT specify the same node as the <code>hNode</code> parameter.</p> <p>In Section 3.1.4.3.2.36 <code>CLUSCTL_RESOURCE_TYPE_REPLICATION_GET_REPLICA_VOLUMES</code>, Renamed <code>PropertyList</code> to <code>Property List</code></p> <p>Changed from:</p> <p>Upon successful completion of this method, the server MUST provide in the buffer designated by the <code>lpOutBuffer</code> parameter a <code>PropertyList</code> containing two properties. The first property MUST have as name the null-terminated Unicode string "SourceVolumes", and the second property MUST have as name the null-terminated Unicode string "TargetVolumes". These two properties MUST contain the same number of <code>PropertyValue</code> structures. The <code>PropertyValue</code> structures MUST be ordered such that the first structure in the "SourceVolumes" list represents a volume that can be paired with the volume represented by the first structure in the "TargetVolumes" list, and so on. The <code>PropertyValue</code> structures MUST have syntax set to <code>CLUSPROP_SYNTAX_LIST_VALUE_SZ</code>, and the buffer MUST contain the null-terminated Unicode name of the volume in the volume GUID format. For example:</p> <p>Changed to:</p> <p>Upon successful completion of this method, the server MUST provide in the buffer designated by the <code>lpOutBuffer</code> parameter a <code>Property List</code> containing two properties. The first property MUST have as name the null-terminated Unicode string "SourceVolumes", and the second property MUST have as name the null-terminated Unicode string "TargetVolumes". These two properties MUST contain the same number of <code>PropertyValue</code> structures. The <code>PropertyValue</code> structures MUST be ordered such that the first structure in the "SourceVolumes" list represents a volume that can be paired with the volume represented by the first structure in the "TargetVolumes" list, and so on. The <code>PropertyValue</code> structures MUST have syntax set to <code>CLUSPROP_SYNTAX_LIST_VALUE_SZ</code>, and the buffer MUST contain the null-terminated Unicode name of the volume in the volume GUID format. For example:</p> <p>In Section 3.1.4.3.2.37 <code>CLUSCTL_RESOURCE_TYPE_REPLICATION_GET_LOG_VOLUME</code>, Renamed <code>PropertyList</code> to <code>Property List</code></p>

Errata Published*	Description
	<p>Changed from:</p> <p>Upon successful completion of this method, the server MUST provide in the buffer designated by the IpOutBuffer parameter a PropertyList containing one Property Value. The value MUST have as name the null-terminated Unicode string "LogVolume". The syntax of this value MUST be set to CLUSPROP_SYNTAX_LIST_VALUE_SZ and the property value buffer MUST contain a null-terminated Unicode string containing the path at which log data can be written.</p> <p>Changed to:</p> <p>Upon successful completion of this method, the server MUST provide in the buffer designated by the IpOutBuffer parameter a Property List containing one Property Value. The value MUST have as name the null-terminated Unicode string "LogVolume". The syntax of this value MUST be set to CLUSPROP_SYNTAX_LIST_VALUE_SZ and the property value buffer MUST contain a null-terminated Unicode string containing the path at which log data can be written.</p> <p>In Section 3.1.4.3.4.22 CLUSCTL_NODE_SCALEOUTNODE_PLACEMENT_UPDATE, Renamed IpInBuffer to IpInBuffer</p> <p>Changed from:</p> <p>If CLUSREG_NAME_RES_VM_ID is not provided in the IpInBuffer, the server MUST fail the request with ERROR_INVALID_DATA.</p> <p>If SCALEOUT_PLACEMENT_RESULT_VM_MIGRATION_RESULT is not provided in the IpInBuffer, the server MUST fail the request with ERROR_INVALID_DATA.</p> <p>Changed to:</p> <p>If CLUSREG_NAME_RES_VM_ID is not provided in the IpInBuffer, the server MUST fail the request with ERROR_INVALID_DATA.</p> <p>If SCALEOUT_PLACEMENT_RESULT_VM_MIGRATION_RESULT is not provided in the IpInBuffer, the server MUST fail the request with ERROR_INVALID_DATA.</p> <p>In Section 3.1.4.3.7.19 CLUSCTL_CLUSTER_CLEAR_UPGRADE_IN_PROGRESS, Fixed typo</p> <p>Changed from:</p> <p>The server MUST accept a CLUSCTL_CLUSTER_CLEAR_UPGRADE_IN_PROGRESS cluster control code request if its protocol server state is in the read/write state, as specified in section 3.1.1</p> <p>Changed to:</p> <p>The server MUST accept a CLUSCTL_CLUSTER_CLEAR_UPGRADE_IN_PROGRESS cluster control code request if its protocol server state is in the read/write state, as specified in section 3.1.1</p>

*Date format: YYYY/MM/DD

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

This topic lists the Errata found in the MS-COMA document 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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[MS-CRTD]: Certificate Templates Structure

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Errata below are for Protocol Document Version [V26.0 – 2021/06/25](#).

Errata Published*	Description								
2021/07/27	<p>In Section 2.27 msPKI-Private-Key-Flag Attribute, replaced normative reference [PKCS12] with [RFC7292].</p> <p>Changed from:</p> <table border="1"><thead><tr><th>Flag</th><th>Meaning</th></tr></thead><tbody><tr><td>0x00000010 CT_FLAG_EXPORTABLE_KEY</td><td>This flag instructs the client to allow other applications to copy the private key to a .pfx file, as specified in [PKCS12], at a later time.</td></tr></tbody></table> <p>Changed to:</p> <table border="1"><thead><tr><th>Flag</th><th>Meaning</th></tr></thead><tbody><tr><td>0x00000010 CT_FLAG_EXPORTABLE_KEY</td><td>This flag instructs the client to allow other applications to copy the private key to a .pfx file, as specified in [RFC7292], at a later time.</td></tr></tbody></table>	Flag	Meaning	0x00000010 CT_FLAG_EXPORTABLE_KEY	This flag instructs the client to allow other applications to copy the private key to a .pfx file, as specified in [PKCS12], at a later time.	Flag	Meaning	0x00000010 CT_FLAG_EXPORTABLE_KEY	This flag instructs the client to allow other applications to copy the private key to a .pfx file, as specified in [RFC7292], at a later time.
Flag	Meaning								
0x00000010 CT_FLAG_EXPORTABLE_KEY	This flag instructs the client to allow other applications to copy the private key to a .pfx file, as specified in [PKCS12], at a later time.								
Flag	Meaning								
0x00000010 CT_FLAG_EXPORTABLE_KEY	This flag instructs the client to allow other applications to copy the private key to a .pfx file, as specified in [RFC7292], at a later time.								

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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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Errata below are for Protocol Document Version [V20.0 - 2021/06/25](#).

Errata Published*	Description
2021/09/07	<p>In Section 2.2.1.2.3.1 TSRemoteGuardPackageCred, changed credBuffer: Windows CredSSP usage of Kerberos User to User tickets.</p> <p>Changed from:</p> <p>credBuffer: An ASN.1 OCTET STRING byte buffer that contains the credentials in a format that SHOULD<22> be specified by the CredSSP server operating system for the package that provided them.</p> <p><22> Section 2.2.1.2.3.1: . . .Windows CredSSP clients will use Kerberos User to User tickets ([RFC4120], section 2.9.2) as the ServiceTicket, but the server does not enforce this. . .</p> <p>Changed to:</p> <p>credBuffer: An ASN.1 OCTET STRING byte buffer that contains the credentials in a format that SHOULD<22> be specified by the CredSSP server operating system for the package that provided them.</p> <p><22> Section 2.2.1.2.3.1: . . .Windows CredSSP clients do not use Kerberos User to User tickets ([RFC4120], section 2.9.2) as the ServiceTicket, but can if necessary; the server does not enforce this. . .</p>
2021/08/10	<p>In Section 2.2.1.2.3.1 TSRemoteGuardPackageCred, adjusted supplemental credential code arrangement and added C bit flag for the Credential Key being present.</p> <p>Changed from:</p> <pre>typedef struct _NTLM_REMOTE_SUPPLEMENTAL_CREDENTIAL {</pre>

Errata Published*	Description	
	L	Indicates that the LM OWF member is present and valid.
	N	Indicates that the NT OWF member is present and valid.
	C	Indicates that the reserved credential key is present and valid ([MS-RDPEAR] section 2.2.1.3.5).

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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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Errata below are for Protocol Document Version [V37.0 - 2021/04/07](#).

Errata Published*	Description
2021/08/17	<p>In Section 3.1.4.5 R_DnsrvUpdateRecord (opnum 4), added processing behavior for the static condition.</p> <p>Changed from:</p> <ul style="list-style-type: none">• If the pAddRecord is for an explicitly defined resource record type DNS_TYPE_CNAME (section 2.2.2.1.1), then delete any existing DNS_TYPE_CNAME record for the node specified in pszNodeName, before adding the record.• If pszZone is not NULL, search the DNS Zone Table for a zone with a name matching the value of pszZone. If a matching zone cannot be found return a failure. <p>Changed to:</p> <ul style="list-style-type: none">• If the pAddRecord is for an explicitly defined resource record type DNS_TYPE_CNAME (section 2.2.2.1.1), then delete any existing DNS_TYPE_CNAME record for the node specified in pszNodeName, before adding the record.• If pAddRecord is for adding a new record to a dnsNode that has or had a static resource record (with TimeStamp at 0), then the new record is added as a static record.<279>• If pszZone is not NULL, search the DNS Zone Table for a zone with a name matching the value of pszZone. If a matching zone cannot be found return a failure. <p><279> Section 3.1.4.5: New records added as static in dnsNodes that contain or contained a static record is supported in Windows Server 2008 and later.</p>
2021/08/10	<p>In Section 3.1.1.1.1 DNS Server Integer Properties, in DsTombstoneInterval added seconds to 100-nanosecond conversion.</p> <p>Changed from:</p>

Errata Published*	Description
	<p>DsTombstoneInterval: . . . Every day at 2:00 AM local time the DNS server MUST conduct a search of all zones stored in the directory server for nodes which have the dnsTombstoned attribute set to TRUE and an EntombedTime (section 2.2.2.2.4.23) value greater than DsTombstoneInterval seconds in the past. . . .</p> <p>Changed to:</p> <p>DsTombstoneInterval: . . . Every day at 2:00 AM local time the DNS server MUST conduct a search of all zones stored in the directory server for nodes which have the dnsTombstoned attribute set to TRUE and an EntombedTime (section 2.2.2.2.4.23) value greater than DsTombstoneInterval seconds in the past (convert seconds to 100-nanosecond intervals for comparison). . . .</p> <p>In Section 3.1.4.5 R_DnssrvUpdateRecord (Opnum 4), changed EntombedTime from seconds to 100-nanosecond intervals and removed redundant instructions.</p> <p>Changed from:</p> <p>If pszZoneName points to a primary zone, attempt to perform addition/deletion/update of the record. If the operation is successful, increment the zone serial number using serial number arithmetic [RFC1982]. If the last record at the node is being deleted and the zone is stored in the directory server, the DNS server MUST set the node's dnsTombstoned attribute to TRUE and the node's dnsRecord (section 2.3.2.2) attribute to contain a DNS_RPC_RECORD_TS record (section 2.2.2.2.4.23) with an EntombedTime value equal to the current time expressed as the number seconds since 12:00 A.M. January 1, 1601 Coordinated Universal Time (UTC). If the zone is directory server-integrated and the update causes new or modified records to be committed to the directory, the new zone serial number MUST also be written to the Serial field of the dnsRecord attribute, as specified in 2.3.2.2. If this operation deletes the last record from the node and the zone is directory server-integrated, the DNS server MUST set the node's DNS Node Tombstone State (section 3.1.1) to TRUE by setting the value of the dnsTombstoned attribute to TRUE and writing a DNS_RPC_RECORD_TS (section 2.2.2.2.4.23) in the dnsRecord attribute.</p> <p>Changed to:</p> <p>If pszZoneName points to a primary zone, attempt to perform addition/deletion/update of the record. If the operation is successful, increment the zone serial number using serial number arithmetic [RFC1982]. If the zone is directory server-integrated and the update causes new or modified records to be committed to the directory, the new zone serial number MUST also be written to the Serial field of the dnsRecord attribute (section 2.3.2.2). If the last record at the node is being deleted and the zone is stored in the directory server or is directory server-integrated, the DNS server MUST set the node's dnsTombstoned attribute to TRUE and the node's dnsRecord attribute to contain a DNS_RPC_RECORD_TS record (section 2.2.2.2.4.23) with an EntombedTime value equal to the current time expressed as the number of 100-nanosecond intervals since 12:00 A.M. January 1, 1601 Coordinated Universal Time (UTC).</p>

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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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Errata Published*	Description
2021/08/10	<p>In section 1.2.2 Informative References a new references was added:</p> <p>[MSFT-CVE-2021-36942] Microsoft Corporation, "Security Vulnerability", CVE-2021-36942, August 10, 2021.</p> <p>In section 3.1.4.2.1 Receiving an EfsRpcOpenFileRaw Message (Opnum 0) product behavior note 38 was added:</p> <p>Changed from:</p> <p>The EfsRpcOpenFileRaw method is used to open an encrypted object on the server for backup or restore. It allocates resources that MUST be released by calling the EfsRpcCloseRaw method.</p> <p>Changed to:</p> <p>The EfsRpcOpenFileRaw method is used to open an encrypted object on the server for backup or restore. It allocates resources that MUST be released by calling the EfsRpcCloseRaw method.<38></p> <p><38> Section 3.1.4.2.1: The following versions of Windows with [MSFT-CVE-2021-36942] will return error code ERROR_ACCESS_DENIED for the EfsRpcOpenFileRaw method using the \pipe\lsarpc endpoint:</p> <ul style="list-style-type: none">• Windows Server 2008 through Windows Server 2022• Windows Server v1803 operating system, Windows 10 v1809 operating system, Windows Server v2004 operating system, and later• Windows 7 through Windows 8 embedded standard 8, and Windows 8.1• Windows 10 v1607 operating system, Windows 10 v1803 operating system, and later• Windows 11 and later

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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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Errata below are for Protocol Document Version [V24.0 - 2021/06/25](#).

Errata Published*	Description
2021/07/27	<p>In Section 2.1.2, Client:</p> <p>Changed from:</p> <p>The client MUST specify packet-level authentication (0x4) or higher, as specified in [MS-RPCE] section 2.2.1.1.8.<6></p> <p>Changed to:</p> <p>The client MUST specify packet-level integrity authentication (0x5) or higher, as specified in [MS-RPCE] section 2.2.1.1.8.<6>.</p>

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[MS-EVEN6]: EventLog Remoting Protocol Version 6.0

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Errata below are for Protocol Document Version [V24.0 – 2021/06/25](#).

Errata Published*	Description
2021/07/27	<p>In Section 2.1.2, Client:</p> <p>Changed from:</p> <p>The client MUST specify packet-level authentication (0x4) or higher, as specified in [MS-RPCE] section 2.2.1.1.8.<5></p> <p>Changed to:</p> <p>The client MUST specify packet-level integrity authentication (0x5) or higher, as specified in [MS-RPCE] section 2.2.1.1.8.<5></p>

*Date format: YYYY/MM/DD

[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 [V34.0 - 2021/06/25](#).

Errata Published*	Description
2021/09/07	<p>In Section 2.1.5.9.20 FSCTL_OFFLOAD_READ the alignment rules have been updated.</p> <p>Changed from:</p> <p>...</p> <ul style="list-style-type: none">Set InputBuffer.CopyLength to BlockAlignTruncate(InputBuffer.CopyLength, Open.File.Volume.LogicalBytesPerSector). <p>...</p> <p>Changed to:</p> <p>...</p> <ul style="list-style-type: none">Set InputBuffer.CopyLength to BlockAlign(InputBuffer.CopyLength, Open.File.Volume.LogicalBytesPerSector). <p>...</p>
2021/08/17	<p>In Section 2.1.1.1 Per Volume a new abstract data model element was added:</p>

Errata Published*	Description
	<ul style="list-style-type: none"> IsHardLinksSupported: A Boolean that is TRUE if the physical media format for this volume supports HardLinks. <1> <p><1> Section 2.1.1.1: Hard links are supported on NTFS volumes, UDFS volumes, and ReFS volumes formatted version 3.5 or later (Windows Server 2022 and later).</p> <p>In Section 2.1.5.14.6 FileLinkInformation the pseudocode was updated for the IsHardLinksSupported abstract data model element.</p> <p>Changed from:</p> <p>...</p> <ul style="list-style-type: none"> If Open.File.FileType is DirectoryFile, the operation MUST be failed with STATUS_FILE_IS_A_DIRECTORY. If Open.Link.IsDeleted is TRUE, the operation MUST be failed with STATUS_ACCESS_DENIED. <p>...</p> <p>Changed to:</p> <p>...</p> <ul style="list-style-type: none"> If Open.File.FileType is DirectoryFile, the operation MUST be failed with STATUS_FILE_IS_A_DIRECTORY. If Open.File.Volume.IsHardLinksSupported is FALSE, the operation MUST be failed with STATUS_NOT_SUPPORTED. If Open.Link.IsDeleted is TRUE, the operation MUST be failed with STATUS_ACCESS_DENIED. <p>...</p> <p>In Section 5 Appendix A: Product Behavior product behavior note 154, the description for the FILE_SUPPORTS_HARD_LINKS row with ReFS was added.</p> <p>Set if 3.5 format or higher volume (formatted using Windows Server 2022 or later)</p>
2021/09/07	<p>In Section 2.1.5.5.3.4 FileIdBothDirectoryInformation the following was updated.</p> <p>Changed from:</p> <p>...</p> <ul style="list-style-type: none"> Entry.FileID set to Link.File.FileId64 <p>...</p> <p>Changed to:</p> <p>...</p> <ul style="list-style-type: none"> If Link.Name == "." (entry for the directory being queried): Entry.FileID set to Open.File.FileId64 Else if Link.Name == ".." (entry for the parent of the directory being queried): Entry.FileID SHOULD <65> be set to Open.Link.ParentFile.FileId64, otherwise MUST be set to zero Else: Entry.FileID set to Link.File.FileId64 EndIf

Errata Published*	Description
	<p><65> Section 2.1.5.5.3.4: The NTFS file system on versions prior to Windows 11 and Windows Server 2022, and non-NTFS file systems on all versions of Windows, always set the FileID field to zero in the ".." entry.</p> <p>...</p> <p>In MS-FSA section 2.1.5.5.3.5 FileIdExtdDirectoryInformation the following was updated.</p> <p>Changed from:</p> <p>...</p> <ul style="list-style-type: none"> • Entry.FileID set to Link.File.FileId128 <p>...</p> <p>Changed to:</p> <p>...</p> <ul style="list-style-type: none"> • If Link.Name == "." (entry for the directory being queried): • Entry.FileID set to Open.File.FileId128 • Else if Link.Name == ".." (entry for the parent of the directory being queried): • Entry.FileID SHOULD<67> be set to Open.Link.ParentFile.FileId128, otherwise MUST be set to zero • Else: • Entry.FileID set to Link.File.FileId128 • EndIf <p><67> Section 2.1.5.5.3.5: The NTFS file system on versions prior to Windows 11 and Windows Server 2022, and non-NTFS file systems on all versions of Windows, always set the FileID field to zero in the ".." entry.</p> <p>...</p> <p>In MS-FSA section 2.1.5.5.3.6 FileIdFullDirectoryInformation the following was updated.</p> <p>Changed from:</p> <p>...</p> <ul style="list-style-type: none"> • Entry.FileID set to Link.File.FileId64 <p>...</p> <p>Changed to:</p> <p>...</p> <ul style="list-style-type: none"> • If Link.Name == "." (entry for the directory being queried): • Entry.FileID set to Open.File.FileId64 • Else if Link.Name == ".." (entry for the parent of the directory being queried): • Entry.FileID SHOULD<69> be set to Open.Link.ParentFile.FileId64, otherwise MUST be set to zero • Else: • Entry.FileID set to Link.File.FileId64 • EndIf <p><69> Section 2.1.5.5.3.6: The NTFS file system on versions prior to Windows 11 and Windows</p>

Errata Published*	Description
	<p>Server 2022, and non-NTFS file systems on all versions of Windows, always set the FileID field to zero in the ".." entry.</p> <p>...</p>
2021/08/17	<p>In Section 2.1.5.9.19 FSCTL_MARK_HANDLE, updated the conditions when STATUS_REIDENT_FILE_NOT_SUPPORTED is returned.</p> <p>Changed from:</p> <p>...</p> <p>Pseudocode for the operation is as follows:</p> <ul style="list-style-type: none"> • 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.<96> • If a file is resident the operation MUST be failed with STATUS_RESIDENT_FILE_NOT_SUPPORTED.<97> • STATUS_INVALID_PARAMETER is returned if: <p>...</p> <p>Changed To:</p> <p>...</p> <ul style="list-style-type: none"> • STATUS_INVALID_PARAMETER is returned if: • InputBuffer.HandleInfo contains any flag other than one and only one of either MARK_HANDLE_READ_COPY or MARK_HANDLE_NOT_READ_COPY. • Open.Mode.FILE_NO_INTERMEDIATE_BUFFERING was not specified at open time, meaning the file was opened for cached IO operations. • If InputBuffer.CopyNumber > (Open.File.Volume.NumberOfDataCopies - 1). • If Open.Stream.StreamType != DataStream. • If InputBuffer.HandleInfo has MARK_HANDLE_READ_COPY set: • If Open.File.Volume.NumberOfDataCopies < 2, the operation MUST be failed with STATUS_NOT_REDUNDANT_STORAGE. • If Open.Stream.IsCompressed is TRUE, the operation MUST be failed with STATUS_COMPRESSED_FILE_NOT_SUPPORTED. • If a file is resident the operation MUST be failed with STATUS_RESIDENT_FILE_NOT_SUPPORTED.<97>

Errata Published*	Description
	<ul style="list-style-type: none">• Set Open.ReadCopyNumber = InputBuffer.CopyNumber. ...

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[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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[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 [V11.0 – 2021/06/25](#).

Errata Published*	Description
2021/08/17	<p>In Section 3.4.4.1.1.1.1, RequestSecurityToken using Federated Authentication, updated behavior note 15:</p> <p>Changed from: <15> Not supported in Windows versions prior to Windows 11.</p> <p>Changed to: <15> Supported in Windows beginning with Windows 10 v1903.</p> <p>In Section 3.4.4.1.1.1.2, RequestSecurityToken using Certificate Authentication, updated behavior note 17:</p> <p>Changed from: <17> Not supported in Windows versions prior to Windows 11.</p> <p>Changed to: <17> Supported in Windows beginning with Windows 10 v1903.</p> <p>In Section 3.4.4.1.1.1.3, RequestSecurityToken using On-Premise Authentication, updated behavior note 19:</p> <p>Changed from: <19> Not supported in Windows versions prior to Windows 11.</p>

Errata Published*	Description
	Changed to: <19> Supported in Windows beginning with Windows 10 v1903.

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[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

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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	<p>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.</p> <p>Changed from:</p> <p>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).</p> <p>Changed to:</p> <p>PayloadSize (4 bytes): The unsigned size, in bytes, of the Payload field. The maximum value for this field is 0x0000FC30 (64,560).</p>

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

This topic lists the Errata found in [MS-NRBF] 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 [V12.0 - 2019/03/13](#).

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

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[MS-NRPC]: Netlogon Remote Protocol

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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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Errata below are for Protocol Document Version [V8.0 – 2021/06/25](#).

Errata Published*	Description
2021/07/13	<p>In Section 3.1.5.1.3.3 Processing Details, updated to support client use of KDFv2 version and specified supporting operating systems.</p> <p>Changed from:</p> <p>"The client derives a signing key from the Session Key ADM element (section 3.1.1), the constant label "AzureAD-SecureConversation", and the ctx value provided in the JWT header of the request by using the process described in [SP800-108]. The client uses this signing key to sign the request."</p> <p>Changed to:</p> <p>"The client derives a signing key from the Session Key ADM element (section 3.1.1), the constant label "AzureAD-SecureConversation", and the ctx value provided in the JWT header of the request by using the process described in [SP800-108]. The client uses this signing key to sign the request.If the capabilities field of the OpenID Provider Metadata ([MS-OIDCE] section 2.2.3.2) from the server includes the value "kdf_ver2", the client can use KDFv2 version<2> for deriving the Session Key. If the client chooses to use KDFv2, the client MUST use SHA256(ctx assertion payload) instead of ctx as the context for deriving the signing key. The client MUST also add the JWT header field "kdf_ver" with value set to 2 to communicate that KDFv2 was used to create the derived signing key."</p> <p><2> Section 3.1.5.1.3.3: This protocol now supports KDF Version 2 for creating derived keys, which is used by clients to create a signed JWT. KDF Version 2 is supported on the operating systems specified in [MSFT-CVE-2021-33781], each with its related KB article download installed.</p> <p>Please see Section 3.1.5.1.4.3 Processing Details, which has changed as follows:</p>

Errata Published*	Description
	<p>Changed from:</p> <p>"The client first requests a primary refresh token from the server as defined in sections 3.1.5.1.2 and 3.2.5.1.2. It then uses the Primary Refresh Token ADM element (section 3.1.1) to populate the refresh_token field in this request for the user authentication certificate."</p> <p>Changed to:</p> <p>"The client first requests a primary refresh token from the server as defined in sections 3.1.5.1.2 and 3.2.5.1.2. It then uses the Primary Refresh Token ADM element (section 3.1.1) to populate the refresh_token field in this request for the user authentication certificate.If the capabilities field of the OpenID Provider Metadata ([MS-OIDCE] section 2.2.3.2) from the server includes the value "kdf_ver2", the client can use KDFv2 version for deriving the Session Key. If the client chooses to use KDFv2, the client MUST use SHA256(ctx assertion payload) instead of ctx as the context for deriving the signing key. The client MUST also add the JWT header field "kdf_ver" with the value set to 2 to communicate that KDFv2 was used for creating the derived signing key."</p> <p>Please see Section 3.1.5.2.1.3 Processing Details, which has changed as follows:</p> <p>Changed from:</p> <p>"The client derives a signing key from the Session Key ADM element (section 3.1.1), the constant label "AzureAD-SecureConversation", and the ctx value provided in the JWT header of the request by using the process described in [SP800-108]. The client uses this signing key to sign the JWT. "</p> <p>Changed to:</p> <p>"The client derives a signing key from the Session Key ADM element (section 3.1.1), the constant label "AzureAD-SecureConversation", and the ctx value provided in the JWT header of the request by using the process described in [SP800-108]. The client uses this signing key to sign the JWT. If the capabilities field of the OpenID Provider Metadata ([MS-OIDCE] section 2.2.3.2) from the server includes the value "kdf_ver2", the client can use KDFv2 version for deriving the Session Key. If the client chooses to use KDFv2, the client MUST use SHA256(ctx assertion payload) instead of ctx as the context for deriving the signing key. The client MUST also add the JWT header field "kdf_ver" with value set to 2 to communicate that KDFv2 was used for creating the derived signing key."</p> <p>Please see Section 3.2.5.1.2.1 Request Body, which has changed as follows:</p> <p>Changed from:</p> <p>"x5c (REQUIRED): The certificate used to sign the request, following the format described in [RFC7515] section 4.1.6."</p> <p>Changed to:</p> <p>"x5c (REQUIRED): The certificate used to sign the request, following the format described in [RFC7515] section 4.1.6.</p> <p>kdf_ver (OPTIONAL): If the capabilities field of the OpenID Provider Metadata ([MS-OIDCE]section 2.2.3.2) from the server includes the value "kdf_ver2", the client can use KDFv2 version for creating context, which is used in deriving the Session Key. This is used in flows to</p>

Errata Published*	Description
	<p>exchange a Primary Refresh token for another token or user authentication certificate, as defined in sections 3.1.5.1.3 and 3.1.5.1.4."</p> <p>Please see Section 3.2.5.1.3.1 Request Body</p> <p>Changed from:</p> <p>"ctx (REQUIRED): The base64-encoded bytes used for signature key derivation."</p> <p>Changed to:</p> <p>"ctx (REQUIRED): The base64-encoded bytes used for signature key derivation.</p> <p>kdf_ver (OPTIONAL): If ctx was created using KDFv2, the client MUST include the JWT header with the kdf_ver field set to 2."</p> <p>Please see Section 3.2.5.1.4.1 Request Body</p> <p>Changed from:</p> <p>"ctx (REQUIRED): The base64-encoded bytes used for signature key derivation."</p> <p>Changed to:</p> <p>"ctx (REQUIRED): The base64-encoded bytes used for signature key derivation.</p> <p>kdf_ver (OPTIONAL): If ctx was created using KDFv2, the client MUST include the JWT header with the kdf_ver field set to 2."</p> <p>Please see Section 3.2.5.2.1.1.1 x-ms-RefreshTokenCredential HTTP header format</p> <p>Changed from:</p> <p>"ctx (REQUIRED): The base64-encoded bytes used for signature key derivation."</p> <p>Changed to:</p> <p>"ctx (REQUIRED): The base64-encoded bytes used for signature key derivation.</p> <p>kdf_ver (OPTIONAL): If ctx was created using KDFv2, the client MUST include the JWT header with this field value set to 2."</p>

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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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Errata below are for Protocol Document Version [V8.0 – 2021/06/25](#).

Errata Published*	Description
2021/07/13	<p>In Section 3.2.5.3.1.3 Processing Details, updated to support client use of KDFv2 version, and specified supporting operating systems.</p> <p>Changed from:</p> <p>"winhello_cert_kr" (AD FS behavior level is AD_FS_BEHAVIOR_LEVEL_3 or higher). The server can include "winhello_cert_kr" in the capabilities field if it supports the krctx parameter as part of the OAuth token request ([MS-OAPXBC] section 2.2.2).<12>"</p> <p>Changed to:</p> <p>"winhello_cert_kr" (AD FS behavior level is AD_FS_BEHAVIOR_LEVEL_3 or higher). The server can include "winhello_cert_kr" in the capabilities field if it supports the krctx parameter as part of the OAuth token request ([MS-OAPXBC] section 2.2.2).<12>"</p> <p>kdf_ver2 (AD FS behavior level is AD_FS_BEHAVIOR_LEVEL_3 or higher). The server can include "kdf_ver2" in the capabilities field if it is supported.<13>The client can use KDFv2 version for deriving the Session Key as described in [MS-OAPXBC] section 3.1.5.1.3.3."</p> <p><13> Section 3.2.5.3.1.3: KDF Version 2 is supported on the operating systems specified in [MSFT-CVE-2021-33779], each with its related KB article download installed.</p>

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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

This topic lists the Errata found in [MC-OLEPS] 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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[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-PKCA]: Public Key Cryptography for Initial Authentication (PKINIT) in Kerberos Protocol

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Errata below are for Protocol Document Version [V14.0 – 2021/06/25](#).

Errata Published*	Description
2021/09/07	<p>In Section 3.1.5 Message Processing Events and Sequencing Rules, removed references to RC2 encryption mode and added reference to the security update.</p> <p>Changed from:</p> <p>In addition to the required ([RFC4556] section 3.1.1) and recommended ([RFC4556] section 3.1.2) algorithms, PKCA supports the rc2-cbc ([RFC4556] section 3.1.4) algorithm. An implementer SHOULD<12> specify des-ede3-cbc ([RFC4556] section 3.1.2) as the default algorithm.</p> <p><12> Section 3.1.5: In Windows with PKCA, the KDC supports both des-ede3-cbc and rc2-cbc. If both des-ede3-cbc and rc2-cbc are present, the KDC uses des-ede3-cbc.</p> <p>Changed to:</p> <p>In addition to the required ([RFC4556] section 3.1.1) and recommended ([RFC4556] section 3.1.2) algorithms, an implementer MUST<12> specify des-ede3-cbc ([RFC4556] section 3.1.2) as the default algorithm.</p> <p><12> Section 3.1.5: In Windows with PKCA, the KDC supports and uses des-ede3-cbc. The RC2 algorithm rc2-cbc is no longer supported for encryption mode based key delivery with Kerberos PKINIT ([RFC4556]). See Windows Key Distribution Center Information Disclosure Vulnerability July 13, 2021 [MSFT-CVE-2021-33764]. This update applies to Windows Servers with Domain Controllers, Windows Server 2008 and later.</p>

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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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Errata below are for Protocol Document Version [V7.0 - 2021/06/25](#).

Errata Published*	Description
2021/09/07	<p>In Section 2.2 Message Syntax, changed data types in TSRemoteGuardInnerPacket.</p> <p>Changed from:</p> <pre>TSRemoteGuardInnerPacket ::= SEQUENCE { version [0] TSRemoteGuardVersion DEFAULT tsremoteguardv1, packageName [1] OCTETSTRINGNOCOPY, buffer [2] OCTETSTRINGNOCOPY, extension [3] ANYNOCOPY OPTIONAL, -- future extension point ... }</pre> <p>Changed to:</p> <pre>TSRemoteGuardInnerPacket ::= SEQUENCE { version [0] TSRemoteGuardVersion DEFAULT tsremoteguardv1, packageName [1] OCTET STRING, buffer [2] OCTET STRING, extension [3] ANY OPTIONAL, -- X.680 open type for future extension point ... }</pre>

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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

This topic lists the Errata found in [MS-RDPEUDP2] 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 [V5.0 - 2021/06/25](#).

Errata Published*	Description
2021/08/17	<p>In Section 3.1.5.2, DelayAckInfo Payload, changed case of a field name:</p> <p>Changed from:</p> <p>maxDelayedAcks</p> <p>Changed to:</p> <p>MaxDelayedAcks</p> <p>In Section 3.1.5.7, Acknowledgement Vector Payload, revised a field name:</p> <p>Changed from:</p> <p>AckVecSize</p> <p>Changed to:</p> <p>codedAckVecSize</p>
2021/08/17	<p>In Section 2.2.1.2.2, OverheadSize Payload, revised the value of OVERHEADSIZE.</p> <p>Changed from:</p> <p>OVERHEADSIZE (0x10)</p> <p>Changed to:</p> <p>OVERHEADSIZE (0x040)</p>

Errata Published*	Description
	<p>In Section 2.2.1.2.3, DelayAckInfo Payload, revised the value of DELAYACKINFO.</p> <p>Changed from:</p> <p>DELAYACKINFO (0x20)</p> <p>Changed to:</p> <p>DELAYACKINFO (0x100)</p> <p>In Section 2.2.1.2.4, AckOfAcks Payload, revised the value of AOA.</p> <p>Changed from:</p> <p>AOA (0x08)</p> <p>Changed to:</p> <p>AOA (0x010)</p> <p>In Section 2.2.1.2.5, DataHeader Payload, revised the value of DATA.</p> <p>Changed from:</p> <p>DATA (0x02)</p> <p>Changed to:</p> <p>DATA (0x004)</p> <p>In Section 2.2.1.2.6, Acknowledgement Vector Payload, revised the value of ACKVEC.</p> <p>Changed from:</p> <p>ACKVEC (0x04)</p> <p>Changed to:</p> <p>ACKVEC (0x008)</p> <p>In Section 2.2.1.2.7, DataBody Payload, revised the value of DATA.</p> <p>Changed from:</p> <p>DATA (0x02)</p> <p>Changed to:</p>

Errata Published*	Description
	DATA (0x004)

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[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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Errata Published*	Description
2021/09/07	<p>In Section 3.1.4.14.2 the return value data type was updated:</p> <p>Changed from:</p> <pre>DHRESULT RpcIppCreateJobOnPrinter ([in] PRINTER_HANDLE hPrinter, [in] DWORD jobId, [in, string, unique] const wchar_t* pdlFormat, [in] DWORD jobAttributeGroupBufferSize, [in, size_is(jobAttributeGroupBufferSize)] BYTE* jobAttributeGroupBuffer, [out, ref] DWORD* ippResponseBufferSize, [out, size_is(*ippResponseBufferSize), ref] BYTE** ippResponseBuffer);</pre> <p>Changed to:</p> <pre>HRESULT RpcIppCreateJobOnPrinter ([in] PRINTER_HANDLE hPrinter, [in] DWORD jobId, [in, string, unique] const wchar_t* pdlFormat, [in] DWORD jobAttributeGroupBufferSize, [in, size_is(jobAttributeGroupBufferSize)] BYTE* jobAttributeGroupBuffer, [out, ref] DWORD* ippResponseBufferSize, [out, size_is(*ippResponseBufferSize), ref] BYTE** ippResponseBuffer</pre>

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);

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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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Errata Published*	Description
2021/07/13	<p>In Section 3.2.2.4 AES Cipher Usage, updated to provide support for recent AES encryption capabilities to the MS-SAMR protocol on multiple Windows operating systems.</p> <p>Changed from:</p> <p>"Advanced Encryption Standard (AES) encryption is achieved in this protocol by using the AEAD-AES-256-CBC-HMAC-SHA512 cipher, as specified in [AES-CBC]. In order to use an encryption key,..."</p> <p>Changed to:</p> <p>"Advanced Encryption Standard (AES) encryption is achieved in this protocol by using the AEAD-AES-256-CBC-HMAC-SHA512 cipher<72> as specified in [AES-CBC]. In order to use an encryption key,..."</p> <p><72> Section 3.2.2.4: The AES cipher AEAD-AES-256-CBC-HMAC-SHA512 and supporting methods, structures, and processing details that enable AES wire encryption protections of sensitive data with this protocol are supported on the operating systems specified in [MSFT-CVE-2021-33757], each with its related KB article download installed.</p>

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

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[MS-SCMR]: Service Control Manager Remote Protocol

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

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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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Errata Published*	Description
2021/09/21	<p>In Section 3.2.5.2.3 Using ServicesAllowedToReceiveForwardedTicketsFrom, removed the UserAccountControl check and added a behavior note to document the addition of the NonForwardableDelegation flag with references to the Kerberos Security Feature Bypass Vulnerability.</p> <p>Changed from:</p> <p>If the service ticket in the additional-tickets field is not set to forwardable,<22> and the USER_NOT_DELEGATED bit is set in the UserAccountControl field in the KERB_VALIDATION_INFO structure ([MS-PAC] section 2.5), then the KDC MUST return KRB-ERR-BADOPTION with STATUS_ACCOUNT_RESTRICTION ([MS-ERREF] section 2.3.1).</p> <p>Changed to:</p> <p>If the service ticket in the additional-tickets field is not set to forwardable,<22> then the KDC MUST return KRB-ERR-BADOPTION with STATUS_ACCOUNT_RESTRICTION ([MS-ERREF] section 2.3.1).<23></p> <p><23> Section 3.2.5.2.3: The Kerberos Security Feature Bypass Vulnerability March 12,2021 [MSFT-CVE-2020-16996] update adds support for the NonForwardableDelegation registry value to (0) enable Enforcement of protection on Active Directory domain controller servers. Active Directory domain controllers will be in Enforcement mode unless the enforcement mode registry key is set to (1) disabled. This update applies to Windows Server 2012 and later. For additional information that includes Windows Server 2008 SP2 operating system and Windows Server 2008 R2 SP1 operating system see [MSFT-RBCD-ProtectedUserChanges].</p>

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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

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Errata below are for Protocol Document Version [V64.0 – 2021/06/25](#).

Errata Published*	Description
2021/09/21	<p>In Section 3.3.5.5.3 Handling GSS-API Authentication, added a check to restrict the generation of SigningKey, ApplicationKey, Channel.SigningKey, Encryption and Decryption Key to only primary authentication.</p> <p>Changed from:</p> <p>7. If Connection.Dialect belongs to the SMB 3.x dialect family and SMB2_SESSION_FLAG_BINDING is not set in the Flags field of the request, the server MUST generate Session.SigningKey as specified in section 3.1.4.2 by providing the following inputs:</p> <p>8. If Connection.Dialect belongs to the SMB 3.x dialect family and SMB2_SESSION_FLAG_BINDING is not set in the Flags field of the request, Session.ApplicationKey MUST be generated as specified in section 3.1.4.2 and passing the following inputs:</p> <p>9. If Connection.Dialect belongs to the SMB 3.x dialect family and SMB2_SESSION_FLAG_BINDING is set in the Flags field of the request, the server MUST generate Channel.SigningKey by providing the following input values:</p> <p>11. If Connection.Dialect belongs to the SMB 3.x dialect family, SMB2_SESSION_FLAG_BINDING is not set in the Flags field of the request, Session.IsAnonymous and Session.IsGuest are set to FALSE, and Connection.ServerCapabilities includes the SMB2_GLOBAL_CAP_ENCRYPTION bit, the server MUST do the following:</p> <p>Changed to:</p> <p>7. If Connection.Dialect belongs to the SMB 3.x dialect family, and SMB2_SESSION_FLAG_BINDING is not set in the Flags field of the request, and the request is not for session reauthentication, the server MUST generate Session.SigningKey as specified in section 3.1.4.2 by providing the following inputs:</p>

Errata Published*	Description
	<p>8. If Connection.Dialect belongs to the SMB 3.x dialect family, SMB2_SESSION_FLAG_BINDING is not set in the Flags field of the request, and the request is not for session reauthentication, Session.ApplicationKey MUST be generated as specified in section 3.1.4.2 and passing the following inputs:</p> <p>9. If Connection.Dialect belongs to the SMB 3.x dialect family, SMB2_SESSION_FLAG_BINDING is set in the Flags field of the request, and the request is not for session reauthentication, the server MUST generate Channel.SigningKey by providing the following input values:</p> <p>11. If Connection.Dialect belongs to the SMB 3.x dialect family, SMB2_SESSION_FLAG_BINDING is not set in the Flags field of the request, Session.IsAnonymous and Session.IsGuest are set to FALSE, Connection.ServerCapabilities includes the SMB2_GLOBAL_CAP_ENCRYPTION bit, and the request is not for session reauthentication, the server MUST do the following:</p>
2021/09/07	<p>In Section 3.3.5.15 Receiving an SMB2 WRITE Request, added negotiated dialect check in processing of SMB2_WRITEFLAG_WRITE_THROUGH flag in SMB2 WRITE request.</p> <p>Changed From:</p> <p>If the server implements the SMB 3.0.2 or SMB 3.1.1 dialect, SMB2_WRITEFLAG_WRITE_THROUGH is set in the Flags field of the request, SMB2_WRITEFLAG_WRITE_UNBUFFERED is not set in the Flags field of the request, and Open.CreateOptions doesn't include the FILE_NO_INTERMEDIATE_BUFFERING bit, the server MUST fail the request with STATUS_INVALID_PARAMETER.</p> <p>If the server implements the SMB 2.1 or the SMB 3.x dialect family, SMB2_WRITEFLAG_WRITE_THROUGH is set in the Flags field of the request, and Open.CreateOptions doesn't include the FILE_NO_INTERMEDIATE_BUFFERING bit, the server MUST fail the request with STATUS_INVALID_PARAMETER.</p> <p>Changed To:</p> <p>If Connection.Dialect is "3.0.2" or "3.1.1", SMB2_WRITEFLAG_WRITE_THROUGH is set in the Flags field of the request, SMB2_WRITEFLAG_WRITE_UNBUFFERED is not set in the Flags field of the request, and Open.CreateOptions doesn't include the FILE_NO_INTERMEDIATE_BUFFERING bit, the server MUST fail the request with STATUS_INVALID_PARAMETER.</p> <p>If Connection.Dialect is "2.1" or "3.0", SMB2_WRITEFLAG_WRITE_THROUGH is set in the Flags field of the request, and Open.CreateOptions doesn't include the FILE_NO_INTERMEDIATE_BUFFERING bit, the server MUST fail the request with STATUS_INVALID_PARAMETER.</p>
2021/08/17	<p>The following sections were updated for processing rules on replay operation using SMB2_FLAGS_REPLAY_OPERATION bit.</p> <p>Section 3.2.5.7 Receiving an SMB2 CREATE Response for a New Create Operation Section 3.2.5.12 Receiving an SMB2 WRITE Response Section 3.2.5.14 Receiving an SMB2 IOCTL Response Section 3.2.5.18 Receiving an SMB2 SET_INFO Response</p> <p>Please see diff file</p>

*Date format: YYYY/MM/DD

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

This topic lists the Errata found in [MS-SMBD] 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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[MS-SPNG]: Simple and Protected GSS-API Negotiation Mechanism (SPNEGO) Extension

This topic lists the Errata found in [MS-SPNG] 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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[MS-SQOS]: Storage Quality of Service Protocol

This topic lists the Errata found in [MS-SQOS] 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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[MS-SSTP]: Secure Socket Tunneling Protocol (SSTP)

This topic lists the Errata found in [MS-SSTP] 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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[MS-SSTR]: Smooth Streaming Protocol

This topic lists the Errata found in the [MS-SSTR] document 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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March 16, 2018 - [Download](#)

Errata below are for Protocol Document Version [V8.0 – 2019/03/13](#).

Errata Published*	Description
2020/07/06	<p>In Section 1.5 Prerequisites/Preconditions, added reference to the amendment for HEVC.</p> <p>Changed from:</p> <p>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></p> <p><1> Section 1.5: The Smooth Streaming Protocol is supported...</p> <p>Changed to:</p> <p>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></p> <p><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].</p> <p><2> Section 1.5: The Smooth Streaming Protocol is supported...</p>

*Date format: YYYY/MM/DD

[MS-SWN]: Service Witness Protocol

This topic lists the Errata found in [MS-SWN] 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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[MS-TCC]: Tethering Control Channel Protocol

This topic lists the Errata found in [MS-TCC] 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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[MS-TDS]: Tabular Data Stream Protocol

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

This topic lists the Errata found in [MS-TLSP] 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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[MS-TPMVSC]: Trusted Platform Module (TPM) Virtual Smart Card Management Protocol

This topic lists the Errata found in [MS-TPMVSC] 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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[MS-TSCH]: Task Scheduler Service Remoting Protocol

This topic lists the Errata found in [MS-TSCH] 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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[MS-TSGU]: Terminal Services Gateway Server Protocol

This topic lists the Errata found in [MS-TSGU] 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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[MS-TSTS]: Terminal Services Terminal Server Runtime Interface Protocol

This topic lists the Errata found in [MS-TSTS] 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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[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.



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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.



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[MS-W32T]: W32Time Remote Protocol

This topic lists the Errata found in [MS-W32T] 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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[MS-WCCE]: Windows Client Certificate Enrollment Protocol

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Errata below are for Protocol Document Version [V46.0 – 2021/06/25](#).

Errata Published*	Description
2021/09/07	<p>In Section 3.2.1.4.3.2.15.1 Creating a CA Exchange Certificate, provided additional information about creating the certificate:</p> <p>Changed from:</p> <ol style="list-style-type: none">1. For the Subject of the exchange certificate, a common name attribute is used with a value the same as the value of the common name attribute in the subject information of the CA signing certificate (Signing_Cert_Certificate datum) and appending "-Xchg" to the value. The Issuer field is filled with the same value as the Subject field....7. If the CA signing certificate contains an Authority Key Identifier extension, add this extension with the same value as in the CA signing certificate (Signing_Cert_Certificate datum). Authority Key Identifier extension is specified in [RFC3280] section 4.2.1.1.8. If the CA signing certificate contains a Subject Key Identifier extension, add this extension with the same value as in the CA signing certificate (Signing_Cert_Certificate datum). Subject Key Identifier extension is specified in [RFC3280] section 4.2.1.2.9. If the CA signing certificate contains an Authority Information Access extension, add this extension with the same value as in the CA signing certificate (Signing_Cert_Certificate datum). Authority Information Access extension is specified in [RFC3280] section 4.2.2.1.10. If the CA signing certificate contains a CRL Distribution Point extension, add this extension with the same value as in the CA signing certificate (Signing_Cert_Certificate datum). CRL Distribution Point extension is specified in [RFC3280] section 4.2.1.14.11. The value for Valid From field is the date and time when the request for CA exchange certificate was received minus the value of the Config_CA_Clock_Skew_Minutes data. The Valid To field is set to one week later. Valid From and Valid To are specified in [RFC3280] section 4.1.2.5.

Errata Published*	Description
	<p>Changed to:</p> <ol style="list-style-type: none"> 1. For the Subject of the exchange certificate, a common name attribute (1) is used with a value the same as the value of the common name attribute (1) in the subject information of the CA signing certificate (Signing_Cert_Certificate datum) and appending "-Xchg" to the value. The Issuer field is filled with the same value as the Subject field of the CA signing certificate (Signing_Cert_Certificate datum). ... 7. The Authority Key Identifier extension is added with the same value as the Subject Key Identifier extension in the CA signing certificate (Signing_Cert_Certificate datum). If Subject Key Identifier extension is not found in CA signing certificate (Signing_Cert_Certificate datum) then SHA1 hash of the public key of CA signing certificate (Signing_Cert_Certificate datum) is used as the value for Authority Key Identifier extension. Authority Key Identifier extension is specified in [RFC3280] section 4.2.1.1. 8. The Subject Key Identifier extension is added with the same value as the SHA1 hash of the public key associated with the exchange certificate. Subject Key Identifier extension is specified in [RFC3280] section 4.2.1.2. 9. The Authority Information Access extension is added with the same value the CA returns when ICertRequestD2::GetCAProperty is called for PropID of CR_PROP_CERTAIAURLS and propIndex of 0xFFFFFFFF. See section 3.2.1.4.3.2.42 for details on how this value is computed. Authority Information Access extension is specified in [RFC3280] section 4.2.2.1. 10. The CRL Distribution Point extension is added with the same value the CA returns when ICertRequestD2::GetCAProperty is called for PropID of CR_PROP_CERTCDPURLS and propIndex of 0xFFFFFFFF. See section 3.2.1.4.3.2.43 for details on how this value is computed. CRL Distribution Point extension is specified in [RFC3280] section 4.2.1.14. 11. The value for Valid From field is the date and time when the request for CA exchange certificate was received minus the value of the Config_CA_Clock_Skew_Minutes data. The Valid To field is set to one week later. Valid From and Valid To are specified in [RFC3280] section 4.1.2.5.
2021/09/07	<p>In a new section 2.2.2.6.5, Null Signature, described the processing and conditions for using a null signature:</p> <p>Changed to:</p> <p>2.2.2.6.5 Null Signature</p> <p>In CMS and CMC certificate request formats, the PKCS #10 request specified in the TaggedRequest field (see section 3.2.1.4.2.1.4.1.3) can contain only a null signature with the following signature field values:</p> <p>signatureAlgorithm (see section 4.2, [RFC2986]) would be set to a hashing algorithm such as "Sha256" (OID 2.16.840.1.101.3.4.2.1).</p> <p>signature (see section 4.2, [RFC2986]) contains only the unencrypted hash octets computed over the DER encoded certificationRequestInfo component (see section 4.2 of RFC2986) using the hash algorithm specified in the signatureAlgorithm field.</p> <p>Clients can send a PKCS #10 request with a null signature when the PKCS #10 request is specified in the TaggedRequest field in the CMS and CMC request formats as specified in sections</p>

Errata Published*	Description												
	<p>3.1.1.4.3.2.2, section 3.2.1.4.2.1.4.1.1, 3.1.1.4.3.1.3, 3.1.1.4.3.2.2, 3.1.1.4.3.3.3, and 3.1.1.4.3.6.1.</p> <p>If the signature validation fails in section 3.2.1.4.2.1.4.1.1, then the CA MUST also check for a null signature and return a nonzero error to the client only when null signature validation fails as well. CA MUST check for null signature only when the PKCS#10 request is specified in the CMS and CMC request formats as specified in sections 3.2.1.4.2.1.4.1.3, 3.2.1.4.2.1.4.2.2, 3.2.2.6.2.1.2.1.2, and 3.2.2.6.2.1.2.2.</p>												
2021/08/10	<p>In Section 3.2.2.6.2.1.4.5.7 msPKI-Private-Key-Flag, removed extra leading zeroes in the following flags in the msPKI-Private-Key-Flag attribute to reduce hex value length from 9 to 8 digits in each stated value: 0x00002000 CT_FLAG_ATTEST_REQUIRED *, 0x00001000 CT_FLAG_ATTEST_PREFERRED *, 0x00004000 CT_FLAG_ATTESTATION_WITHOUT_POLICY *, 0x00000200 CT_FLAG_EK_TRUST_ON_USE *, 0x00000400 CT_FLAG_EK_VALIDATE_CERT *, 0x00000800 CT_FLAG_EK_VALIDATE_KEY *</p> <p>Changed from:</p> <table border="1" data-bbox="399 737 1070 1545"> <thead> <tr> <th data-bbox="399 737 1070 821">Flag</th> </tr> </thead> <tbody> <tr> <td data-bbox="399 821 1070 869">0x00000001 CT_FLAG_REQUIRE_PRIVATE_KEY_ARCHIVAL</td> </tr> <tr> <td data-bbox="399 869 1070 953">0x00000080 CT_FLAG_REQUIRE_SAME_KEY_RENEWAL</td> </tr> <tr> <td data-bbox="399 953 1070 1037">0x00000200 CT_FLAG_ATTEST_REQUIRED *</td> </tr> <tr> <td data-bbox="399 1037 1070 1121">0x00000100 CT_FLAG_ATTEST_PREFERRED *</td> </tr> <tr> <td data-bbox="399 1121 1070 1205">0x00000000 CT_FLAG_ATTEST_NONE *</td> </tr> <tr> <td data-bbox="399 1205 1070 1289">0x00000400 CT_FLAG_ATTESTATION_WITHOUT_POLICY *</td> </tr> <tr> <td data-bbox="399 1289 1070 1373">0x00000200 CT_FLAG_EK_TRUST_ON_USE *</td> </tr> <tr> <td data-bbox="399 1373 1070 1457">0x00000400 CT_FLAG_EK_VALIDATE_CERT *</td> </tr> <tr> <td data-bbox="399 1457 1070 1541">0x00000800 CT_FLAG_EK_VALIDATE_KEY *</td> </tr> </tbody> </table> <p>Changed to:</p> <table border="1" data-bbox="399 1692 1070 1814"> <thead> <tr> <th data-bbox="399 1692 1070 1776">Flag</th> </tr> </thead> <tbody> <tr> <td data-bbox="399 1776 1070 1814">0x00000001 CT_FLAG_REQUIRE_PRIVATE_KEY_ARCHIVAL</td> </tr> </tbody> </table>	Flag	0x00000001 CT_FLAG_REQUIRE_PRIVATE_KEY_ARCHIVAL	0x00000080 CT_FLAG_REQUIRE_SAME_KEY_RENEWAL	0x00000200 CT_FLAG_ATTEST_REQUIRED *	0x00000100 CT_FLAG_ATTEST_PREFERRED *	0x00000000 CT_FLAG_ATTEST_NONE *	0x00000400 CT_FLAG_ATTESTATION_WITHOUT_POLICY *	0x00000200 CT_FLAG_EK_TRUST_ON_USE *	0x00000400 CT_FLAG_EK_VALIDATE_CERT *	0x00000800 CT_FLAG_EK_VALIDATE_KEY *	Flag	0x00000001 CT_FLAG_REQUIRE_PRIVATE_KEY_ARCHIVAL
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Errata Published*	Description								
	<table border="1"> <tr> <td data-bbox="402 228 1070 310">0x00000080 CT_FLAG_REQUIRE_SAME_KEY_RENEWAL</td> </tr> <tr> <td data-bbox="402 310 1070 392">0x00002000 CT_FLAG_ATTEST_REQUIRED *</td> </tr> <tr> <td data-bbox="402 392 1070 474">0x00001000 CT_FLAG_ATTEST_PREFERRED *</td> </tr> <tr> <td data-bbox="402 474 1070 556">0x00000000 CT_FLAG_ATTEST_NONE *</td> </tr> <tr> <td data-bbox="402 556 1070 638">0x00004000 CT_FLAG_ATTESTATION_WITHOUT_POLICY *</td> </tr> <tr> <td data-bbox="402 638 1070 720">0x00000200 CT_FLAG_EK_TRUST_ON_USE *</td> </tr> <tr> <td data-bbox="402 720 1070 802">0x00000400 CT_FLAG_EK_VALIDATE_CERT *</td> </tr> <tr> <td data-bbox="402 802 1070 884">0x00000800 CT_FLAG_EK_VALIDATE_KEY *</td> </tr> </table>	0x00000080 CT_FLAG_REQUIRE_SAME_KEY_RENEWAL	0x00002000 CT_FLAG_ATTEST_REQUIRED *	0x00001000 CT_FLAG_ATTEST_PREFERRED *	0x00000000 CT_FLAG_ATTEST_NONE *	0x00004000 CT_FLAG_ATTESTATION_WITHOUT_POLICY *	0x00000200 CT_FLAG_EK_TRUST_ON_USE *	0x00000400 CT_FLAG_EK_VALIDATE_CERT *	0x00000800 CT_FLAG_EK_VALIDATE_KEY *
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0x00000400 CT_FLAG_EK_VALIDATE_CERT *									
0x00000800 CT_FLAG_EK_VALIDATE_KEY *									
2021/07/13	<p>In Section 2.1 Transport, clarified how authentication level configuration impacts client CA connections.</p> <p>Changed from:</p> <p>Authentication level: SHOULD<6> be set to RPC_C_AUTHN_LEVEL_PKT_PRIVACY (6).</p> <p><6> Section 2.1: "All Windows clients set the authentication level to RPC_C_AUTHN_LEVEL_PKT_PRIVACY. On the server side, if IF_ENFORCEENCRYPTICERTREQUEST or IF_ENFORCEENCRYPTICERTADMIN are set (see section 3.2.1.1.4) and the RPC_C_AUTHN_LEVEL_PKT_PRIVACY authentication level is not specified from the client, the CA refuses to establish a connection with the client by returning a nonzero error. By default, however, Windows CAs do not require the RPC_C_AUTHN_LEVEL_PKT_PRIVACY authentication level. That is, neither IF_ENFORCEENCRYPTICERTREQUEST nor IF_ENFORCEENCRYPTICERTADMIN are set."</p> <p>Changed to:</p> <p>"Authentication level: SHOULD be set to RPC_C_AUTHN_LEVEL_PKT_PRIVACY (0x06).</p> <p>Windows clients typically set the authentication level to RPC_C_AUTHN_LEVEL_PKT_PRIVACY (0x06).<6></p> <p>If a CA server has IF_ENFORCEENCRYPTICERTREQUEST set (section 3.2.1.1.4) and the RPC_C_AUTHN_LEVEL_PKT_PRIVACY (0x06) authentication level ([MS-RPCE] section 2.2.1.1.8) is not specified by the client for certificate-request operations, the CA MUST deny a connection to the client and return a non-zero error. If a CA server has IF_ENFORCEENCRYPTICERTADMIN set (section 3.2.1.1.4) and the RPC_C_AUTHN_LEVEL_PKT_PRIVACY (0x06) authentication level is not specified by the client for certificate administrative operations, the CA MUST deny a connection to the client and return a non-zero error.<7>"</p>								

Errata Published*	Description
	<6> Windows XP sets the authentication level to RPC_C_AUTHN_LEVEL_PKT_INTEGRITY (0x05). <7> By default, CAs on Windows Server 2012 operating system and later have IF_ENFORCEENCRYPTICERTREQUEST and IF_ENFORCEENCRYPTICERTADMIN set.

*Date format: YYYY/MM/DD

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

This topic lists the Errata found in [MS-WCFESAN] 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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[MS-WDSMT]: Windows Deployment Services Multicast Transport Protocol

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[MS-WDSOSD]: Windows Deployment Services Operation System Deployment 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-WSP]: Windows Search Protocol

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

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Errata below are for Protocol Document Version [V14.0 – 2021/06/25](#).

Errata Published*	Description
2021/09/21	<p>In Section 3.1.4.1.3.2 wst:RequestedSecurityTokenType, updated to clarify the RequestSecurityTokenResponseCollection and RequestedSecurityToken element responses, the certificate locations, and the BinarySecurityToken format and value type.</p> <p>Changed from:</p> <p>"The WSTEP extends wst: RequestedSecurityTokenType with two additional elements.</p> <ul style="list-style-type: none">• <xs:element ref="wsse:BinarySecurityToken" />• <xs:element ref="wsse:SecurityTokenReference" /> <p>wsse:BinarySecurityToken: The wsse:BinarySecurityToken element contains the issued certificate. The issued certificate follows the encoding and data structure defined in [MS-WCCE] section 2.2.2.8."</p> <p>Changed to:</p> <p>"MS-WSTEP extends the wst: RequestedSecurityTokenType with two additional elements as follows.</p> <ul style="list-style-type: none">• <xs:element ref="wsse:BinarySecurityToken" />• <xs:element ref="wsse:SecurityTokenReference" /> <p>The server SHOULD<2> include the end entity certificate in the RequestedSecurityTokenresponse. The ValueType of the BinarySecurityToken element for this RequestedSecurityToken response MUST be X509v3 [RFC5280]. The server MUST also include a CMC full PKI response in the RequestSecurityTokenResponseCollection, as specified in sections 4.2 and 4.3 of [WSTrust1.3].</p> <p>wsse:BinarySecurityToken: The wsse:BinarySecurityToken element contains the issued certificatein either a full CMC response or as a stand alone x509v3 certificate[RFC5280].</p> <p><2> Section 3.1.4.1.3.2: Microsoft Windows always includes the requested end entity certificate in the RequestedSecurityToken."</p>

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

This topic lists the Errata found in the MS-WSUSAR document 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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[MS-WSUSOD]: Windows Server Update Services Protocols Overview

This topic lists the Errata found in [MS-WSUSOD] 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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[MS-WSUSSS]: Windows Update Services: Server-Server Protocol

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

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Errata below are for Protocol Document Version [V31.0 - 2021/06/25](#).

Errata Published*	Description
2021/09/07	<p>In Section 2.2.2.2.4, SyncUpdates, updated the applicability of the ClientBehaviors element.</p> <p>Changed from:</p> <p><19> Section 2.2.2.2.4: The ClientBehaviors element is not supported in Windows clients earlier than Windows 10 v21H1 operating system.</p> <p>Changed to:</p> <p><19> Section 2.2.2.2.4: The ClientBehaviors element is not supported in Windows clients and servers earlier than Windows 10 v2004 and Windows Server v2004 operating system.</p>
2021/08/17	<p>In Section 2.2.2.2.6 GetExtendedUpdateInfo, added the GeoId property to the Request XML as part of the GetExtendedUpdateInfo method and provided definition of the GeoId property. Added product behavior note to indicate operating systems that support the GeoId property via feature backports to those systems.</p> <p>Changed from:</p> <p>"Request:</p> <pre><s:element name="GetExtendedUpdateInfo"> <s:complexType> <s:sequence> <s:element minOccurs="0" maxOccurs="1" name="cookie" type="s1:Cookie" /> <s:element minOccurs="0" maxOccurs="1" name="revisionIDs" type="s1:ArrayOfInt" /> <s:element minOccurs="0" maxOccurs="1" name="infoTypes" type="s1:ArrayOfXmlUpdateFragmentType" /> <s:element minOccurs="0" maxOccurs="1" name="locales"</pre>

Errata Published*	Description
	<pre> type="s1:ArrayOfString" /> </s:sequence> </s:complexType> </s:element> </pre> <p>...</p> <p>locales: Optionally specifies the locales for which localizable extended metadata MUST be returned. Localizable metadata are elements such as human-readable strings, which are represented differently between locales, as specified in [MS-LCID]. The service SHOULD always return the EN locale extended metadata.</p> <p>Response:</p> <p>...</p> <p>Changed to:</p> <p>Request:</p> <pre> <s:element name="GetExtendedUpdateInfo"> <s:complexType> <s:sequence> <s:element minOccurs="0" maxOccurs="1" name="cookie" type="s1:Cookie" /> <s:element minOccurs="0" maxOccurs="1" name="revisionIDs" type="s1:ArrayOfInt" /> <s:element minOccurs="0" maxOccurs="1" name="infoTypes" type="s1:ArrayOfXmlUpdateFragmentType" /> <s:element minOccurs="0" maxOccurs="1" name="locales" type="s1:ArrayOfString" /> <s:element minOccurs="0" maxOccurs="1" name="GeoId" type="s1:String" /> </s:sequence> </s:complexType> </s:element> </pre> <p>...</p> <p>locales: Optionally specifies the locales for which localizable extended metadata MUST be returned. Localizable metadata are elements such as human-readable strings, which are represented differently between locales, as specified in [MS-LCID]. The service SHOULD always return the EN locale extended metadata.</p> <p>GeoId: Optionally specifies the region for which to retrieve end user license agreement (EULA) XML fragments and digests for the requested updates, as specified in the [ISO-3166] three-letter region codes.<22></p> <p>Response:</p> <p>...</p> <p><22> Section 2.2.2.2.6: The GeoId property is backported [MSKB-5005101] for support on the Windows 10 v2004, Windows 10 v20H2, Windows 10 v21H1 operating system, Windows Server v2004 Core operating system, and Windows Server v20H2 Core operating system.</p> <p>In Section 3.1.1.1 Abstract Data Model, updated region information in the Metadata Table by adding the GeoId element and description to the Eula entry; updated product behavior note <32>:</p>

Errata Published*	Description
	<p>Changed from:</p> <p>Eula: There are zero or more "Eula" entries created from the revision's metadata: one for each XmlNode, N, with unqualified XPATH /Update/LocalizedPropertiesCollection/EulaFile.</p> <p>RevisionID: References the entry in the revision table for the revision's metadata.</p> <p>FragmentType: Eula.</p> <p>XmlFragment: Strip namespaces from the XmlNode.</p> <p>Locale: The "Language" attribute of the XmlNode.</p> <p>Note Clients don't use the EULA fragments obtained from a Windows Server Update Services (WSUS) server (this fragment is only used by clients talking to the WSUS). Instead, a WSUS server administrator MUST accept EULAs on behalf of clients.<32></p> <p>Changed to:</p> <p>Eula: There are zero or more "Eula" entries created from the revision's metadata: one for each XmlNode, N, with unqualified XPATH /Update/LocalizedPropertiesCollection/EulaFile.</p> <p>RevisionID: References the entry in the revision table for the revision's metadata.</p> <p>FragmentType: Eula.</p> <p>XmlFragment: Strip namespaces from the XmlNode.</p> <p>Locale: The "Language" attribute of the XmlNode.</p> <p>GeoId: Specifies the geographic region for which the end user license agreement (EULA) XML fragment is intended, if any. No GeoId or an empty GeoId indicates that the EULA is a "Rest of World" EULA with no region-specific targeting, as specified in the [ISO-3166] three-letter region codes.</p> <p>Note Clients don't use the EULA fragments obtained from a Windows Server Update Services (WSUS) server (this fragment is only used by clients talking to the WSUS). Instead, a WSUS server administrator MUST accept EULAs on behalf of clients.<32>"</p> <p>Changed from:</p> <p><32> Section 3.1.1.1: WUA expects the /Update/LocalizedPropertiesCollection/EulaFile node to conform to the following schema.</p> <pre> <complexType name="EulaFile"> <annotation> <documentation>A localized end user license agreement (EULA) file for the update. The MSUS Client will download the EULA to the local hard drive and validate Digest.</documentation> </annotation> <!-- The following sequence is expected only by Windows 8 and Windows Server 2012 --> <sequence> <element name="AdditionalDigest" minOccurs="0" maxOccurs="unbounded" type="bt:AdditionalDigest"/> </sequence> <attribute name="Digest" type="bt:FileDigest" use="required" /> <attribute name="DigestAlgorithm" type="bt:FileDigestAlgorithm" use="required" /> <attribute name="FileName" type="bt:FileName" use="required" /> <attribute name="Size" type="bt:FileSize" use="required" /> <attribute name="Language" type="upd:LocalizedPropertiesLanguage" use="required" /> </pre>

Errata Published*	Description
	<pre data-bbox="591 226 773 247" style="text-align: center;"></complexType></pre> <p data-bbox="367 304 500 325">Changed to:</p> <p data-bbox="367 373 1393 422"><32> Section 3.1.1.1: WUA expects the /Update/LocalizedPropertiesCollection/EulaFile node to conform to the following schema.</p> <pre data-bbox="418 485 1403 982"> <complexType name="EulaFile"> <annotation> <documentation>A localized end user license agreement (EULA) file for the update. The MSUS Client will download the EULA to the local hard drive and validate Digest.</documentation> </annotation> <!-- The following sequence is expected only by Windows 8 and Windows Server 2012 --> <sequence> <element name="AdditionalDigest" minOccurs="0" maxOccurs="unbounded" type="bt:AdditionalDigest"></element> </sequence> <attribute name="Digest" type="bt:FileDigest" use="required" /> <attribute name="DigestAlgorithm" type="bt:FileDigestAlgorithm" use="required" /> <attribute name="FileName" type="bt:FileName" use="required" /> <attribute name="Size" type="bt:FileSize" use="required" /> <attribute name="Language" type="upd:LocalizedPropertiesLanguage" use="required" /> <attribute name="GeoId" type="s1:String" use="optional" /> </complexType> </pre> <p data-bbox="367 1041 1349 1062">In Section 6.2 Client Web Services WSDL, added the GeoId property to the protocol WSDL:</p> <p data-bbox="367 1108 529 1129">Changed from:</p> <pre data-bbox="418 1161 1344 1398"> <s:sequence> <s:element minOccurs="0" maxOccurs="1" name="cookie" type="tns:Cookie" /> <s:element minOccurs="0" maxOccurs="1" name="revisionIDs" type="tns:ArrayOfInt" /> <s:element minOccurs="0" maxOccurs="1" name="infoTypes" type="tns:ArrayOfXmlUpdateFragmentType" /> <s:element minOccurs="0" maxOccurs="1" name="locales" type="tns:ArrayOfString" /> </s:sequence> </pre> <p data-bbox="367 1486 500 1507">Changed to:</p> <pre data-bbox="418 1539 1344 1799"> <s:sequence> <s:element minOccurs="0" maxOccurs="1" name="cookie" type="tns:Cookie" /> <s:element minOccurs="0" maxOccurs="1" name="revisionIDs" type="tns:ArrayOfInt" /> <s:element minOccurs="0" maxOccurs="1" name="infoTypes" type="tns:ArrayOfXmlUpdateFragmentType" /> <s:element minOccurs="0" maxOccurs="1" name="locales" type="tns:ArrayOfString" /> <s:element minOccurs="0" maxOccurs="1" name="GeoId" type="s1:String" /> </pre>

Errata Published*	Description
	</s:sequence>
2021/08/10	<p>In Section 3.1.5.7 SyncUpdates, updated to replace one instance of 'ChannelUpdates' with 'ChangedUpdates' in SyncUpdatesResponse.NewCookie bullet point.</p> <p>Changed from:</p> <p>"... if the current deployment's LastChangeTime is less than the value stored in this cookie, then the deployment need not be returned in the ChannelUpdates list, since the deployment data will already be cached on the client."</p> <p>Changed to:</p> <p>"... if the current deployment's LastChangeTime is less than the value stored in this cookie, then the deployment need not be returned in the ChangedUpdateslist, since the deployment data will already be cached on the client."</p> <p>In Section 3.1.5.12 SyncPrinterCatalog, updated to replace one instance of 'ChannelUpdates' with 'ChangedUpdates' in SyncPrinterCatalogResponse.NewCookie bullet point.</p> <p>Changed from:</p> <p>"... if the current deployment's LastChangeTime is less than the value stored in this cookie, then the deployment need not be returned in the ChannelUpdates list, since the deployment data will already be cached on the client."</p> <p>Changed to:</p> <p>"... if the current deployment's LastChangeTime is less than the value stored in this cookie, then the deployment need not be returned in the ChangedUpdates list, since the deployment data will already be cached on the client."</p>

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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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