

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

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1 Introduction

This document specifies the Group Policy: Wireless/Wired Protocol Extension protocol, hereafter referred to as the "Wireless/Wired Group Policy Protocol".

The Wireless/Wired Group Policy Protocol depends on the Microsoft [Group Policy: Core Protocol](#), as specified in [MS-GPOL].

The Wireless/Wired Group Policy Protocol consists of Wireless/Wired Group Policy administrative-side and client-side plug-ins. The administrative-side plug-in specifies and edits wireless or wired policy settings through a user interface, and uses the **Lightweight Directory Access Protocol (LDAP)** to store the settings to a specific location in a logical structure known as the **Group Policy object**. The client-side plug-in uses LDAP to retrieve the Wireless/Wired policy settings from the specified location and then applies these settings to the client. This document specifies the behavior of the Wireless/Wired Group Policy administrative-side and client-side plug-ins.

1.1 Glossary

The following terms are defined in [\[MS-GLOS\]](#):

- Active Directory**
- Advanced Encryption Standard (AES)**
- binary large object (BLOB)**
- certification authority (CA) or certification authority**
- class identifier (CLSID)**
- directory service (DS)**
- distinguished name (DN)**
- domain controller (DC)**
- Extensible Authentication Protocol (EAP)**
- Group Policy**
- Group Policy object (GPO)**
- Group Policy server**
- Lightweight Directory Access Protocol (LDAP)**
- little-endian**
- local area network (LAN)**
- service set identifier (SSID)**
- station (STA)**
- Transport Layer Security (TLS)**
- type-length-value (TLV)**
- Unicode**
- Wi-Fi Protected Access (WPA)**
- Wi-Fi Protected Access 2 (WPA2)**
- wireless Local Area Network (WLAN)**
- XML**
- XML schema (XSD)**

The following terms are defined in [\[MS-GPOL\]](#):

- directory string**

The following terms are specific to this document:

- 802.11 Access Point (AP):** Any entity that has IEEE 802.11 **station (STA)** functionality and provides access to the distribution services, via the wireless medium for associated STAs.

MAY, SHOULD, MUST, SHOULD NOT, MUST NOT: These terms (in all caps) are used as described in [\[RFC2119\]](#). All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

1.2 References

1.2.1 Normative References

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact dochelp@microsoft.com. We will assist you in finding the relevant information. Please check the archive site, <http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624>, as an additional source.

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[IANA-ENT] Internet Assigned Numbers Authority, "Private Enterprise Numbers", January 2007, <http://www.iana.org/assignments/enterprise-numbers>

[IEEE802.11-2007] Institute of Electrical and Electronics Engineers, "Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications", ANSI/IEEE Std 802.11-2007, <http://standards.ieee.org/getieee802/download/802.11-2007.pdf>

[IEEE802.11i] Institute of Electrical and Electronics Engineers, "IEEE Standards for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications, Amendment 6: Medium Access Control (MAC) Security Enhancements", IEEE Std 802.11i, 2004, <http://standards.ieee.org/getieee802/download/802.11i-2004.pdf>

[IEEE802.1X] Institute of Electrical and Electronics Engineers, "IEEE Standard for Local and Metropolitan Area Networks - Port-Based Network Access Control", December 2004, <http://ieeexplore.ieee.org/iel5/9828/30983/01438730.pdf>

[MS-ADA2] Microsoft Corporation, "[Active Directory Schema Attributes M](#)", June 2007.

[MS-ADSC] Microsoft Corporation, "[Active Directory Schema Classes](#)", June 2007.

[MS-ADSO] Microsoft Corporation, "[Active Directory System Overview](#)", July 2009.

[MS-ADTS] Microsoft Corporation, "[Active Directory Technical Specification](#)", June 2007.

[MS-CHAP] Microsoft Corporation, "[Extensible Authentication Protocol Method for Microsoft Challenge Handshake Authentication Protocol \(CHAP\) Specification](#)", January 2007.

[MS-GPOL] Microsoft Corporation, "[Group Policy: Core Protocol Specification](#)", June 2007.

[MS-PEAP] Microsoft Corporation, "[Protected Extensible Authentication Protocol \(PEAP\) Specification](#)", January 2007.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, <http://www.ietf.org/rfc/rfc2119.txt>

[RFC2251] Wahl, M., Howes, T., and Kille, S., "Lightweight Directory Access Protocol (v3)", RFC 2251, December 1997, <http://www.ietf.org/rfc/rfc2251.txt>

[RFC2716] Aboba, B., and Simon, D., "PPP EAP TLS Authentication Protocol", RFC 2716, October 1999, <http://www.ietf.org/rfc/rfc2716.txt>

[RFC3748] Aboba, B., Blunk, L., Vollbrecht, J., et al., "Extensible Authentication Protocol (EAP)", RFC 3748, June 2004, <http://www.ietf.org/rfc/rfc3748.txt>

[XMLSCHEMA] World Wide Web Consortium, "XML Schema", September 2005, <http://www.w3.org/2001/XMLSchema>

1.2.2 Informative References

[ECMA-262] ECMA International, "ECMAScript Language Specification" ECMA-262, December 1999, <http://www.ecma-international.org/publications/standards/Ecma-262.htm>

[EXP-GPOL] Microsoft Corporation, "Summary of New or Expanded Group Policy Settings", <http://technet2.microsoft.com/WindowsVista/en/library/2b8dc2fd-eafe-4c74-914c-ec101133feb41033.mspix>

[MS-GLOS] Microsoft Corporation, "[Windows Protocols Master Glossary](#)", March 2007.

[MSFT-EADWNP] Microsoft Corporation, "Add, Edit, or Remove Active Directory-based Wireless Network Policies", January 2005, <http://technet2.microsoft.com/WindowsServer/en/Library/da6663a2-f4f8-4e85-bfb5-12b8a46adf121033.mspix>

[MSFT-NFLHWV] Microsoft Corporation, "New Networking Features in Windows Server 2008 and Windows Vista", November 2006, <http://technet.microsoft.com/en-us/library/bb726965.aspx>

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[WPA] Wi-Fi Alliance, "Wi-Fi Protected Access: Strong, Standards-based, Interoperable Security for Today's Wi-Fi Networks", April 2003, http://www.wi-fi.org/files/wp_8_WPA%20Security_4-29-03.pdf

[WPA2] Wi-Fi Alliance, "Q&A: WPA2", March 2005, http://www.wifialliance.com/files/kc/kc_11_WPA2_QandA_3-23-05.pdf

1.3 Overview

The Wireless/Wired Group Policy Protocol depends on the Group Policy: Core Protocol [\[MS-GPOL\]](#). Three entities are involved in the Group Policy protocol—the administrative-side plug-in, a generic data store, and a client-side plug-in. The administrative-side plug-in is used to read protocol-specific data to and write protocol-specific data from the Group Policy object (GPO). The generic data store holds the GPO. The client-side plug-in reads the protocol-specific data from and writes the protocol-specific data to the GPO.

This document specifies the behavior of the Wireless/Wired Group Policy administrative-side and client-side plug-ins. The administrative-side plug-in is used to specify Wireless/Wired policy settings. The client-side plug-in is used to retrieve the configuration data from the generic data store and then apply these settings to the client.

1.3.1 Wireless/Wired Group Policy Administrative-Side Plug-in

When an administrator uses an administrative tool to create a new wireless or wired Group Policy within a GPO, the administrative-side plug-in generates the data and saves it in the generic data store using LDAP, as specified in [\[MS-GPOL\]](#) section 3.3.4.

The following illustration shows this process. Logical Client refers to an administrative tool; Server refers to the generic data store.

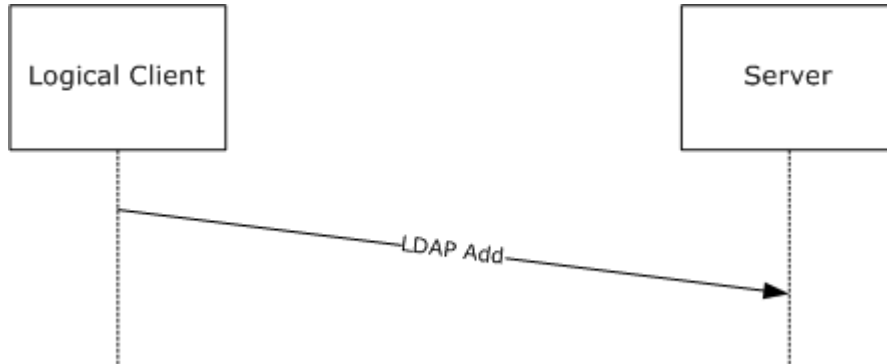


Figure 1: Logical client/server LDAP add communication

When an administrator uses an administrative tool to update an existing wireless or wired Group Policy within a GPO, the administrative-side plug-in uses LDAP modify functionality to update the data in the generic data store.

In the following illustration, Logical Client refers to an administrative tool; Server refers to the generic data store.

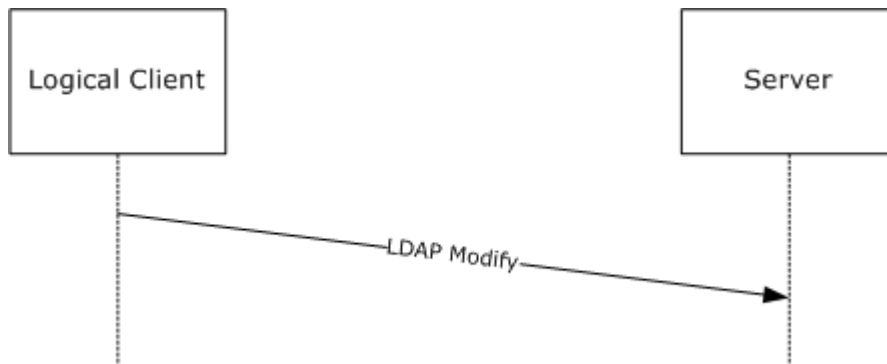


Figure 2: Logical client/server LDAP modify communication

In a similar manner, when an administrator uses an administrative tool to read or delete an existing wireless or wired Group Policy within a GPO, the administrative-side plug-in uses appropriate LDAP functionality to read or delete the data in the generic data store. See section [3.1](#) for further information on these operations.

1.3.2 Wireless/Wired Group Policy Client-Side Plug-in

When certain client-side events (for example, client restart) take place, the client-side plug-in fetches the Wireless/Wired Group Policy Protocol data from the generic data store using LDAP search

functionality. Details on client-side events relevant to Group Policy are specified in [\[MS-GPOL\]](#) section 3.2.4.

The following illustration shows the process of obtaining the configuration data. Logical Client refers to the client; Server refers to the generic data store.

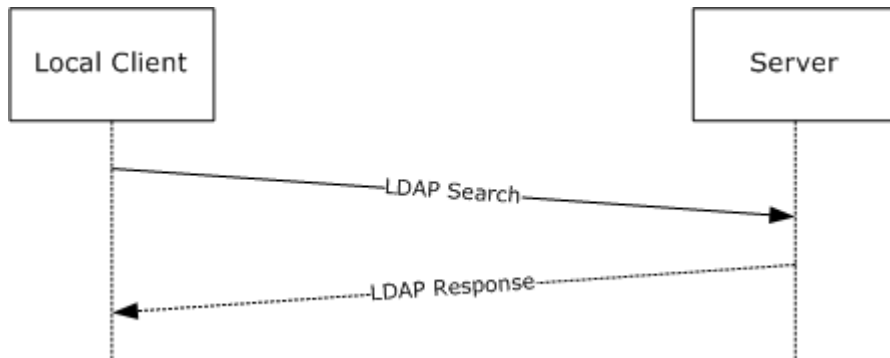


Figure 3: Logical client/server LDAP search communication

1.4 Relationship to Other Protocols

The Wireless/Wired Group Policy Protocol depends on the Windows Group Policy Protocol [\[MS-GPOL\]](#). The Wireless/Wired Group Policy Protocol is initiated only as part of the Group Policy Protocol as specified in [\[MS-GPOL\]](#) section 1.4, which specifies invocation of all Group Policy Protocol extension protocols. The Wireless/Wired Group Policy Protocol also depends on LDAP, and on all of the protocols on which the Group Policy Protocol depends.

The Wireless/Wired Group Policy administrative-side and client-side plug-ins read and write wireless or wired networking configuration data using LDAP.

The following figure shows the relationship between the Wireless/Wired Group Policy Protocol and the Windows Group Policy Protocol [\[MS-GPOL\]](#). In general, the Windows Group Policy Protocol can use either LDAP or SMB (as shown in the figure). However, the Wireless/Wired Group Policy protocol always uses LDAP as transport and never uses SMB.

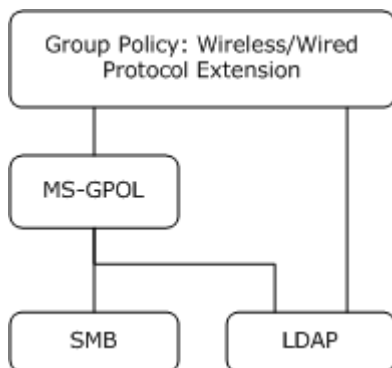


Figure 4: Relationship of the Wireless/Wired Group Policy Protocol to underlying protocols

1.5 Prerequisites/Preconditions

The prerequisites for this protocol are the same as those for the Group Policy Protocol, as specified in [\[MS-GPOL\]](#) section 1.5.

1.6 Applicability Statement

The Wireless/Wired Group Policy Protocol depends on the Windows Group Policy Protocol, as specified in [\[MS-GPOL\]](#). The Wireless/Wired Group Policy Protocol is applicable only within the Group Policy framework.

The Wireless/Wired Group Policy Protocol may be used to configure and deploy **wireless local area network (WLAN)** (802.11) and wired local area network (LAN) (802.3) settings to Group Policy-managed clients. Configuration settings include, but are not limited to, networking authentication, encryption, and security settings.

The Wireless/Wired Group Policy Protocol is appropriate only for use when the same settings are relevant to many clients. To configure individual clients with custom settings, the client network configuration UI should be used instead. For more information on networking in Windows Vista® operating system and Windows Server® 2008 operating system, see [\[MSFT-NFLHWV\]](#).

1.7 Versioning and Capability Negotiation

1.7.1 Wireless Group Policy Versioning and Capability Negotiation

The wireless **Group Policy** provides versioning capability using protocol-specific configuration data stored in the generic data store.

The administrative-side plug-in generates versioning data that reflects the wireless Group Policy format type and wireless network security settings. There are two format types: **binary large object (BLOB)**-based and **XML**-based.

In the BLOB-based format, the wireless connectivity and security settings are saved in a binary format, as described in section [2.2.1.1](#). The BLOB contains at least one sub-BLOB and may contain multiple sub-BLOBs. Each sub-BLOB contains a version number and version-specific policy settings. Three sub-BLOBs are currently defined:

- Version 1 supports wireless security standards up to Wired Equivalent Privacy (WEP). For more details about WEP, see [\[IEEE802.11-2007\]](#).
- Version 2 supports all the security standards version 1 supports plus **Wi-Fi Protected Access (WPA)**. For more information about WPA, see [\[WPA\]](#).
- Version 3 supports all the security standards version 2 supports plus **Wi-Fi Protected Access 2 (WPA2)**. For more information, see [\[WPA2\]](#).

In the XML-based format, the wireless connectivity and security settings are saved in XML. The XML-based format for the wireless Group Policy does not provide versioning or capability negotiations. Currently only one version of the XML format is defined. However, as described in section [6.1](#), the **XML schema (XSD)** namespace contains versioning information so that versioning or capability negotiations can be added if necessary. For more information about the XML-based wireless Group Policy, see section [2.2.1.2](#).

An XML-based wireless Group Policy takes precedence over a BLOB-based one. Within a format type, higher version numbers take precedence. The wireless Group Policy client-side plug-in fetches

the version with highest precedence that it can interpret from those available in the generic data store.

1.7.2 Wired Group Policy Versioning and Capability Negotiation

The XML-based format for the wired Group Policy does not provide versioning or capability negotiations. Currently, only one version of the XML format is defined. However, as described in section 6.2, the XML schema (XSD) namespace contains versioning information so that versioning or capability negotiations can be added if necessary. For more information about the XML-based wired Group Policy, see section 2.2.2.

1.8 Vendor-Extensible Fields

None.

1.9 Standards Assignments

The following table shows the Wireless/Wired Group Policy **class identifiers**.

Parameter	GUID value	Reference
Wireless administrative-side plug-in	{2DA6AA7F-8C88-4194-A558-0D36E7FD3E64}	[MS-GPOL] section 1.8
Wireless client-side plug-in	{0ACDD40C-75AC-47ab-BAA0-BF6DE7E7FE63}	[MS-GPOL], section 1.8
Wired administrative-side plug-in	{06993B16-A5C7-47EB-B61C-B1CB7EE600AC}	[MS-GPOL], section 1.8
Wired client-side plug-in	{B587E2B1-4D59-4e7e-AED9-22B9DF11D053}	[MS-GPOL], section 1.8

2 Messages

2.1 Transport

The Wireless/Wired Group Policy Protocol uses the LDAP protocol [\[RFC2251\]](#) to read and write data to the remote **Active Directory** data store. The client-side and administrative-side plug-ins MUST use the LDAP bind mechanism in Active Directory to perform authentication (as specified in [\[MS-ADTS\]](#) section 5.1.1) and SHOULD use the LDAP message security layer to provide message integrity and confidentiality protection services that are negotiated as part of the authentication (as specified in [\[MS-ADTS\]](#) section 5.1.2.1).

2.2 Message Syntax

The Wireless/Wired Group Policy MUST be read from and written to the generic data store using LDAP [\[RFC2251\]](#).

The administrative-side plug-in and the client-side plug-in for the Wireless/Wired Group Policy Protocol MUST interact with the generic data store as described in sections [1.3.1](#) and [1.3.2](#), respectively.

The following class names are used while constructing various LDAP messages:

- BLOB-based wireless Group Policy is stored as an Active Directory object that MUST be an instance of class msieeee80211-Policy.
- BLOB-based wired Group Policy is not supported.
- XML-based wireless Group Policy is stored as an Active Directory object that MUST be an instance of class ms-net-ieee-80211-GroupPolicy.
- XML-based wired Group Policy is stored as an Active Directory object that MUST be an instance of class ms-net-ieee-8023-GroupPolicy.

2.2.1 Message Syntax for Wireless Group Policy

2.2.1.1 Message Syntax for BLOB-Based Wireless Group Policy

For more information about BLOB-based policy, see section [1.7.1](#). The wireless policy data is specified in section [2.2.1.1.2](#). The format of the profile data of wireless policy data is specified in section [2.2.1.1.3](#).

The BLOB-based group policy MUST consist of an array of one or more (up to three) wireless policy sub-BLOBs. There is no ordering requirement for the wireless policy sub-BLOBs.

Multiple-byte fields (16-bit, 32-bit, and 64-bit fields) MUST be transmitted in **little-endian** byte order, unless otherwise specified.

2.2.1.1.1 Wireless Policy Sub-BLOB

Each wireless policy sub-BLOB MUST consist of the following 4-tuple:

- **MajorVersion**
- **MinorVersion**

- **WirelessPolicyDataLength**
- **WirelessPolicyData**

This format of the sub-BLOB MUST be as follows.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
MajorVersion											MinorVersion																				
WirelessPolicyDataLength																															
WirelessPolicyData (variable)																															
...																															

MajorVersion (2 bytes): A 2-byte unsigned integer that specifies the version of the Wireless Policy Sub-BLOB. [<1>](#)

Value	Meaning
1	Version 1
2	Version 2
3	Version 3

MinorVersion (2 bytes): A 2-byte unsigned integer specifying the minor version of the Wireless Policy Sub-BLOB for a specific major version. If the **MajorVersion** is 1, 2, or 3, the **MinorVersion** MUST be 0.

WirelessPolicyDataLength (4 bytes): A 4-byte unsigned integer specifying the total length in bytes of **WirelessPolicyData**.

WirelessPolicyData (variable): A BLOB of a length in bytes equal to the value of **WirelessPolicyDataLength**.

2.2.1.1.2 Wireless Policy Data

Wireless policy data contains wireless Group Policy settings as shown here. Among other fields, it contains an array of wireless profile settings. The format of the wireless profile settings depends on the value of the **MajorVersion** field in the wireless policy sub-BLOB, as specified in section [2.2.1.1.1](#). Currently, the format is defined for three values of the **MajorVersion** field: 1, 2, and 3. These formats are specified in sections [2.2.1.1.4](#) and [2.2.1.1.5](#).

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
PollingInterval																															
DisableZeroConf																															

NetworkToAccess
ConnectToNonPreferredNtwks
NumberOfWirelessProfileSettings
WirelessProfileSetting (variable)
...

PollingInterval (4 bytes): A 4-byte unsigned integer specifying the interval, in minutes, after which domain clients MAY check for changes in the BLOB-based wireless policy. [<2>](#) This value MUST be greater than 0.

DisableZeroConf (4 bytes): A 4-byte unsigned integer. If this value is zero, the domain clients use the wireless connection component in the operating system for managing wireless connectivity; if nonzero, domain clients do not use the wireless connection component in the operating system for managing wireless connectivity.

NetworkToAccess (4 bytes): A 4-byte unsigned integer specifying the types of wireless networks with which the domain client is to associate.

Definitions of these network types are as specified in [\[IEEE802.1X\]](#). This field MUST be one of the following values.

Value	Meaning
1	Any available network, with access point (infrastructure) networks preferred over computer-to-computer (ad hoc) networks.
2	Access point (infrastructure) networks only.
3	Computer-to-computer (ad hoc) networks only.

ConnectToNonPreferredNtwks (4 bytes): A 4-byte unsigned integer. A nonzero value specifies that the wireless connection component in the operating system on the domain client should permit automatic connections to wireless networks that are not configured as preferred networks. A 0 value specifies that the implementation's wireless connection component on the domain client should not permit automatic connections to wireless networks that are not configured as preferred networks. [<3>](#)

NumberOfWirelessProfileSettings (4 bytes): A 4-byte unsigned integer specifying the number of **WirelessProfileSetting** fields that follow.

WirelessProfileSetting (variable): A wireless profile setting corresponding to a wireless network. This field is repeated in the Wireless Policy Data packet a number of times equal to the value of **NumberOfWirelessProfileSettings**, and each repetition MUST specify a different wireless network. The order of the wireless profile settings defines the relative preference of these wireless networks. Higher preference networks MUST be listed before lower preference networks.

A wireless profile setting consists of the following fields.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
WirelessProfileSettingsLength																															
WirelessProfileSettingsData (variable)																															
...																															

WirelessProfileSettingsLength (4 bytes): A 4-byte unsigned integer specifying the length in bytes of the corresponding **WirelessProfileSettingsData** BLOB plus 4.

WirelessProfileSettingsData (variable): A BLOB of data specifying settings for a wireless network to which domain clients may attempt to connect.

2.2.1.1.3 Format of Wireless Profile Settings Data

Profile setting data has two possible formats:

- Wireless profile setting version A
- Wireless profile setting version B

Wireless profile setting version A MUST be used in wireless policy sub-BLOB version 1 and version 2. Wireless profile setting version B MUST be used in wireless policy sub-BLOB version 3.

2.2.1.1.4 Wireless Profile Settings Version A

This section specifies the profile settings data format for BLOB version 1 and version 2.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
SSID																															
...																															
...																															
...																															
...																															
...																															
...																															
...																															
(SSID cont'd for 8 rows)																															

SSIDLength
802.11Encryption
ProfileIndex
802.11Authentication
AutomaticKeyProvision
NetworkType
Enable8021x
8021xSupplicantMode
EAPType
EAPDataLen
EAPData (variable)
...
MachineAuthentication
MachineAuthenticationType
GuestAuthentication
802.1XMaxStart
802.1XStartPeriod
802.1XAuthPeriod
802.1XHeldPeriod
DescriptionLen
Description (variable)
...

SSID (64 bytes): An array of 32 Unicode characters specifying the wireless LAN network name, also known as the **service set identifier (SSID)** as specified in [\[IEEE802.11-2007\]](#). If the actual SSID length is less than 32 **Unicode** characters, the remaining bytes **MUST** be set to 0.

SSIDLength (4 bytes): A 4-byte unsigned integer specifying the number of Unicode characters in the **SSID**. The value **MUST** be within the range of 0 and 32.

802.11Encryption (4 bytes): An unsigned integer specifying the type of 802.11 encryption method to be used by domain clients for connecting to this **WLAN**.

For wireless policy sub-BLOB version 1, this value **MUST** be one of the following.

Value	Meaning
0	Encryption Disabled
1	WEP

For wireless policy sub-BLOB version 2, this value **MUST** be one of the following.

Value	Meaning
0	Encryption Disabled
1	WEP
2	Temporal Key Integrity Protocol (TKIP)
3	Advanced Encryption Standard (AES) encryption method is as specified in [IEEE802.1X] and [IEEE802.11i] .

ProfileIndex (4 bytes): A 4-byte unsigned integer specifying the index of this wireless profile setting in the array of wireless profiles contained in the **WirelessProfileSettingsData** field of the [Wireless Policy Data](#) packet. The value **MUST** be within the range of 0 to (**NumberOfWirelessProfileSettings-1**).

802.11Authentication (4 bytes): An unsigned integer indicating the type of 802.11 authentication the domain clients use for connecting to the WLAN.

For wireless policy sub-BLOB version 1, this value **MUST** be one of the following.

Value	Meaning
0	Open 802.11 authentication
1	Shared 802.11 authentication

For wireless policy sub-BLOB version 2, this value **MUST** be one of the following.

Value	Meaning
0	Open 802.11 authentication
1	Shared 802.11 authentication

Value	Meaning
3	WPA-Enterprise 802.11 authentication
4	WPA-Personal 802.11 authentication

For more information on WPA-based authentication, see [\[WPA\]](#), [IEEE802.11-2007], and as specified in [\[IEEE802.1X\]](#).

AutomaticKeyProvision (4 bytes): A 4-byte unsigned integer. If nonzero, the domain client must be provided with a WEP encryption key through some means other than manual configuration, such as a key provided on the network adapter or through IEEE 802.1X authentication. If 0, the domain client must be provided with a WEP encryption key through manual configuration.

NetworkType (4 bytes): A 4-byte unsigned integer specifying the type of network represented by this wireless profile setting. It MUST be one of the following values.

Value	Meaning
1	Ad hoc WLAN
2	Infrastructure (access point-based) WLAN

Enable8021x (4 bytes): A 4-byte unsigned integer; a nonzero value specifies that the domain client uses the IEEE 802.1X authentication protocol [\[IEEE802.1X\]](#) to authenticate with the WLAN. A 0 value specifies that the domain client does not use the IEEE 802.1X authentication protocol.

8021xSupplicantMode (4 bytes): A 4-byte unsigned integer; specifies the transmission behavior of the EAPOL-Start message for domain clients when they authenticate to a WLAN using IEEE 802.1X. This value MUST be one of the following.

Value	Meaning
1	Specifies that EAPOL-Start messages are not sent.
2	Client determines when to send EAPOL-Start messages based on network capability and, if needed, sends an EAPOL-Start message.
3	Transmit per IEEE 802.1X. Sends an EAPOL-Start message upon association to initiate the IEEE 802.1X authentication process.

EAPType (4 bytes): A 4-byte unsigned integer; specifies the Extensible Authentication Protocol (EAP) method to be used by the domain clients while using IEEE 802.1X authentication to connect to a WLAN. The value for this field MUST be a legal EAP method type, as specified in [\[RFC3748\]](#) section 6.2.

EAPDataLen (4 bytes): A 4-byte unsigned integer specifying the length of the **EAPData** field.

EAPData (variable): A BLOB specifying EAP configuration settings to use while performing IEEE 802.1X authentication. The format of the BLOB is implementation-specific; if Microsoft EAP methods are used by the clients, the formats specified in section [2.2.3.1](#) MUST be used.

MachineAuthentication (4 bytes): A 4-byte unsigned integer; a nonzero value specifies that the domain client uses machine credentials to perform IEEE 802.1X authentication.

MachineAuthenticationType (4 bytes): A 4-byte unsigned integer. This value specifies the way in which the domain client is to use machine or user credentials while performing IEEE 802.1X authentication. This value MUST be one of the following.

Value	Meaning
0	With user authentication. When users are not logged on to the domain computer, IEEE 802.1X authentication is performed using the computer credentials. After a user logs on to the computer, authentication is maintained with the computer credentials. If a user failed to connect to the network previously, IEEE 802.1X authentication is performed using the user credentials.
1	With user re-authentication. When users are not logged on to the domain computer, IEEE 802.1X authentication is performed using the computer credentials. After a user logs on to the computer, authentication is performed using the user credentials. When a user logs off the computer, authentication is performed with the computer credentials.
2	Computer-only authentication. Authentication is performed using the computer credentials. User authentication is not performed.

GuestAuthentication (4 bytes): A 4-byte unsigned integer; a nonzero value specifies that the domain client performs IEEE 802.1X authentication with guest credentials when either user or computer credentials are not available.

802.1XMaxStart (4 bytes): A 4-byte unsigned integer; the value MUST be defined in accordance with the *MaxStart* parameter, as specified in [\[IEEE802.1X\]](#).

802.1XStartPeriod (4 bytes): A 4-byte unsigned integer, defined in accordance with the *StartPeriod* parameter, as specified in [\[IEEE802.1X\]](#).

802.1XAuthPeriod (4 bytes): A 4-byte unsigned integer; the value MUST be defined in accordance with the *AuthPeriod* parameter, as specified in [\[IEEE802.1X\]](#).

802.1XHeldPeriod (4 bytes): A 4-byte unsigned integer; the value MUST be defined in accordance with the *HeldPeriod* parameter, as specified in [\[IEEE802.1X\]](#).

DescriptionLen (4 bytes): A 4-byte unsigned integer specifying the length of a Unicode text string describing the wireless network associated with the wireless profile Setting.

Description (variable): A Unicode string specifying a human-readable description for the wireless network associated with the wireless profile setting.

2.2.1.1.5 Wireless Profile Settings Version B

This section specifies the profile Settings Data format for BLOB version 3.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
SSID																															
...																															

...
...
...
...
...
...
...
(SSID cont'd for 8 rows)
SSIDLength
802.11 Encryption
ProfileIndex
802.11 Authentication
AutomaticKeyProvision
NetworkType
Enable8021x
8021xSupplicantMode
EAPType
EAPDataLen
EAPData (variable)
...
MachineAuthentication
MachineAuthenticationType
GuestAuthentication
802.1XMaxStart

802.1XStartPeriod
802.1XAuthPeriod
802.1XHeldPeriod
DescriptionLen
Description (variable)
...
PreferredSettingFlags
PreAuthModePresent
PreAuthThrottlePresent
PreAuthMode
PreAuthThrottle
PmkCacheModePresent
PmkCacheSizePresent
PmkCacheTTLSecPresent
PmkCacheMode
PmkCacheSize
PmkCacheTTLSec

SSID (64 bytes): An array of 32 Unicode characters specifying the WLAN name, also known as the SSID as specified in [\[IEEE802.11-2007\]](#). If the actual SSID length is fewer than 32 Unicode characters, the remaining bytes MUST be set to 0.

SSIDLength (4 bytes): A 4-byte unsigned integer specifying the number of Unicode characters in the **SSID**. The value MUST be within the range of 0 and 32.

802.11 Encryption (4 bytes): For wireless policy sub-BLOB version 3, this value MUST be one of the following.

Value	Meaning
0	Encryption disabled

Value	Meaning
1	WEP
2	TKIP
3	The AES encryption method is as specified in [IEEE802.1X] and [IEEE802.11i] .

ProfileIndex (4 bytes): A 4-byte unsigned integer specifying the index of this wireless profile setting in the array of wireless profiles contained in the **WirelessProfileSettingsData** field of the [Wireless Policy Data](#) packet. The value MUST be within the range of 0 to (**NumberOfWirelessProfileSettings**-1).

802.11 Authentication (4 bytes): An unsigned integer indicating the type of 802.11 authentication the domain clients use for connecting to the WLAN.

For wireless policy sub-BLOB version 3, this value MUST be one of the following.

Value	Meaning
0	Open 802.11 authentication
1	Shared 802.11 authentication
3	WPA-Enterprise 802.11 authentication
4	WPA-Personal 802.11 authentication
5	WPA2-Enterprise 802.11 authentication
6	WPA2-Personal 802.11 authentication

WPA2 authentication is as specified in [\[IEEE802.1X\]](#) and [\[IEEE802.11i\]](#).

AutomaticKeyProvision (4 bytes): A 4-byte unsigned integer. If nonzero, the domain client is provided with a WEP encryption key through some means other than manual configuration, such as a key provided on the network adapter or through IEEE 802.1X authentication; if 0, the domain client is provided with a WEP encryption key through manual configuration.

NetworkType (4 bytes): A 4-byte unsigned integer specifying the type of network represented by this wireless profile setting. It MUST be one of the following values.

Value	Meaning
1	Computer-to-computer (ad hoc) WLAN.
2	Infrastructure (access point-based) WLAN.

Enable8021x (4 bytes): A 4-byte unsigned integer. A nonzero value specifies that the domain client uses the IEEE 802.1X authentication protocol (as specified in [\[IEEE802.1X\]](#)) to authenticate with the WLAN; a 0 value specifies that the domain client does not use the IEEE 802.1X authentication protocol.

8021xSupplicantMode (4 bytes): A 4-byte unsigned integer; specifies the transmission behavior of the EAPOL-Start message for domain clients when they authenticate to a WLAN using IEEE 802.1X (as specified in [\[IEEE802.1X\]](#)). This value MUST be one of the following.

Value	Meaning
1	Specifies that EAPOL-Start messages are not sent.
2	Client determines when to send EAPOL-Start messages based on network capability and, if needed, sends an EAPOL-Start message.
3	Transmit per IEEE 802.1X. Sends an EAPOL-Start message upon association to initiate the IEEE 802.1X authentication process.

EAPType (4 bytes): A 4-byte unsigned integer; specifies the EAP method to be used by the domain clients while using IEEE 802.1X authentication (as specified in [\[IEEE802.1X\]](#)) to connect to a WLAN. The value for this field MUST be a legal EAP method type, as specified in [\[RFC3748\]](#) section 6.2.

EAPDataLen (4 bytes): A 4-byte unsigned integer specifying the length of the **EAPData** field.

EAPData (variable): A BLOB specifying EAP configuration settings to be used while performing IEEE 802.1X authentication. The format of the BLOB is implementation-specific; if Microsoft EAP methods are used by the clients, the formats specified in section [2.2.3.1](#) MUST be used.

MachineAuthentication (4 bytes): A 4-byte unsigned integer; a nonzero value specifies that the domain client uses computer credentials to perform IEEE 802.1X authentication.

MachineAuthenticationType (4 bytes): A 4-byte unsigned integer. This value specifies the way in which the domain client is to use computer or user credentials while performing IEEE 802.1X authentication (as specified in [\[IEEE802.1X\]](#)). This value MUST be one of the following.

Value	Meaning
0	With user authentication. When users are not logged on to the domain computer, IEEE 802.1X authentication (as specified in [IEEE802.1X]) is performed using the computer credentials. After a user logs on to the computer, authentication is maintained with the computer credentials. If a user failed to connect to the network previously, IEEE 802.1X authentication is performed using the user credentials.
1	With user re-authentication. When users are not logged on to the domain computer, IEEE 802.1X authentication (as specified in [IEEE802.1X]) is performed using the computer credentials. After a user logs on to the computer, authentication is performed using the user credentials. When a user logs off the computer, authentication is performed with the computer credentials.
2	Computer-only authentication. To be performed by using the computer credentials. User authentication is not performed.

GuestAuthentication (4 bytes): A 4-byte unsigned integer; a nonzero value specifies that the domain client performs IEEE 802.1X authentication (as specified in [\[IEEE802.1X\]](#)) with guest credentials when either user or computer credentials are not available.

802.1XMaxStart (4 bytes): A 4-byte unsigned integer; the value MUST be defined in accordance with the *MaxStart* parameter, as specified in [\[IEEE802.1X\]](#).

802.1XStartPeriod (4 bytes): A 4-byte unsigned integer, defined in accordance with the *StartPeriod* parameter, as specified in [\[IEEE802.1X\]](#).

802.1XAuthPeriod (4 bytes): A 4-byte unsigned integer; the value MUST be defined in accordance with the *AuthPeriod* parameter, as specified in [\[IEEE802.1X\]](#).

802.1XHeldPeriod (4 bytes): A 4-byte unsigned integer; the value MUST be defined in accordance with the *HeldPeriod* parameter, as specified in [\[IEEE802.1X\]](#).

DescriptionLen (4 bytes): A 4-byte unsigned integer specifying the length of a Unicode text string describing the wireless network associated with the wireless profile setting.

Description (variable): A Unicode string specifying a human-readable description for the wireless network associated with the wireless profile setting.

PreferredSettingFlags (4 bytes): A 4-byte unsigned integer specifying whether the domain clients are to treat the wireless network as a nonbroadcast network. This value MUST be one of the following.

Value	Meaning
0	The wireless network is a broadcast network.
1	The wireless network is a nonbroadcast network.

PreAuthModePresent (4 bytes): A 4-byte unsigned integer specifying the presence or absence of the field describing the IEEE 802.11i pre-authentication mode. If this field is 0, the **PreAuthMode** field has no defined meaning and is ignored by the domain client, as specified in [\[IEEE802.11i\]](#). If this field is nonzero, the **PreAuthMode** field is interpreted by the domain client as specified in the **PreAuthMode** field description.

PreAuthThrottlePresent (4 bytes): A 4-byte unsigned integer specifying the presence or absence of the field describing the IEEE 802.11i pre-authentication throttle mode. If this field is 0, the **PreAuthThrottle** field has no defined meaning and is ignored by the domain client. If this field is nonzero, the **PreAuthThrottle** field is interpreted by the domain client as specified by the **PreAuthThrottle** field description.

PreAuthMode (4 bytes): A 4-byte unsigned integer; this field specifies the IEEE 802.11i pre-authentication mode that the domain client is to use to invoke any IEEE 802.11i pre-authentication capability while connecting to the wireless network. This value MUST be one of the following.

Value	Meaning
0	IEEE 802.11i pre-authentication is not to be invoked.
1	IEEE 802.11i pre-authentication is to be invoked.

PreAuthThrottle (4 bytes): A 4-byte unsigned integer; this field specifies the IEEE 802.11i pre-authentication throttle, that is, the maximum number of IEEE 802.11i pre-authentication attempts that a domain client can perform while staying associated with an access point. This value MUST be in the range 1–16.

PmkCacheModePresent (4 bytes): A 4-byte unsigned integer specifying the presence or absence of the field describing the IEEE 802.11i PMK caching mode. If this field is 0, the **PmkCacheMode** field has no defined meaning and is ignored by the domain client. If this

field is nonzero, the **PmkCacheMode** field MUST be interpreted by the domain client as specified in the **PmkCacheMode** field description.

PmkCacheSizePresent (4 bytes): A 4-byte unsigned integer specifying the presence or absence of the field describing the IEEE 802.11i PMK cache size maximum. If this field is 0, the **PmkCacheSize** field has no defined meaning and is ignored by the domain client. If this field is nonzero, the **PmkCacheSize** field is interpreted by the domain client as specified in the **PmkCacheSize** field description.

PmkCacheTTLSecPresent (4 bytes): A 4-byte unsigned integer specifying the presence or absence of the field describing the IEEE 802.11i PMK cache time to live. If this field is 0, the **PmkCacheTTLSec** field has no defined meaning and is ignored by the domain client. If this field is nonzero, the **PmkCacheTTLSec** field is interpreted by the domain client as specified in the **PmkCacheTTLSec** field description.

PmkCacheMode (4 bytes): A 4-byte unsigned integer; this field specifies the mode that the domain client is to use for IEEE 802.11i PMK caching capability (as specified in [\[IEEE802.11i\]](#)) while connecting to a network. This value MUST be one of the following.

Value	Meaning
1	IEEE 802.11 PMK caching is not to be invoked.
2	IEEE 802.11 PMK caching is to be invoked.

PmkCacheSize (4 bytes): A 4-byte unsigned integer; this field specifies the maximum number of entries that a domain client can maintain while performing IEEE 802.11i PMK caching (as specified in [\[IEEE802.11i\]](#)) for a wireless network. This field MUST be in the range 16–255.

PmkCacheTTLSec (4 bytes): A 4-byte unsigned integer; this field MUST specify, in seconds, the maximum lifetime of PMK cache entries that a domain client is to maintain while performing IEEE 802.11i PMK caching (as specified in [\[IEEE802.11i\]](#)) for a wireless network. This field MUST be in the range 300–86,400.

2.2.1.2 Message Syntax for XML-Based Wireless Group Policy

The XML-based wireless Group Policy MUST be packed as a single XML string that is constructed according to the wireless policy schema, as specified in [Appendix A](#) section 6.1. The syntax for fields in the XML string MUST adhere to this schema specification. In accordance with this schema, primitive data types are defined by the World Wide Web Consortium's XML schema. For more details, see [\[XMLSCHEMA\]](#).

The fields in the wireless policy XML string MUST be as follows:

name: User-friendly name for the wireless policy.

description: User-friendly description string for the wireless policy.

enableAutoConfig: This value specifies if the domain clients uses the wireless connection component in the operating system for managing wireless connectivity.

showDeniedNetwork: A true/false Boolean value; if true, the wireless connection component on the domain client shows the denied networks to the user.

allowList: A list of 0 or more networks to which the wireless connection component of the domain client may establish connections.

blockList: A list of 0 or more networks to which the wireless connection component on the domain client is not to establish connections.

denyAllIBSS: A true/false Boolean value; if true the domain client connects only to 802.11 infrastructure networks.

denyAllESS: A true/false Boolean value; if true, the domain client connects only to 802.11 ad hoc networks.

profileList: The list of wireless profiles within the policy, each of which MUST conform to the WLAN profile schema, as specified in Appendix A section 6.3. This element specifies an ordered list of wireless networks with settings that a domain client is to connect to. The elements of the WLAN profile schema are described in section [2.2.1.2.1](#).

allowEveryoneToCreateAllUserProfiles: A Boolean value; if true, all users on the domain client are allowed to create WLAN profile settings that can be used by all other users on the same domain client to connect to WLANs.

onlyUseGPPProfilesForAllowedNetworks: A Boolean value; if true, the domain clients only use the network settings configured by this protocol for connecting to the WLANs specified in the allowList earlier in this list.

enableSoftAp: A Boolean value; if true, the domain client is allowed to act as an **IEEE 802.11 access point (AP)** in addition to its wireless connection as a **station (STA)**. enableSoftAp is enabled by default. [<4>](#)

enableExplicitCreds: A Boolean value; if true, explicit user credentials are allowed.

Explicit user credentials are user credentials that a user has made available to a machine. They are used only for the machine's network authentication and connectivity (for example, to run upgrades or administrative scripts), regardless of which user is logged in or whether any user is logged in; they are not used for any other purpose. [<5>](#)

blockPeriod: The length of time, in minutes, during which the domain client will not try to reconnect to the same network after an authentication failure. [<6>](#)

2.2.1.2.1 Message Syntax for XML-Based Wireless Profiles

An XML-based WLAN profile is packed as a single XML string that MUST be constructed according to the XML schema as specified in [Appendix A](#) section 6.3. In accordance with this schema, primitive data types are defined by the World Wide Web Consortium's XML schema. For more information, see [\[XMLSCHEMA\]](#).

name: A user-friendly name of the wireless profile specified by the wireless profile XML string.

SSID: The WLAN network name, also known as the SSID, as specified in [\[IEEE802.11-2007\]](#).

nonBroadcast: A true/false Boolean field; if true, the domain treats the wireless network as a nonbroadcast network.

connectionType: The type of network to connect to while using this wireless profile. This value MUST be one of the following:

- IBSS: The wireless network is an ad hoc network.
- ESS: The wireless network is an infrastructure network.

connectionMode: When the domain client is to connect to a wireless network. This value MUST be one of the following:

- manual: Connection to the network occurs only if the user has explicitly requested it.
- auto: Attempt to connect to the network should occur automatically whenever the network is in range.

autoSwitch: If the connection to a more preferred network is attempted when already connected to a network. A more preferred network is one that is ordered higher in a list of preferred wireless networks.

phyType: The IEEE 802.11 physical type that a domain client uses while connected to this wireless network.

authentication: The type of 802.11 authentication the domain clients uses for connecting to the WLAN. This value MUST be one of the following:

- open: Open 802.11 authentication
- shared: Shared 802.11 authentication
- WPA: WPA-Enterprise 802.11 authentication
- WPAPSK: WPA-Personal 802.11 authentication
- WPA2: WPA2-Enterprise 802.11 authentication
- WPA2PSK: WPA2-Personal 802.11 authentication

For information on 802.11 authentication methods, see [\[WPA\]](#), and as specified in [\[IEEE802.1X\]](#) and [\[IEEE802.11i\]](#).

encryption: The type of 802.11 encryption algorithm used by domain clients for connecting to this WLAN. This field MUST have one of the following values:

- none: Encryption disabled
- WEP: Equivalent privacy
- TKIP: Temporal Key Integrity Protocol
- AES: Advanced Encryption Standard

For more information on encryption methods, see [\[IEEE802.11-2007\]](#), and as specified in [\[IEEE802.11i\]](#).

PMKCacheMode: The mode that the domain client uses for IEEE 802.11i PMK caching capability while connecting to a network. This value MUST be one of the following:

- enabled: PMK caching is to be invoked.

- disabled: PMK caching is not to be invoked.

Details on PMK caching are specified in [\[IEEE802.11i\]](#).

PMKCacheTTL: The maximum lifetime, in seconds, of PMK cache entries that a domain client is to maintain while performing IEEE 802.11i PMK caching for a wireless network.

PMKCacheSize: The maximum number of entries that a domain client is to maintain while performing IEEE 802.11i PMK caching for a wireless network.

PreAuthMode: The IEEE 802.11i pre-authentication mode that the domain client uses to invoke any IEEE 802.11i pre-authentication capability while connecting to the wireless network. This value MUST be one of the following:

- enabled: Pre-authentication is enabled.
- disabled: Pre-authentication is disabled.

Details on pre-authentication are as specified in [\[IEEE802.11i\]](#).

PreAuthThrottle: The IEEE 802.11i pre-authentication throttle, that is, the maximum number of IEEE 802.11i pre-authentication attempts that a domain client is to perform while staying associated with an access point.

useOneX: A Boolean value; if set to TRUE, the domain clients use IEEE 802.1X authentication protocol to authenticate with the WLAN; otherwise, set to FALSE. If set to TRUE, the **security** element MUST contain a child element **OneX**, formed according to the XML schema as specified in Appendix A section 6.5.

FIPSMODE: A Boolean value; if set to TRUE, the domain clients use cryptographic modules that are compliant with FIPS 140-2 [\[FIPS140\]](#) requirements while performing cryptographic operations to connect to the WLAN.

heldPeriod: This value MUST be defined as per the *HeldPeriod* parameter, as specified in [\[IEEE802.1X\]](#).

authPeriod: This value MUST be defined as per the *AuthPeriod* parameter, as specified in [\[IEEE802.1X\]](#).

startPeriod: This value MUST be defined in accordance with the *StartPeriod* parameter, as specified in [\[IEEE802.1X\]](#).

maxStart: This value MUST be defined in accordance with the *MaxStart* parameter, as specified in [\[IEEE802.1X\]](#).

maxAuthFailures: The number of times a wireless connection component on the domain client attempts IEEE 802.1X authentication in spite of failures.

supplicantMode: The transmission behavior of the EAPOL-Start message for domain clients when they authenticate to a WLAN using IEEE 802.1X [\[IEEE802.1X\]](#). This value MUST be one of the following:

- inhibitTransmission: Specifies that EAPOL-Start messages are not sent.
- includeLearning: Client determines when to send EAPOL-Start messages based on network capability and, if needed, sends an EAPOL-Start message.

- compliant: Transmit per IEEE 802.1X. Sends an EAPOL-Start message upon association to initiate the IEEE 802.1X authentication process.

authMode: The way in which the domain client uses computer or user credentials while performing IEEE 802.1X authentication. This value MUST be one of the following:

- user: When users are not logged on to the domain computer, IEEE 802.1X authentication is performed using the computer credentials. After a user logs on to the computer, authentication is maintained with the computer credentials. If a user failed to connect to the network previously, IEEE 802.1X authentication is performed using the user credentials.
- machineOrUser: When users are not logged on to the domain computer, IEEE 802.1X authentication is performed using the computer credentials. After a user logs on to the computer, authentication is performed using the user credentials. When a user logs off the computer, authentication is performed with the computer credentials.
- machine: Authentication is always be performed by using the computer credentials. User authentication is never performed.
- guest: Specifies that the domain client performs IEEE 802.1X authentication with guest credentials.

EAPConfig: The EAP configuration used by the domain client while performing IEEE 802.1X authentication, as specified in [\[RFC3748\]](#). The content of this element is specified in section [2.2.3.2.<7>](#)

2.2.2 Message Syntax for Wired Group Policy

The wired Group Policy MUST be packed as a single XML string that is constructed according to the wired policy schema, as specified in [Appendix A](#) section 6.2. The syntax for fields in the XML string MUST adhere to this schema specification.

The fields in the wired policy XML string MUST be as follows:

name: User-friendly name for the wired policy.

description: User-friendly description string for the wired policy.

enableAutoConfig: This value determines if the domain clients use the wired authentication component in the operating system for managing wireless connectivity.

profileList: The list of wired authentication profiles within the policy, each of which MUST conform to the wired LAN profile schema, as specified in Appendix A section 6.4. This list MUST contain at least one profile. The domain clients use these profile settings to perform wired authentication against the wired switches.

blockPeriod: The length of time, in minutes, during which the domain client will not try to reconnect to the same network after an authentication failure. [<8>](#)

enableExplicitCreds: A Boolean value; if true, explicit user credentials are allowed.

Explicit user credentials are user credentials that a user has made available to a machine. They are used only for the machine's network authentication and connectivity (for example, to run upgrades or administrative scripts), regardless of which user is logged on or whether any user is logged on; they are not used for any other purpose. [<9>](#)

2.2.2.1 Message Syntax for XML-Based Wired Profiles

An XML-based WLAN profile is packed as a single XML string that is constructed according to the XML schema (XSD) as specified in [Appendix A](#) section 6.4. [<10>](#)

OneXEnabled: A Boolean value that specifies whether the network supports the IEEE 802.1X authentication protocol so domain clients can use it. If set to TRUE, the **security** element MUST contain a child element **OneX**, formed according to the XML schema (XSD) as specified in Appendix A section 6.5.

OneXEnforced: A Boolean value that specifies whether the domain clients use IEEE 802.1X authentication protocol to authenticate with the network. If it is set to FALSE and IEEE 802.1X authentication fails, clients will fall back to unauthenticated access.

heldPeriod: This value MUST be defined in accordance with the *HeldPeriod* parameter, as specified in [\[IEEE802.1X\]](#).

authPeriod: This value MUST be defined in accordance with the *AuthPeriod* parameter, as specified in [\[IEEE802.1X\]](#).

startPeriod: This value MUST be defined as the *StartPeriod* parameter, as specified in [\[IEEE802.1X\]](#).

maxStart: This value MUST be defined in accordance with the *MaxStart* parameter, as specified in [\[IEEE802.1X\]](#).

maxAuthFailures: The number of times the wired connection component on the domain client attempts IEEE 802.1X authentication in spite of failures.

supplicantMode: Specifies the transmission behavior of the EAPOL-Start message for domain clients when they authenticate to a WLAN using IEEE 802.1X. This value MUST be one of the following:

- **inhibitTransmission:** EAPOL-Start messages are not sent.
- **includeLearning:** Client determines when to send EAPOL-Start messages based on network capability; an EAPOL-Start message is sent if needed.
- **compliant:** Transmit per IEEE 802.1X. An EAPOL-Start message is sent upon association to initiate the IEEE 802.1X authentication process.

authMode: The way the domain client uses computer or user credentials while performing IEEE 802.1X authentication. This value MUST be one of the following:

- **user:** When users are not logged on to the domain computer, IEEE 802.1X authentication is performed using the computer credentials. After a user logs on to the computer, authentication is maintained with the computer credentials. If a user failed to connect to the network previously, IEEE 802.1X authentication is performed using the user credentials.
- **machineOrUser:** When users are not logged on to the domain computer, IEEE 802.1X authentication is performed using the computer credentials. After a user logs on to the computer, authentication is performed using the user credentials. When a user logs off the computer, authentication is performed with the computer credentials.
- **machine:** Authentication is performed by using the computer credentials. User authentication is not performed.

- guest: The domain client performs IEEE 802.1X authentication with guest credentials.

EAPConfig: The EAP configuration used by the domain client while performing IEEE 802.1X authentication, as specified in [\[RFC3748\]](#). The content of this element is specified in section [2.2.3.2](#).

2.2.3 Configuration Elements for EAP Methods

The format of the **EAP** configuration elements is defined by the EAP method vendor. The following sections define the format of the EAP configuration elements only if the [802.1x schema \(section 6.5\)](#) is being used and Microsoft is the vendor of the EAP method being used on the clients. If Microsoft is not the vendor of the EAP method being used on the client, then the format of the EAP configuration elements is defined by the EAP method vendor.

2.2.3.1 Configuration Element Syntax for BLOB-Based Wireless Profiles

The BLOB-Based Wireless Profiles as specified in sections [2.2.1.1.4](#) and [2.2.1.1.5](#), contain a variable-length **EAPData** field. This field is a BLOB describing the Extensible Authentication Protocol (EAP) configuration settings to be used while performing IEEE 802.1X [\[IEEE802.1X\]](#) authentication. The format of this field is specific to the EAP method specified in the **EAPType** field of the same element and to the implementation of this EAP method being used by the clients.

Following are the data formats for different values of **EAPType** assuming the Microsoft EAP method implementations. For other implementations of the EAP methods denoted by these **EAPType** values, please contact the corresponding vendors for **EAPData** BLOB information.

EapType	EapData Format
13 (EAP-TLS)	EAPTLS_CONN_PROPERTIES (section 2.2.3.1.1)
25 (EAP-PEAP)	PEAP_CONN_PROP (section 2.2.3.1.2)
26 (EAP-MSChapV2)	EAPMSCHAPv2_CONN_PROPERTIES (section 2.2.3.1.3)
Other	A BLOB with EAP configuration settings to be used for this EAPType . Please contact the corresponding vendor for the EAP method implementation on the client for the format of this data.

2.2.3.1.1 EAPTLS_CONN_PROPERTIES

This data structure specifies the configuration for the Microsoft implementation of EAP-TLS as specified in [\[RFC2716\]](#), on the client. The fields are as follows.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Version																															
Size																															
Flags																															
TrustedCertHashInfo																															

Value	Description
E	EapTlsSimpleCertSel: If set to 1, the client should simplify the list of certificates with which the user is prompted for selection. The client should group the certificates that are usable for EAP-TLS authentication based on the entity that was issued the certificate as indicated by the Subject Alternative Name and Subject fields of the certificates. If more than one such group is present then the client should select the most recently issued certificate from each group to create the list that is presented to the user to select a certificate to be used for authentication. This setting is ignored if EapTlsRegistry bit is not set.
F	EapTlsDisablePromptValidation: If set to 1, the client does not prompt the user during the process of validating the certificate of the authenticating server. <11>

TrustedCertHashInfo (24 bytes): Contains the certificate information of the trusted root **certification authority** that the client trusts to accept a certificate of the authenticating server. This field is ignored by the client if **EapTlsNoValidateServerCert** is set. These 24 bytes are set to 0 if no trusted root certification authorities are indicated.

This field format is defined as **CertHashInfo**, and consists of the following sub-fields.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
HashSize																															
CertHash																															
...																															
...																															
...																															
...																															

HashSize (4 bytes): A 4-byte unsigned integer that is set to the size of the hash of the certificate stored in the **CertHash** field.

CertHash (20 bytes): 20 bytes containing the hash of the certificate belonging to the trusted root certification authority that the client trusts to accept a certificate of the authenticating server.

ServerName (variable): A null-terminated, semicolon-separated list of server names. Each server name consists of either an array of Unicode characters indicating the name of an authenticating server with which the client can authenticate without additional user consent, or a regular expression as specified in [\[ECMA-262\]](#) section 7.8.5. <12>

NumberOfCAs (4 bytes): A 4-byte unsigned integer that is set to the number of trusted root certification authorities being indicated including the preceding one.

TrustedCertHashInfoList (variable): An optional field that is present if and only if **NumberOfCAs** field is greater than 1. **TrustedCertHashInfoList** contains a list of

(NumberOfCAs-1) **TrustedCertHashInfo** structures for different trusted root certification authorities. The client trusts either the trusted root certification authority indicated in the preceding **TrustedCertHashInfo** field or one from the list of **TrustedCertHashInfo** structures in this field to accept a certificate of the authenticating server.

2.2.3.1.2 PEAP_CONN_PROP

This data structure specifies the configuration for Microsoft implementation of Protected Extensible Authentication Protocol (PEAP) Specification [\[MS-PEAP\]](#) on the client. The fields are as follows.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Version																															
Size																															
NumberOfEAPTypes																															
Flags																															
PeapTlsProperties (variable)																															
...																															
InnerMethodProperties (variable)																															
...																															
IdentityPrivacyString (variable)																															
...																															
Padding (variable)																															
...																															

Version (4 bytes): A 4-byte unsigned integer that indicates the version of the PEAP_CONN_PROP. It is set to 1.

Size (4 bytes): A 4-byte unsigned integer that is set to the total size of the PEAP_CONN_PROP data structure in bytes plus (NumberOfEAPTypes + 1)* 4 plus the size of **IdentityPrivacyString**, including NULL character in bytes.

NumberOfEAPTypes (4 bytes): A 4-byte unsigned integer that indicates the number of EAP methods configured as the inner EAP method for PEAP. It is set to either 0 or 1. [<13>](#)

0x00000000
0x00000001

Flags (4 bytes): A 4-byte unsigned integer that indicates the properties for PEAP configuration by setting the following bit values.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	D	C	B	A

Where the bits are defined as:

Value	Description
A	PeapFastRoaming: If set to 1, the clients participate in fast-roaming.
B	PeapInnerEAPOptional: If set to 1, the client allows the absence of any inner EAP method for successful authentication. <14>
C	PeapEnforceCryptoBinding: If set to 1, the client disconnects and fail PEAP authentication if the authenticating server does not provide a cryptobinding TLV. <15>
D	PeapEnableQuarantine: If set to 1, the client enables Network Access Protection feature in the PEAP protocol. <16>
E	PeapEnableIdentityPrivacy: If set to 1, the client enables the identity privacy feature in the PEAP protocol. <17>

PeapTlsProperties (variable): A variable size data that, except for the absence of the **Padding** field, follows the format defined by [PEAP_TLS_PHASE1_CONN_PROPERTIES \(section 2.2.3.1.2.1\)](#). This field indicates the parameters that the clients use to establish the TLS tunnel in Phase 1 of PEAP as specified in [\[MS-PEAP\]](#) section 3.1.5.4.

InnerMethodProperties (variable): Optional variable size data that follows the format defined by [PEAP_INNER_METHOD_PROPERTY \(section 2.2.3.1.2.2\)](#) indicating the parameters the client uses for Inner EAP method inside PEAP. This field is present if **NumberOfEAPTypes** field is set to 1.

IdentityPrivacyString (variable): Optional variable size null-terminated Unicode string that MAY [<18>](#) be used to indicate the identity to be used in EAP-Identity response packet.

Padding (variable): Optional variable size field. Extends PEAP_CONN_PROP to the length specified in the **Size** field.

2.2.3.1.2.1 PEAP_TLS_PHASE1_CONN_PROPERTIES

This data structure specifies the configuration for Microsoft implementation of PEAP Specification Phase 1 on the client. The fields are as follows.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Version																															
Size																															

ServerName (variable): A null-terminated string of Unicode characters indicating a name of an authenticating server that the client can authenticate to without additional user-consent. This may be a regular expression (as described in [\[ECMA-262\]](#), section 7.8.5). This field is ignored by the client if **PeapTlsPhase1NoValidateServerCert** or **PeapTlsPhase1NoValidateName** is set to 1. [<20>](#)

Padding (3 bytes): A 3-byte padding field. The contents of this field are ignored.

2.2.3.1.2.2 PEAP_INNER_METHOD_PROPERTY

The PEAP_INNER_METHOD_PROPERTY specifies the parameters for an Inner EAP method for Microsoft implementation of Protected Extensible Authentication Protocol (PEAP) [\[MS-PEAP\]](#) on the client. The fields are as follows.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Version																															
Size																															
InnerEapType																															
InnerEapData (variable)																															
...																															
Padding																															

Version (4 bytes): A 4-byte unsigned integer that is set to 1.

Size (4 bytes): A 4-byte unsigned integer that is set to the total size of this structure including all fields in bytes, plus 3.

InnerEapType (4 bytes): A 4-byte unsigned integer that indicates the EAP type of the PEAP inner EAP method.

Value	Meaning
13	The format of InnerEapData is EAPTLS_CONN_PROPERTIES .
26	The format of InnerEapData is EAPMSCHAPv2_CONN_PROPERTIES .

All other InnerEapType values signify A BLOB indicating EAP configuration settings to be used for this InnerEapType. Contact the corresponding EAP method vendor for the format of this data.

InnerEapData (variable): A variable data indicating the parameters that the client uses for inner EAP method as described by **InnerEapType**. The format of this field depends on the value of **InnerEapType**. Contact the corresponding EAP method vendor for the format of this data.

Padding (3 bytes): A 3-byte padding field. The contents of this field are ignored.

2.2.3.1.3 EAPMSCHAPv2_CONN_PROPERTIES

This data structure specifies the configuration for Microsoft implementation of the EAP-MsChapV2 [\[MS-CHAP\]](#) method on the client. The fields are as follows.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Version																															
Flags																															

Version (4 bytes): A 4-byte unsigned integer set to 1.

Flags (4 bytes): A 4-byte unsigned integer that indicates the properties for EAP-MsChapV2 configuration by setting the following bit values.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	A	0

Where the bits are defined as:

Value	Description
A	LogonCreds: If set to 1, the client uses the logon username and password associated with the user for whom the authentication is being performed.

2.2.3.2 Configuration Element Syntax for XML-Based Wired and Wireless Profiles

The XML-based wired and wireless profiles, as specified in section [2.2.1.2.1](#) and section [2.2.2.1](#), contain an optional element named **EAPConfig**. This element contains implementation-specific Extensible Authentication Protocol (EAP) configuration settings to be used while performing IEEE 802.1X authentication, as specified in [\[IEEE802.1X\]](#).

The **EAPConfig** element contains one or more instances of the [EapHostConfig element \(section 2.2.3.2.1\)](#).

2.2.3.2.1 EapHostConfig Element

The EapHostConfig element is a string which MUST be formatted according to the XML schema in section [6.6](#). EapHostConfig contains the following elements:

EapMethod: An element of type [EapMethodType \(section 2.2.3.2.2\)](#) as defined in section [2.2.3.2.2](#).

Exactly one of the following elements:

Config: An element of type [BaseEapMethodConfig \(section 2.2.3.2.3\)](#), as defined in section [2.2.3.2.3](#), which contains implementation-specific EAP configuration packaged as an XML string.

ConfigBlob: The hexadecimal representation of a BLOB containing implementation-specific EAP configuration.

Microsoft EAP method implementations can be accompanied by either XML or BLOB-formatted configuration, as described in the following table.

EapMethod\Type	Config Format	ConfigBlob Format
13 (EAP-TLS)	BaseEap (section 2.2.3.2.4) with EapTlsConnectionProperties (section 2.2.3.2.5)	EAPTLS_CONN_PROPERTIES (section 2.2.3.1.1)
25 (EAP-PEAP)	BaseEap with MsPeapConnectionProperties (section 2.2.3.2.6)	PEAP_CONN_PROP (section 2.2.3.1.2)
26 (EAP-MSChapV2)	BaseEap with MsChapV2ConnectionPropertiesV1 (section 2.2.3.2.7)	EAPMSCHAPv2_CONN_PROPERTIES (section 2.2.3.1.3)

For other implementations of the EAP methods denoted by these **EAPType** values or for implementations of other EAP methods, please contact the corresponding vendors for the required contents of **Config** or **ConfigBlob**.

2.2.3.2.2 EapMethodType

The EapMethodType complex type defines a string which MUST be formatted according to the XML schema in section [6.6.1](#). An element of type EapMethodType contains the following elements:

Type: An 8-bit unsigned integer which specifies the Extensible Authentication Protocol (EAP) method to be used by the domain clients while using IEEE 802.1X authentication as specified in [\[IEEE802.1X\]](#), to connect to a network. The value for this field MUST be a legal EAP method type, as specified in [\[RFC3748\]](#) section 6.2. Setting this field to "254", indicates that the EAP method is an expanded EAP method, in which case **VendorId** and **VendorType** MUST be included.

VendorId: An optional unsigned 8-bit integer representing the IANA Private Enterprise Number, as specified in [\[IANA-ENT\]](#), of the method vendor; required if **Type** indicates an expanded EAP method (Type = 254).

VendorType: An optional unsigned 8-bit integer whose value is defined by the EAP method vendor; required if **Type** indicates an expanded EAP method (Type = 254).

AuthorId: An unsigned 8-bit integer representing the IANA Private Enterprise Number, as specified in [\[IANA-ENT\]](#), of the method author. The **AuthorId** and **VendorId** do not need to be the same for a particular method.

2.2.3.2.3 BaseEapMethodConfig

The BaseEapMethodConfig complex type defines a string which MUST be formatted according to the XML schema in section [6.6.2](#). An element of this type is a placeholder for the vendor-specific method configuration. The Vendor's implementation-specific configuration nodes may be placed within this element where allowed in the schema by the "xs:any" tag.

All Microsoft EAP methods define the contents of the BaseEapMethodConfig to have the following contents:

Eap: An element of type [BaseEap \(section 2.2.3.2.4\)](#), as specified in section [2.2.3.2.4](#).

2.2.3.2.4 BaseEap

All Microsoft EAP methods define the contents of the [BaseEapMethodConfig \(section 2.2.3.2.3\)](#) to contain one element of type BaseEap. Method-specific configuration is achieved by the elements of the BaseEap schema in a method-specific schema.

The BaseEap complex type defines a string which MUST be formatted according to the XML schema in section [6.6.3](#). This schema defines the following elements:

EapType: An abstract element of type BaseEapTypeParameters which is overridden by the method-specific schema. One or more **EapType** elements may be included.

Type: An 8-bit unsigned integer which specifies the Extensible Authentication Protocol (EAP) method to be used by the domain clients while using IEEE 802.1X authentication, as specified in [\[IEEE802.1X\]](#), to connect to a network. The value for this field MUST be a legal EAP method type, as specified in [\[RFC3748\]](#) section 6.2, and MUST be an EAP method type implemented by Microsoft.

2.2.3.2.5 EapTlsConnectionProperties

The Microsoft implementation of EAP-TLS overrides the abstract type **BaseEapTypeParameters** with type **EapTlsConnectionPropertiesV1**. This type is defined to be a string formatted according to the XML schema in section [6.8.1](#), and imports **EapTlsConnectionPropertiesV2** from the schema in section [6.8.2 <21>](#). The **EapTlsConnectionPropertiesV1** type defines the following elements:

CredentialsSource: An element of type **CredentialsSourceParameters**, containing one of the following elements:

SmartCard: An empty string whose presence indicates that the certificate should be obtained from a SmartCard available to the operating system.

CertificateStore: An element whose presence indicates that the certificate should be obtained from the operating system certificate store. This element may also contain the following element:

SimpleCertSelection: An optional Boolean. If TRUE or absent, then the method will automatically select a certificate for authentication without user interaction, if possible. If FALSE, the method will always prompt the user to select a certificate.

ServerValidation: An element of type [ServerValidationParameters \(section 2.2.3.2.8\)](#) as specified in section [2.2.3.2.8](#).

DifferentUsername: A Boolean. If TRUE, specifies that a different user name should be used for EAP Identity response than the one present in the certificate. If FALSE, EAP uses the same identity as in the certificate's alternate subject name.

The EapTlsConnectionPropertiesV2 schema (section 6.8.2) in section [6.8.2](#) defines the following additional elements:

PerformServerValidation: An optional Boolean which indicates whether server validation is performed.

AcceptServerName: An optional Boolean which indicates whether the server name is validated against the name string specified in the ServerNames (ServerValidationParameters) element.

TLSExtensions: An optional container for elements of other namespaces which enables future enhancements to the schema.

2.2.3.2.6 MsPeapConnectionProperties

The Microsoft implementation of PEAP overrides the abstract type **BaseEapTypeParameters** with type **MsPeapConnectionPropertiesV1**. This type is defined to be a string formatted according to the XML schema in section [6.9.1](#). The **MsPeapConnectionPropertiesV1** type defines the following elements:

ServerValidation: An optional element of type [ServerValidationParameters \(section 2.2.3.2.8\)](#). See section [2.2.3.2.8](#) for more information.

IdentityPrivacy: An optional element of type **IdentityPrivacyParameters** which contains information about anonymous identity usage during PEAP authentication. Use of this element is deprecated; the IdentityPrivacy tag of **PeapExtensions** SHOULD [<22>](#) be used instead. This element contains the following values:

EnableIdentityPrivacy: An optional Boolean which indicates whether IdentityPrivacy should be enabled. If TRUE, an anonymous identity is substituted for the user's true identity.

AnonymousUserName: Contains an anonymous identity used in place of a user's true identity. It is sent during Phase 1 of PEAP authentication, as specified in [\[MS-PEAP\]](#) section 3.1.5.4, when Identity is sent as plain text. Anonymous identity usage is determined by the **EnableIdentityPrivacy** element.

FastReconnect: An optional Boolean. If TRUE, PEAP attempts to use Fast Reconnect. If FALSE, full authentication is used.

InnerEapOptional: An optional Boolean. If TRUE, PEAP does not attempt to perform inner EAP method authentication.

Eap: An element of type [BaseEap \(section 2.2.3.2.4\)](#) containing parameters for the inner EAP method. See section [2.2.3.2.4](#) for more information.

EnableQuarantineChecks: An optional Boolean. If TRUE, PEAP performs NAP authorization checks as part of Phase 2 authentication as specified in [\[MS-PEAP\]](#) section 3.1.5.6. If FALSE or absent, it does not.

RequireCryptoBinding: An optional Boolean. If TRUE, PEAP performs CryptoBinding validation as part of authentication result negotiation. If FALSE or absent, it does not.

PeapExtensions: An extensible field reserved for future extensions to the Microsoft PEAP implementation.

The [MsPeapConnectionPropertiesV2 schema \(section 6.9.2\)](#) in section [6.9.2](#) defines the following additional elements in PeapExtensions: [<23>](#)

PerformServerValidation: An optional Boolean which indicates whether server validation is performed.

AcceptServerName: An optional Boolean which indicates whether the server name is validated against the name string specified in the ServerNames (ServerValidationParameters) element.

IdentityPrivacy: An optional element of type IdentityPrivacyParameters which contains information about anonymous identity usage during PEAP authentication. This element contains the following values:

EnableIdentityPrivacy: An optional Boolean which indicates whether Identity Privacy should be enabled. If TRUE, an anonymous identity is substituted for the user's true identity.

AnonymousUserName: Contains an anonymous identity used in place of a user's true identify. It is sent during the Phase 1 of PEAP authentication, as specified in [\[MS-PEAP\]](#) section 3.1.5.4, when Identity is sent as plain text. Anonymous identity usage is determined by the **EnableIdentityPrivacy** element.

PeapExtensionsV2: An extensible field reserved for future extensions to the Microsoft PEAP implementation.

2.2.3.2.7 MsChapV2ConnectionPropertiesV1

The Microsoft implementation of EAP-MSCHAPv2 overrides the abstract type **BaseEapTypeParameters** with type MsChapV2ConnectionPropertiesV1. This type is defined to be a string formatted according to the XML schema in section [6.7](#). The MsChapV2ConnectionPropertiesV1 type defines the following element:

UseWinLogonCredentials: An optional Boolean. If TRUE or absent, CHAP attempts to authenticate using the logged-on user's username and password, as specified in [\[MS-CHAP\]](#) section 3.2.5.2. If FALSE, it does not.

2.2.3.2.8 ServerValidationParameters

This type is referenced within the [EapTlsConnectionPropertiesV1 schema \(section 6.8.1\)](#) and the [MsPeapConnectionPropertiesV1 schema \(section 6.9.1\)](#). This type is defined to be a string formatted according to the type definition in the corresponding XML schema in section [6.8](#) or [6.9](#). The **ServerValidationParameters** type defines the following elements:

DisableUserPromptForServerValidation: An optional Boolean which specifies method behavior in case the server's certificate does not chain to a trusted root. If TRUE, certificate errors will cause the connection to be refused. If FALSE, the user is prompted to manually accept or reject the certificate.

ServerNames: An optional string which specifies the list of servers to which the client may authenticate. This element also contains an optional attribute:

PerformServerValidation: A Boolean indicating whether server validation is performed. [<24>](#)

AcceptServerName: An optional Boolean which indicates whether the server name is validated against the name string specified in the ServerNames (ServerValidationParameters) element. [<25>](#)

TrustedRootCA: The thumbprint of a root certification authority (CA) which is trusted to issue server certificates, represented as the hexadecimal encoding of the certificate hash. Multiple such elements can be present.

2.3 Directory Service Schema Elements

The Wireless/Wired Group Policy Protocol accesses the following **directory service** schema classes and attributes listed in the following table.

For the syntactic specifications of the following <Class> or <Class> <Attribute> pairs, refer to: Active Directory Domain Services (AD/DS) [\[MS-ADA2\]](#) and Active Directory Schema Classes [\[MS-ADSC\]](#).

Class	Attribute
msieee80211-Policy	cn description msieee80211-Data msieee80211-ID whenChanged
ms-net-ieee-80211-GroupPolicy	cn description ms-net-ieee-80211-GP-PolicyData ms-net-ieee-80211-GP-PolicyGUID whenChanged
ms-net-ieee-8023-GroupPolicy	cn description ms-net-ieee-8023-GP-PolicyData ms-net-ieee-8023-GP-PolicyGUID whenChanged

3 Protocol Details

3.1 Administrative-Side Plug-in Details

The administrative-side plug-in has a user interface that allows an administrator to author policy objects on the Active Directory that have the format specified in section [2.2](#).

3.1.1 Abstract Data Model

The abstract data model of the Wireless/Wired Group Policy Protocol for an administrator includes the abstract data model of Group Policy, as specified in [\[MS-GPOL\]](#) section 3.1.1. For more information about the meanings of the different attributes, see [\[MSFT-WNPE\]](#), [\[MSFT-EADWNP\]](#), [\[MSFT-NFLHWV\]](#), [\[EXP-GPOL\]](#), [\[MS-ADSC\]](#), and sections [6.10](#) and [6.11](#).

In addition, the administrator needs to obtain the configuration details of the networks being configured. The abstract data model for these configuration details maps to the data elements specified in section [2.2](#).

The following table shows different policy types and their corresponding containers and classes.

Policy type (policyType)	Container path to store the policy object (policyContainerPath)	Class of the policy object (policyClass)
BLOB-based wireless Group Policy	<ScopedGPOPath>\Microsoft\Windows\Wireless	msieee80211-Policy
XML-based wireless Group Policy	<ScopedGPOPath>\Microsoft\Windows\IEEE80211	ms-net-ieee-80211-GroupPolicy
Wired Group Policy	<ScopedGPOPath>\Microsoft\Windows\IEEE8023	ms-net-ieee-8023-GroupPolicy

In the preceding table, the <ScopedGPOPath> is the scoped GPO path for the computer GPO. Details about the scoped GPO path are as specified in [\[MS-GPOL\]](#) section 2.2.2. The Active Directory classes (policyClass) listed in the table are found by searching the container path (policyContainerPath), which corresponds to the policy type (policyType). The following sections refer to these entries as policyType, policyContainerPath, and policyClass.

3.1.1.1 ADConnection Handle

The **ADConnection Handle** element is a handle to an **ADConnection** ([\[MS-ADSO\]](#) section 6.2). It is used to manage communication between the administrative-side plug-in and Active Directory **servers**.

3.1.2 Timers

None.

3.1.3 Initialization

When the Wireless/Wired Group Policy Protocol administrative-side plug-in starts, it gets a scoped GPO path from the Group Policy protocol portion, as specified in [\[MS-GPOL\]](#). For each policyClass that it supports, the plug-in then SHOULD [<26>](#) attempt to use LDAP (as specified in [\[RFC2251\]](#)) to

retrieve all existing Wireless/Wired Group Policy Protocol objects by searching for the returned Active Directory objects that are an instance of the class. This Active Directory class MUST be searched under the policyContainerPath that corresponds to the policyType.

To use LDAP, the administrative-side plug-in invokes the "Initialize an ADConnection" task ([\[MS-ADSO\]](#) section 6.2.6.1.1) with the following parameters and stores the new *TaskReturnADConnection* returned from the task as the [ADConnection Handle \(section 3.1.1.1\)](#) element:

- *TaskInputTargetName*: MAY be specified by the administrator, or if not specified, the joined domain name
- *TaskInputPortNumber*: 389

The Wireless/Wired Group Policy Protocol administrative-side plug-in then MUST read protocol-specific policy object data with the format specified in sections [2.2.1](#) and [2.2.2](#). Any additional entries in the configuration data that do not pertain to the configuration format specified in sections [2.2.1](#) and [2.2.2](#) are not defined by this protocol and MUST NOT be processed. It is recommended that the administrative-side plug-in then display the current policy information to the administrator.

It is recommended that the administrator be informed if this step fails.

3.1.4 Higher-Layer Triggered Events

The following section specifies the higher-layer triggered events and corresponding processing that the administrative-side plug-in MUST perform when those events take place.

3.1.4.1 Policy Creation

The following section describes the process for a policy creation trigger for a policyType specified according to the table in section [3.1.1](#).

When an administrator triggers a request to create a policy for a policyType using the administrative-side plug-in, the administrative-side plug-in collects the policy settings from the administrator and formats them as specified in section [2.2](#).

It MUST then generate a policyContainerPath from the scoped GPO path, and check whether an Active Directory object that is an instance of the policyClass already exists under the policyContainerPath. If such an object exists, the administrative-side plug-in MUST modify the existing policy object according to the steps specified in section [3.1.4.2](#); if such an object does not exist, the administrative-side plug-in MUST use the specification as specified in [\[RFC2251\]](#) to store the formatted policy data in the store under the policyContainerPath as an instance of the policyClass class. The name of the object MUST be the same as the name of the policy that is assigned by the administrator who created the policy. This step could fail due to a failure returned from the LDAP messages or due to any other local reason. Detection and processing of such failures is implementation-specific, but it is recommended that the administrator be informed.

For example, when an administrator triggers a request to create a BLOB-based wireless Group Policy using the administrative-side plug-in, the administrative-side plug-in will collect the policy settings from the administrator and format them as specified in section [2.2](#).

It then generates a "<ScopedGPOPath>\Microsoft\Windows\Wireless" path from the scoped GPO path. Then it checks whether an Active Directory object that is an instance of msieee80211-Policy already exists under "<ScopedGPOPath>\Microsoft\Windows\Wireless". If such an object exists, the administrative-side plug-in modifies the existing policy object according to the steps specified in section [3.1.4.2](#); if such an object does not exist, the administrative-side plug-in uses LDAP (as

specified in [\[RFC2251\]](#)) to store the formatted policy data in the store under "`<ScopedGPOPath>\Microsoft\Windows\Wireless`" as an instance of class `msieeee80211-Policy`. The name of the object is the same as the name of the policy that is assigned by the administrator who created the policy.

The specification of `policyClass` enumerations specified in the table in section [3.1.1](#) is as specified in section [6.10](#), [6.11](#) and in [\[MS-ADSC\]](#) section 2.126.

3.1.4.2 Policy Modification

For a given `policyType` the administrative-side plug-in MUST already have a reference to an Active Directory object that is an instance of the corresponding Active Directory class specified in the table in section [3.1.1](#). This reference MUST be stored under `policyContainerPath`. When the administrator triggers a request to modify this policy using the administrative-side plug-in, the administrative-side plug-in collects the new set of policy settings that includes the modified settings from the administrator and formats them as specified in section [2.2](#). The administrative-side plug-in MUST then modify this existing object using LDAP (as specified in [\[RFC2251\]](#)). This step could fail due to a failure returned from the LDAP messages or due to any other local reason. Detection and processing of such failures is implementation-specific, but it is recommended that the administrator be informed.

For example, for an XML-based wireless Group Policy, the administrative-side plug-in will already have a reference to an existing Active Directory object that is an instance of the Active Directory class `ms-net-ieee-80211-GroupPolicy` and is stored under "`<ScopedGPOPath>\Microsoft\Windows\IEEE80211`". When the administrator triggers a request to modify this policy using the administrative-side plug-in, the administrative-side plug-in collects the new set of policy settings that includes the modified settings from the administrator and formats them as specified in section [2.2](#). Then the administrative-side plug-in modifies this existing object, as specified in [\[RFC2251\]](#).

3.1.4.3 Policy Deletion

For a given `policyType` the administrative-side plug-in MUST already have a reference to an Active Directory object that is an instance of the corresponding Active Directory class specified in the table in section [3.1.1](#). This reference MUST be stored under `policyContainerPath`. When the administrator triggers a request to delete this policy using the administrative-side plug-in, the administrative-side plug-in MUST delete this existing object using LDAP, as specified in [\[RFC2251\]](#). This step could fail due to a failure returned from the LDAP messages or due to any other local reason. Detection and processing of such failures is implementation-specific, but it is recommended that the administrator be informed.

For example, for a wired Group Policy, the administrative-side plug-in already has a reference to an existing Active Directory object that is an instance of the Active Directory class `ms-net-ieee-8023-GroupPolicy` and stored under "`<ScopedGPOPath>\Microsoft\Windows\IEEE8023`". When the administrator triggers a request to delete this policy using the administrative-side plug-in, the administrative-side plug-in deletes this existing policy object, as specified in [\[RFC2251\]](#), using `delete`.

3.1.5 Message Processing Events and Sequencing Rules

3.1.5.1 Reading a Wireless or Wired Policy Object from Active Directory

The following protocol sequences MUST be generated:

1. An LDAP BindRequest from the administrative-side plug-in to the **Group Policy server** is generated. Authentication options MUST be specified in the LDAP BindRequest. In addition, message security SHOULD be requested of the underlying LDAP transport, as specified in section [2.1](#). The parameters MUST include the following.

Parameter	Value
DN	A zero-length string
Authentication Algorithm	"Kerberos with credentials in Unicode" (computer policy mode) or "SPNEGO" (user policy mode)
Version	3

2. The plug-in MUST wait for a time-out period of at least 2 minutes (120 seconds) to receive an LDAP BindResponse. If the plug-in fails to receive the LDAP BindResponse within this time-out period, it MUST terminate the reading of the wireless or wired policy. [<27>](#)

After the successful BindResponse, the plug-in MUST send an LDAP SearchRequest to the Group Policy server with the parameters in the following table.

Parameter	Value
baseObject	The LDAP DN for the wireless or wired Group Policy inside the computer section of the GPO. baseObject MUST always be in the following form: For BLOB-based wireless policy: CN=Wireless, CN=Windows, CN=Microsoft, Scoped GPO DN where Scoped GPO DN is as specified in [MS-GPOL] . For XML-based wireless policy: CN=IEEE80211, CN=Windows, CN=Microsoft, Scoped GPO DN For wired Group Policy: CN=IEEE8023, CN=Windows, CN=Microsoft, Scoped GPO DN
Scope	This MUST be set to value 1. LDAP Search Request searches all entries in the first level below the base entry, which excludes the base entry.
derefAliases	This MUST be set to 0 (neverDerefAliases) to dereference in searching.
sizeLimit	This MUST be set to 0 (which specifies no limit).
timeLimit	This MUST be set to 0 (which specifies no limit).
typesOnly	This MUST be set to FALSE according to the LDAP's definition of FALSE.
Filter	The query MUST be filtered so that only wireless or wired GPOs are returned. For BLOB-based wireless policy: The LDAP filter "(objectClass= msieee80211-Policy)" MUST be used. For XML-based wireless policy: The LDAP filter "(objectClass= ms-net-ieee-80211-GroupPolicy)" MUST be used. For wired Group Policy: The LDAP filter "(objectClass= ms-net-ieee-8023-GroupPolicy)" MUST be used.
Attributes	The following attribute names SHOULD be passed as inputs to the LDAP search

Parameter	Value
	<p>request:</p> <p>For BLOB-based wireless policy:</p> <p>msieeee80211-ID: An identifier to uniquely identify a BLOB-based wireless Group Policy.</p> <p>msieeee80211-Data: A data BLOB according to a well-defined format that describes the different settings in the policy. For more information about interpreting this data, see section 2.2.1.1.</p> <p>cn: Name of the policy.</p> <p>description: A user-defined description for the policy.</p> <p>whenChanged: Time stamp of the last time the policy was edited.</p> <p>For XML-based wireless policy:</p> <p>ms-net-ieee-80211-GP-PolicyGUID: A unique identifier to identify the policy object.</p> <p>ms-net-ieee-80211-GP-PolicyData: An XML string according to a well-defined schema. For more information, see section 2.2.</p> <p>cn: Name of the policy.</p> <p>description: A description for the policy.</p> <p>whenChanged: Time stamp of the last time the policy was edited.</p> <p>For wired Group Policy:</p> <p>ms-net-ieee-8023-GP-PolicyGUID: A unique identifier to identify the policy object.</p> <p>ms-net-ieee-8023-GP-PolicyData: An XML string according to a well-defined schema. For more information, see section 2.2.</p> <p>cn: Name of the policy.</p> <p>description: A description for the policy.</p> <p>whenChanged: Time stamp of the last time the policy was edited.</p>

3. A successful reply from the LDAP search request MUST contain one or more LDAP search response messages. Those messages MUST contain one or more searchResultEntries. The searchResultEntry MUST also contain an attributes field with the values for the attributes request in the LDAP search message. The format of the attributes is specified in section [2.2](#).
4. An LDAP UnbindRequest SHOULD be made by the plug-ins to close the connection, unless the plug-in will reuse the [ADConnection Handle \(section 3.1.1.1\)](#) for future requests.

For details about creating, modifying, and deleting wired and wireless GPOs, see section [3](#).

3.1.5.2 Creating a Wireless or Wired Policy Object on Active Directory

When the administrative-side plug-in attempts to create a wireless or wired GPO for a GPO, the following protocol sequence MUST be generated.

An LDAP BindRequest from the administrative-side plug-in to the Group Policy server and an LDAP BindResponse in reply MUST be generated. The parameters to the BindRequest MUST be identical to those specified in section [3.1.5.1](#).

1. The administrative-side plug-in MUST search under the ScopedGPOPath for the existence of the container object named "Microsoft" by sending an LDAP Search message with the parameters shown in the following table.

Parameter	Value
baseObject	It MUST be Scoped GPO DN.
Scope	This MUST be set to search all entries in the first level below the base entry, excluding the base entry.
derefAliases	This MUST be set to 0 (neverDerefAliases) to dereference in searching.
sizeLimit	This MUST be set to 0 (which specifies no limit).
timeLimit	This MUST be set to 0 (which specifies no limit).
typesOnly	This MUST be set to FALSE according to the LDAP's definition of FALSE.
Filter	The LDAP filter "(objectClass= Container)" MUST be used.
attributes	This field MUST specify the attribute's "commonName".

2. If the LDAP search returns nothing, or the attributes returned in the LDAP searchResponse do not contain commonName with the value equal to "Microsoft", it MUST create a container Active Directory object by sending an LDAP Add request message with the parameters shown in the following table.

Parameter	Value
Entry	MUST be "CN=Microsoft, LDAP DN".
attributes	MUST specify the attribute's "objectClass" in an attributeList, as specified in [RFC2251] .

The attribute's member is itself a sequence of attribute name and value pairs. The following table specifies these pairs and their meanings.

Attribute name	Value
objectClass	This MUST be the directory string value "container".

3. The administrative-side plug-in MUST search under the ScopedGPOPath\Microsoft for the existence of a container object named "Windows" by sending an LDAP Search message with the parameters shown in the following table.

Parameter	Value
baseObject	It MUST be CN=Microsoft, LDAP DN.
Scope	This MUST be set to 1. LDAP Search Request searches all entries in the first level below the base entry, excluding the base entry.
derefAliases	This MUST be set to 0 (neverDerefAliases) to dereference in searching.
sizeLimit	This MUST be set to 0 (which specifies no limit).
timeLimit	This MUST be set to 0 (which specifies no limit).
typesOnly	This MUST be set to FALSE according to the LDAP protocol's definition of FALSE.

Parameter	Value
Filter	The LDAP filter "(objectClass= Container)" MUST be used.
attributes	This field MUST specify the attribute's "commonName".

If the **resultCode** field of the **addResponse** message is non-zero, the add operation failed. Regardless of the outcome of this step, this protocol sequence MUST proceed to step 8 (LDAP UnbindRequest).

- If the LDAP Search returns nothing, or the commonName attribute returned in the LDAP searchResponse does not contain "Windows", it SHOULD create a container Active Directory object by sending an LDAP Add request message with the parameters shown in the following table.

Parameter	Value
Entry	MUST be "CN=Windows, CN=Microsoft, Scoped GPO DN".
attributes	This field MUST specify the attribute's "objectClass" in an attributeList, as specified in [RFC2251] .

The attribute's member is itself a sequence of attribute name and value pairs. The following table specifies these pairs and their meanings.

Attribute name	Value
objectClass	This MUST be the directory string value "container".

If the **resultCode** field of the **addResponse** message is non-zero, the add operation failed. In this case, this protocol sequence MUST proceed directly to step 8 (LDAP UnbindRequest).

- The administrative-side plug-in MUST search under the ScopedGPOPath for the existence of a container by sending an LDAP Search message with the parameters shown in the following table.

Parameter	Value
baseObject	It MUST be "CN=Windows, CN=Microsoft, Scoped GPO DN".
Scope	This MUST be set to search all entries in the first level below the base entry, excluding the base entry.
derefAliases	This MUST be set to 0 (neverDerefAliases) to dereference in searching.
sizeLimit	This MUST be set to 0 (which specifies no limit).
timeLimit	This MUST be set to 0 (which specifies no limit).
typesOnly	This MUST be set to FALSE according to the LDAP protocol's definition of FALSE.
Filter	The LDAP filter "(objectClass= Container)" MUST be used.
attributes	This field MUST specify the attribute's "commonName".

- If the LDAP Search returns nothing, or the attributes returned in the LDAP searchResponse do not contain the following values for commonName:

- For BLOB-based wireless policy: "Wireless".
- For XML-based wireless policy: "IEEE80211".
- For wired Group Policy: "IEEE8023".

It MUST then create a container Active Directory object by sending an LDAP Add request message with the parameters shown in the following table.

Parameter	Value
Entry	BLOB-based wireless policy: MUST be "CN=Wireless, CN=Windows, CN=Microsoft, Scoped GPO DN" XML-based wireless policy: MUST be "CN= IEEE80211, CN=Windows, CN=Microsoft, Scoped GPO DN" Wired Group Policy: MUST be "CN= IEEE8023, CN=Windows, CN=Microsoft, Scoped GPO DN"
attributes	This field MUST specify the attribute's "objectClass" in an attributeList, as specified in [RFC2251] .

The attribute's member is itself a sequence of attribute name and value pairs. The following table specifies these pairs and their meanings.

Attribute name	Value
objectClass	This MUST be the directory string value "container".

If the **resultCode** field of the **addResponse** message is non-zero, the add operation failed. In this case, this protocol sequence MUST proceed directly to step 8 (LDAP UnbindRequest).

7. The administrative-side plug-in MUST create an object in the Active Directory that contains the wired or wireless policy settings. It MUST send an LDAP addRequest, as specified in [\[RFC2251\]](#).

Parameter	Value
Entry	For BLOB-based wireless policy: It MUST be "CN=Wireless, CN=Windows, CN=Microsoft, Scoped GPO DN". For XML-based wireless policy: It MUST be "CN=IEEE80211, CN=Windows, CN=Microsoft, Scoped GPO DN". For wired policy: It MUST be "CN=IEEE8023, CN=Windows, CN=Microsoft, Scoped GPO DN".
attributes	This field MUST specify the following attributes: For BLOB-based wireless policy: msieee80211-ID MUST be a unique identifier to uniquely identify a BLOB-based wireless Group Policy. msieee80211-Data MUST be a data BLOB according to a well-defined format that describes the different settings in the policy. For more information about interpreting this data, see section 3.1.5.1 . description MUST be a user-defined description for the policy. whenChanged MUST be time stamp of the policy creation time by the administrative-side plug-in. The final timestamp value is created by the server.

Parameter	Value
	<p>For XML-based wireless policy:</p> <p>ms-net-ieee-80211-GP-PolicyGUID MUST be a unique identifier to identify the policy object.</p> <p>ms-net-ieee-80211-GP-PolicyData MUST be an XML string according to a well-defined schema. For more information, see section 2.2.</p> <p>description: A description for the policy.</p> <p>whenChanged MUST be a time stamp of the policy creation time by the administrative-side plug-in. The final timestamp value is created by the server.</p> <p>For wired Group Policy:</p> <p>ms-net-ieee-8023-GP-PolicyGUID MUST be a unique identifier to identify the policy object.</p> <p>ms-net-ieee-8023-GP-PolicyData: MUST be an XML string according to a well-defined schema. For more information, see section 2.2.</p> <p>description: A description for the policy.</p> <p>whenChanged MUST be a time stamp of the policy creation time by the administrative-side plug-in. The final timestamp value is created by the server.</p>

Additionally, the attributes in the following table MUST also be supplied in the attributeList.

Attribute Name	Value
objectClass	<p>For BLOB-based wireless policy:</p> <p>This MUST be the directory string value "msieee80211-Policy".</p> <p>For XML-based wireless policy:</p> <p>This MUST be the directory string value "ms-net-ieee-80211-GroupPolicy".</p> <p>For wired policy:</p> <p>This MUST be the directory string value "ms-net-ieee-8023-GroupPolicy".</p>
cn	This field MUST be the expected name of the policy represented as directory string.

This message creates an Active Directory object of the corresponding policy. If the **resultCode** field of the **addResponse** message is non-zero, the add operation failed. Regardless of the outcome of this step, this protocol sequence MUST proceed to step 8 (LDAP UnbindRequest).

8. An LDAP UnbindRequest SHOULD be made by the plug-in that corresponds to the previous LDAP BindRequest to close the connection, unless the plug-in will reuse the [ADConnection Handle \(section 3.1.1.1\)](#) for future requests.

3.1.5.3 Modifying a Wireless or Wired Policy Object on Active Directory

When the administrative-side plug-in attempts to modify an existing wireless or wired GPO for a GPO, the following protocol sequence MUST be generated:

1. Identify an existing wireless or wired policy from the Active Directory that is to be modified. This can be done using the steps mentioned in section [3.1.5.1](#).
2. For this policy, identify the following values.

Parameter	Value
policyName	Name of the policy object.
policyIdentifier	For BLOB-based wireless policy: msieee80211-ID. For XML-based wireless policy: ms-net-ieee-80211-GP-PolicyGUID: A unique identifier to identify the policy object. For wired Group Policy: ms-net-ieee-8023-GP-PolicyGUID: A unique identifier to identify the policy object.

3. The administrative-side plug-in MUST modify the existing object in the Active Directory that contains the wireless or wired policy settings. It MUST send an LDAP modifyRequest, as specified in [\[RFC2251\]](#), with the following parameters.

Parameter	Value
Entry	For BLOB-based wireless policy: It MUST be CN=policyName, CN=Wireless, CN=Windows, CN=Microsoft, Scoped GPO DN. For XML-based wireless policy: It MUST be CN=policyName, CN=IEEE80211, CN=Windows, CN=Microsoft, Scoped GPO DN. For wired policy: It MUST be CN=policyName, CN=IEEE8023, CN=Windows, CN=Microsoft, Scoped GPO DN. Where policyName is the name of the policy identified in step 2.
attributes	This field MUST specify the following attributes: For BLOB-based wireless policy: msieee80211-ID MUST be set the same as the one identified in step 2 for policyIdentifier. msieee80211-Data MUST be a data BLOB containing the modified policy settings formatted according to a well-defined format that describes the different settings in the policy. For more information about interpreting this data, see section 3.1.5.1 . description MUST be a user-defined description for the policy. whenChanged MUST be a time stamp of the policy modification time by the administrative-side plug-in. For XML-based wireless policy: ms-net-ieee-80211-GP-PolicyGUID MUST be set the same as the one identified in step 2 for policyIdentifier. ms-net-ieee-80211-GP-PolicyData MUST be an XML string containing modified policy settings according to a well-defined schema. For more information, see section 2.2 . description: A description for the policy. whenChanged MUST be a time stamp of the policy modification time by the administrative-side plug-in. For wired Group Policy: ms-net-ieee-8023-GP-PolicyGUID MUST be set the same as the one identified in step 2 for policyIdentifier. ms-net-ieee-8023-GP-PolicyData MUST be an XML string containing modified policy

Parameter	Value
	settings according to a well-defined schema. For more information, see section 2.2 . description: A description for the policy. whenChanged MUST be a time stamp of the policy modification time by the administrative-side plug-in.

This message modifies the existing Active Directory object of the corresponding policy.

If the **resultCode** field of the **modifyResponse** message is non-zero, the modify operation failed. Regardless of the result of the modify operation, this protocol sequence MUST proceed to step 4 (LDAP UnbindRequest).

4. An LDAP UnbindRequest SHOULD be made by the plug-in that corresponds to the previous LDAP BindRequest to close the connection, unless the plug-in will reuse the [ADConnection Handle \(section 3.1.1.1\)](#) for future requests.

3.1.5.4 Deleting a Wireless or Wired Policy Object on Active Directory

When the administrative-side plug-in attempts to delete an existing wireless or wired GPO for a GPO, the following protocol sequence MUST be generated:

1. Identify an existing wireless or wired policy from the Active Directory that is to be deleted. This can be done using the steps mentioned in section [3.1.5.1](#)
2. For this policy, identify the following values.

Parameter	Value
policyName	The name of the policy object.

3. The administrative-side plug-in MUST delete the existing object in the Active Directory that contains the wireless or wired policy settings. It MUST send an LDAP delRequest, as specified in [\[RFC2251\]](#), with the following parameters.

Parameter	Value
Entry	For BLOB-based wireless policy: It MUST be CN=policyName, CN=Wireless, CN=Windows, CN=Microsoft, Scoped GPO DN. For XML-based wireless policy: It MUST be CN=policyName, CN=IEEE80211, CN=Windows, CN=Microsoft, Scoped GPO DN. For wired policy: It MUST be CN=policyName, CN=IEEE8023, CN=Windows, CN=Microsoft, Scoped GPO DN. Where policyName is the name of the policy identified in step 2.

This message deletes the existing Active Directory object of the corresponding policy.

If the **resultCode** field of the **delResponse** message is non-zero, the delete operation failed. Regardless of the result of the delete operation, this protocol sequence MUST proceed to step 4 (LDAP UnbindRequest).

- An LDAP UnbindRequest SHOULD be made by the plug-in that corresponds to the previous LDAP BindRequest to close the connection, unless the plug-in will reuse the [ADConnection Handle \(section 3.1.1.1\)](#) for future requests.

3.1.6 Timer Events

None.

3.1.7 Other Local Events

None.

3.2 Client-Side Plug-in Details

During policy application, the wireless or wired plug-in is invoked after the Group Policy: Core Protocol, as specified in [\[MS-GPOL\]](#), computes a list of GPOs for which the Wireless/Wired Group Policy Protocol is to be invoked.

3.2.1 Abstract Data Model

This section describes a conceptual model of possible data organization that an implementation maintains to participate in this protocol. The described organization is provided to facilitate the explanation of how the protocol behaves. This document does not mandate that implementations adhere to this model as long as their external behavior is consistent with that described in this document.

The Wireless/Wired Group Policy Protocol plug-ins themselves maintain no state. The underlying wireless connection and wired authentication components in the client operating system maintain a state that MAY be updated by the plug-in. The abstract data model for the state maintained by the wireless connection and wired authentication components maps to the data elements specified in section [2.2](#).

The plug-ins receive a [Filtered GPO List \(section 3.2.1.5\)](#) of the available Wireless/Wired Group Policy objects, as specified in [\[MS-GPOL\]](#) section 3.2.1.5. This list enumerates the policy objects which contain Wireless/Wired policy, which the plug-in MAY process.

3.2.2 Timers

When a wireless policy client-side plug-in applies a BLOB-based wireless Group Policy, it MAY maintain a timer that controls the period at which to check for updates to the currently applied policy. This timer is configured using the PollingInterval configuration retrieved as part of the BLOB-based wireless policy object, as specified in section [2.2.1.1](#).

3.2.3 Initialization

Beyond the initialization required for Group Policy itself, the wireless Group Policy client-side plug-in fetches the policy objects available in the generic data store and selects the wireless object with the highest precedence that it can interpret. [<28>](#) Among the wireless Group Policy types, an XML-based wireless policyType takes precedence over a BLOB-based wireless policyType. Within a policyType, higher-version numbers take precedence. The wired Group Policy client-side plug-in fetches the first object of the wired Group Policy policyType returned by the Active Directory (AD). Retrieval and selection of wired Group Policy occurs independently from wireless Group Policy, and one of each may be selected during initialization.

3.2.4 Higher-Layer Triggered Events

The plug-in implements the abstract event interface, as specified in [\[MS-GPOL\]](#) section 3.2.4. Upon retrieving updated policy, the client of the Group Policy: Core Protocol, as specified in [\[MS-GPOL\]](#), invokes the Wireless/Wired Group Policy Protocol plug-in with a list of GPOs that it has identified as containing wireless settings. The following logical parameters are accepted:

- **New or changed GPOs:** A scoped GPO path for any GPO that has been added or changed since the policy was last retrieved.
- **Deleted GPOs:** A scoped GPO path for any GPO that no longer applies but that was applied during the previous policy application session.
- **A set of flags defining aspects of this policy application session:** The values of these flags are specified in [\[MS-GPOL\]](#) section 3.2.4.
- **A security token enabling impersonation of the user for user policy application mode**

The plug-in does not make use of the flags or security token arguments. The [Filtered GPO List \(section 3.2.1.5\)](#), as specified in [\[MS-GPOL\]](#) section 3.2.1.5, is initialized with the contents of the "New or changed GPOs" argument.

3.2.5 Message Processing Events and Sequencing Rules

Upon notification that a GPO has been added, changed, or deleted, the plug-in MUST select the highest-precedence GPO which applies, using the precedence logic described in section [3.2.3](#). The plug-in then MUST retrieve the policy from the GPO that is linked to the organizational unit (OU) that is closest to the client computer in the domain hierarchy. For example, it should be noted that if the client belongs to an OU within a domain, and there is a GPO linked to the domain and another GPO linked to the OU, the client will retrieve the policy from the GPO linked to the OU. For more information about OUs, see [\[MS-ADTS\]](#).

Upon selection of a scoped GPO path from the [Filtered GPO List \(section 3.2.1.5\)](#), as specified in [\[MS-GPOL\]](#) section 3.2.1.5, the wireless or wired client-side plug-in MUST retrieve a corresponding protocol-specific policy as specified in sections [3.2.5.1](#), [3.2.5.2](#), and [3.2.5.3](#). The client-side plug-in MUST use the LDAP bind mechanism for authentication. In addition, message security SHOULD be requested of the underlying LDAP transport, as specified in section [2.1](#). The Wireless/Wired Group Policy Protocol plug-in MUST interpret the contents of the wireless or wired policy objects according to the format specified in section [2.2](#). Any additional entries in the contents that are not included in section [2.2](#) MUST be ignored by the wireless or wired plug-in. The plug-in MUST provide policy settings to the wireless and wired connection components in the client's operating system.

3.2.5.1 Retrieving BLOB-Based Wireless Group Policy for a GPO

The wireless Group Policy Protocol plug-in gets a scoped GPO path (Scoped GPO DN) from the Group Policy protocol client, as specified in section [3.2.4](#). The plug-in MUST use LDAP search functionality with the LDAP distinguished name as "CN=Wireless, CN=Windows, CN=Microsoft". The "search" operation MUST be used by searching for the CN=msieeee80211-Data with (objectClass=msieeee80211-Policy) and baseObject scope.

For the specification of msieeee80211-Policy, see [\[MS-ADSC\]](#) section 2.126.

3.2.5.2 Retrieving XML-Based Wireless Group Policy for a GPO

The wireless Group Policy plug-in gets a scoped GPO path (Scoped GPO DN) from the Group Policy protocol client (as specified in section [3.2.4](#)). The plug-in MUST use LDAP search functionality with

the LDAP distinguished name as "CN=IEEE80211, CN=Windows, CN=Microsoft, Scoped GPO DN". The "search" operation MUST be used by searching for the CN=ms-net-ieee-80211-GP-PolicyData with (objectClass= ms-net-ieee-80211-GroupPolicy) and baseObject scope.

For the specification of ms-net-ieee-80211-GP-PolicyData, see section [6.10](#) and as specified in [\[MS-ADSC\]](#).

3.2.5.3 Retrieving XML-Based Wired Group Policy for a GPO

The wired Group Policy plug-in gets a scoped GPO path (Scoped GPO DN) from the Group Policy protocol client (as specified in section [3.2.4](#)). The plug-in MUST use LDAP search functionality with the LDAP distinguished name as "CN=IEEE8023, CN=Windows, CN=Microsoft, Scoped GPO DN". The "search" operation MUST be used by searching for the CN=ms-net-ieee-8023-GP-PolicyData with (objectClass= ms-net-ieee-8023-GroupPolicy) and baseObject scope.

For the specification of ms-net-ieee-8023-GP-PolicyData, see section [6.11](#), and as specified in [\[MS-ADSC\]](#).

3.2.6 Timer Events

When the timer specified in section [3.2.2](#) expires, the client MUST recheck for BLOB-based wireless policy updates using the method specified in section [3.2.5.1](#).

3.2.7 Other Local Events

None.

4 Protocol Examples

4.1 XML Wireless Group Policy - WPA2-Enterprise with PEAP-MSCHAPv2

This sample profile uses Protected Extensible Authentication Protocol [\[MS-PEAP\]](#) with Microsoft Challenge Handshake Authentication Protocol [\[MS-CHAP\]](#) to provide password-based authentication to the network

This sample is configured to use Wi-Fi Protected Access 2 security running in Enterprise mode (WPA2-Enterprise). The WPA2-Enterprise security type uses 802.1X for the authentication exchange with the backend. The Advanced Encryption Standard (AES) cipher type is used for encryption.

```
<?xml version="1.0" encoding="US-ASCII"?>
<WLANProfile xmlns="http://www.microsoft.com/networking/WLAN/profile/v1">
  <name>SampleWPA2EnterprisePEAPMSCHAP</name>
  <SSIDConfig>
    <SSID>
      <name>SampleWPA2EnterprisePEAPMSCHAP</name>
    </SSID>
  </SSIDConfig>
  <connectionType>ESS</connectionType>
  <connectionMode>auto</connectionMode>
  <MSM>
    <security>
      <authEncryption>
        <authentication>WPA2</authentication>
        <encryption>AES</encryption>
        <useOneX>true</useOneX>
      </authEncryption>
      <OneX xmlns="http://www.microsoft.com/networking/OneX/v1">
        <EAPConfig>
          <EapHostConfig
xmlns="http://www.microsoft.com/provisioning/EapHostConfig"

xmlns:eapCommon="http://www.microsoft.com/provisioning/EapCommon"

xmlns:baseEap="http://www.microsoft.com/provisioning/BaseEapMethodConfig">
            <EapMethod>
              <eapCommon:Type>25</eapCommon:Type>
              <eapCommon:AuthorId>0</eapCommon:AuthorId>
            </EapMethod>
            <Config
xmlns:baseEap="http://www.microsoft.com/provisioning/BaseEapConnectionPropertiesV1"

xmlns:msPeap="http://www.microsoft.com/provisioning/MsPeapConnectionPropertiesV1"

xmlns:msChapV2="http://www.microsoft.com/provisioning/MsChapV2ConnectionPropertiesV1">
              <baseEap:Eap>
                <baseEap:Type>25</baseEap:Type>
                <msPeap:EapType>
                  <msPeap:ServerValidation>

<msPeap:DisableUserPromptForServerValidation>>false</msPeap:DisableUserPromptForServerValidati
on>

                  <msPeap:TrustedRootCA />
                </msPeap:ServerValidation>
                <msPeap:FastReconnect>true</msPeap:FastReconnect>
            </Config>
          </EAPConfig>
        </OneX>
      </security>
    </MSM>
  </WLANProfile>
```

```

        <msPeap:InnerEapOptional>0</msPeap:InnerEapOptional>
        <baseEap:Eap>
            <baseEap:Type>26</baseEap:Type>
            <msChapV2:EapType>
<msChapV2:UseWinLogonCredentials>>false</msChapV2:UseWinLogonCredentials>
            </msChapV2:EapType>
        </baseEap:Eap>

<msPeap:EnableQuarantineChecks>>false</msPeap:EnableQuarantineChecks>

<msPeap:RequireCryptoBinding>>false</msPeap:RequireCryptoBinding>
        <msPeap:PeapExtensions />
        </msPeap:EapType>
    </baseEap:Eap>
</Config>
</EapHostConfig>
</EAPConfig>
</OneX>
</security>
</MSM>
</WLANProfile>

```

4.2 XML Wired Group Policy – EAP-TLS with Local Certificates

This profile sample shows a wired network profile used to connect to a network that uses Extensible Authentication Protocol Transport Level Security (EAP-TLS) certificates stored on the local machine for 802.1X authentication.

```

<?xml version="1.0" encoding="US-ASCII"?>
<LANProfile xmlns="http://www.microsoft.com/networking/LAN/profile/v1">
  <MSM>
    <security>
      <OneXEnforced>>false</OneXEnforced>
      <OneXEnabled>>true</OneXEnabled>
      <OneX xmlns="http://www.microsoft.com/networking/OneX/v1">
        <EAPConfig>
          <EapHostConfig
xmlns="http://www.microsoft.com/provisioning/EapHostConfig"
xmlns:eapCommon="http://www.microsoft.com/provisioning/EapCommon"
xmlns:baseEap="http://www.microsoft.com/provisioning/BaseEapMethodConfig">
            <EapMethod>
              <eapCommon:Type>13</eapCommon:Type>
              <eapCommon:AuthorId>0</eapCommon:AuthorId>
            </EapMethod>
          <Config
xmlns:baseEap="http://www.microsoft.com/provisioning/BaseEapConnectionPropertiesV1"
xmlns:eapTls="http://www.microsoft.com/provisioning/EapTlsConnectionPropertiesV1">
            <baseEap:Eap>
              <baseEap:Type>13</baseEap:Type>
              <eapTls:EapType>
                <eapTls:CredentialsSource>

```

```

        <eapTls:CertificateStore />
    </eapTls:CredentialsSource>
    <eapTls:ServerValidation>

<eapTls:DisableUserPromptForServerValidation>>false</eapTls:DisableUserPromptForServerValidati
on>

        <eapTls:ServerNames />
    </eapTls:ServerValidation>
    <eapTls:DifferentUsername>>false</eapTls:DifferentUsername>
</eapTls:EapType>
</baseEap:Eap>
</Config>
</EapHostConfig>
</EAPConfig>
</OneX>
</security>
</MSM>
</LANProfile>

```

4.3 Wireless Group Policy BLOB

This policy sample shows a BLOB which contains profiles for three wireless networks. The first network is secured using Wired Equivalent Privacy (WEP), with authentication provided via EAP-TLS. The second network is secured using Wi-Fi Protected Access 2 in Enterprise mode (WPA2-Enterprise), with authentication provided by PEAP, using EAP-MS-CHAPv2 as the inner EAP method. The final network is secured using WPA2 in Personal mode with a user-configured key; no EAP method is used. The subsequent tables show the token streams from the example in an expanded and annotated form.

```

03 00 00 00 F8 03 00 00 30 2A 00 00 00 00 00 00 01 00 00 00 01 00 00 00 03 00 00 00 74 01 00
00 53 00 61 00 6D 00 70 00 6C 00 65 00 53 00 53 00 49 00 44 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 0A 00 00 00 01 00 00 00 00 00 00 00 00 00 00 00 00 01 00 00 00 02 00 00 00 01 00 00 00
03 00 00 00 0D 00 00 00 72 00 00 00 02 00 00 00 72 00 00 00 15 00 00 00 14 00 00 00 74 2C 31
92 E6 07 E4 24 EB 45 49 54 2B E1 BB C5 3E 61 74 E2 00 00 04 00 00 00 14 00 00 00 A4 34 89 15
9A 52 0F 0D 93 D0 32 CC AF 37 E7 FE 20 A8 B4 19 14 00 00 00 CD D4 EE AE 60 00 AC 7F 40 C3 80
2C 17 1E 30 14 80 30 C0 72 14 00 00 00 BE 36 A4 56 2F B2 EE 05 DB B3 D3 23 23 AD F4 45 08 4E
D6 56 01 00 00 00 01 00 00 00 00 00 00 00 03 00 00 00 05 00 00 00 12 00 00 00 01 00 00 00 25
00 00 00 54 00 68 00 69 00 73 00 20 00 69 00 73 00 20 00 74 00 68 00 65 00 20 00 64 00 65 00
73 00 63 00 72 00 69 00 70 00 74 00 69 00 6F 00 6E 00 20 00 66 00 6F 00 72 00 20 00 76 00 65
00 72 00 73 00 69 00 6F 00 6E 00 20 00 33 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00 00 00
03 00 00 00 00 00 00 00 00 00 00 00 00 00 00 02 00 00 00 64 00 00 00 D0 02 00 00 70 01 00
00 53 00 65 00 63 00 6F 00 6E 00 64 00 50 00 72 00 6F 00 66 00 69 00 6C 00 65 00 53 00 53 00
49 00 44 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
00 00 00 11 00 00 00 03 00 00 00 01 00 00 00 05 00 00 00 01 00 00 00 02 00 00 00 01 00 00 00
02 00 00 00 19 00 00 00 6E 00 00 00 01 00 00 00 6E 00 00 00 01 00 00 00 01 00 00 00 01 00 00
00 45 00 00 00 04 00 00 00 02 00 00 00 14 00 00 00 74 2C 31 92 E6 07 E4 24 EB 45 49 54 2B E1
BB C5 3E 61 74 E2 14 00 00 00 A4 34 89 15 9A 52 0F 0D 93 D0 32 CC AF 37 E7 FE 20 A8 B4 19 00
00 01 00 00 00 17 00 00 00 1A 00 00 00 01 00 00 00 02 00 00 00 00 00 00 00 00 00 00 00 00 01 00
00 00 01 00 00 00 00 00 00 00 03 00 00 00 05 00 00 00 12 00 00 00 01 00 00 00 25 00 00 00 53
00 61 00 6D 00 70 00 6C 00 65 00 20 00 44 00 65 00 73 00 63 00 72 00 69 00 70 00 74 00 69 00
6F 00 6E 00 20 00 66 00 6F 00 72 00 20 00 53 00 65 00 63 00 6F 00 6E 00 64 00 20 00 50 00 72
00 6F 00 66 00 69 00 6C 00 65 00 00 00 00 00 01 00 00 00 00 00 00 00 01 00 00 00 03 00 00 00
01 00 00 00 01 00 00 00 01 00 00 00 02 00 00 00 80 00 00 00 C0 A8 00 00 00 01 00 00 54 00 68
00 69 00 72 00 64 00 50 00 72 00 6F 00 66 00 69 00 6C 00 65 00 00 00 00 00 00 00 00 00 00 00
00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0C
00 00 00 03 00 00 00 02 00 00 06 00 00 00 00 00 00 00 02 00 00 00 00 00 00 00 00 00 01 00 00
0D 00 00 00 00 00 00 00 01 00 00 00 02 00 00 00 00 00 00 00 03 00 00 00 05 00 00 00 12 00 00
00 01 00 00 00 24 00 00 00 53 00 61 00 6D 00 70 00 6C 00 65 00 20 00 44 00 65 00 73 00 63 00

```

```

72 00 69 00 70 00 74 00 69 00 6F 00 6E 00 20 00 66 00 6F 00 72 00 20 00 54 00 68 00 69 00 72
00 64 00 20 00 50 00 72 00 6F 00 66 00 69 00 6C 00 65 00 00 00 00 00 00 00 00 00 00 00 00
01 00 00 00 03 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 02 00 00 00 80 00 00 00 C0 A8 00
00

```

4.3.1 Wireless Policy Sub-BLOB Token Streams

The following table shows token streams relating to the [Wireless Policy Sub-BLOB \(section 2.2.1.1.1\)](#).

Token Stream	Description
03 00	Major Version: 3
00 00	Minor Version: 0
F8 03 00 00	WirelessPolicyDataLength: 0x3F8 = 1016 bytes
30 2A ... 00 00 (1016 bytes)	Wireless Policy Data: see section 4.3.2

4.3.2 Wireless Policy Data Token Streams

The following table shows token streams relating to the [Wireless Policy Data \(section 2.2.1.1.2\)](#).

Token Stream	Description
30 2A 00 00	PollingInterval: 0x2A30 = 10800 minutes = 3 hours DisableZeroConf: No
00 00 00 00	DisableZeroConf: No
01 00 00 00	NetworkToAccess: Any
01 00 00 00	ConnectToNonPreferredNtwks: Yes
03 00 00 00	NumberOfWirelessProfileSettings: 3
74 01 00 00	WirelessProfileSettingsLength: 0x174 = 372 bytes
53 00 ... 00 00 (372 bytes)	Wireless Profile Settings Data: See section 4.3.3
70 01 00 00	WirelessProfileSettingsLength: 0x170 = 368 bytes
53 00 ... 00 00 (368 bytes)	Wireless Profile Settings Data: see section 4.3.5
00 01 00 00	WirelessProfileSettingsLength: 0x100 = 256 bytes
54 00 ... 00 00 (256 bytes)	Wireless Profile Settings Data: see section 4.3.10

4.3.3 First Wireless Profile Settings Version B Token Streams

The following table shows token streams relating to the first [Wireless Profile Settings version B \(section 2.2.1.1.5\)](#).

Token Stream	Description
01 00 00 00	PreAuthMode: Ignored due to PreAuthModePresent
03 00 00 00	PreAuthThrottle: Ignored due to PreAuthThrottlePresent
00 00 00 00	PmkCacheModePresent: False
00 00 00 00	PmkCacheSizePresent: False
00 00 00 00	PmkCacheTTLSecPresent: False
02 00 00 00	PmkCacheMode: Ignored due to PmkCacheModePresent
64 00 00 00	PmkCacheSize: Ignored due to PmkCacheSizePresent
D0 02 00 00	PmkCacheTTLSec: Ignored due to PmkCacheTTLSecPresent

4.3.4 EAPTLS_CONN_PROPERTIES Token Streams

The following table shows token streams relating to [EAPTLS_CONN_PROPERTIES \(section 2.2.3.1.1\)](#), the EAPData field for EAP-TLS.

Token Stream	Description
02 00 00 00	Version: 2
72 00 00 00	Size: 0x72 = 114 bytes
15 00 00 00	Flags: EapTlsRegistry: Local certificate EapTlsNoValidateServerCert: False EapTlsNoValidateName: True EapTlsDifferentUsername: False EapTlsSimpleCertSel: True EapTlsDisablePromptValidation: False
14 00 00 00	TrustedCertHashInfo\HashSize: 0x14 = 20 bytes
74 2C 31 92 E6 07 E4 24 EB 45 49 54 2B E1 BB C5 3E 61 74 E2	TrustedCertHashInfo\CertHash
00 00	ServerName (null)
04 00 00 00	NumberOfCAs: 4 (for example, 3 more TrustedCertInfo structures follow)
14 00 00 00	TrustedCertHashInfo\HashSize: 0x14 = 20 bytes
A4 34 89 15 9A 52 0F 0D 93 D0 32 CC AF 37 E7 FE 20 A8 B4	19TrustedCertHashInfo\CertHash

Token Stream	Description
14 00 00 00	TrustedCertHashInfo\HashSize: 0x14 = 20 bytes
CD D4 EE AE 60 00 AC 7F 40 C3 80 2C 17 1E 30 14 80 30 C0	72TrustedCertHashInfo\CertHash
14 00 00 00	TrustedCertHashInfo\HashSize: 0x14 = 20 bytes
BE 36 A4 56 2F B2 EE 05 DB B3 D3 23 23 AD F4 45 08 4E D6 56	TrustedCertHashInfo\CertHash

4.3.5 Second Wireless Profile Settings Version B Token Streams

The following table shows token streams relating to the second [Wireless Profile Settings version B \(section 2.2.1.1.5\)](#).

Token	StreamDescription
53 00 65 00 63 00 6F 00 6E 00 64 00 50 00 72 00 6F 00 66 00 69 00 6C 00 65 00 53 00 53 00 49 00 44 00	SSID: "SecondProfileSSID"
11 00 00 00	SSIDLength: 0x11 = 17 characters
03 00 00 00	802.11 Encryption: AES
01 00 00 00	ProfileIndex: 1
05 00 00 00	802.11 Authentication: WPA2-Enterprise
01 00 00 00	AutomaticKeyProvision: True
02 00 00 00	NetworkType: Infrastructure
01 00 00 00	Enable8021x: True
02 00 00 00	8021xSupplicantMode: Send EAPOL-Start if needed
19 00 00 00	EAPType: PEAP
6E 00 00 00	EAPDataLen: 0x6E = 110 bytes
01 00 ... 00 00	(110 bytes)EAPData: see section 4.3.6
01 00 00 00	Machine Authentication: Computer Credentials
01 00 00 00	Machine Authentication Type: User Reauthentication
00 00 00 00	Guest Authentication: No
03 00 00 00	802.1XMaxStart

Token	StreamDescription
05 00 00 00	802.1XStartPeriod
12 00 00 00	802.1XAuthPeriod
01 00 00 00	802.1XHeldPeriod
25 00 00 00	DescriptionLen: 0x25 = 37 characters
53 00 61 00 6D 00 70 00 6C 00 65 00 20 00 44 00 65 00 73 00 63 00 72 00 69 00 70 00 74 00 69 00 6F 00 6E 00 20 00 66 00 6F 00 72 00 20 00 53 00 65 00 63 00 6F 00 6E 00 64 00 20 00 50 00 72 00 6F 00 66 00 69 00 6C 00 65 00	Description: "Sample Description for Second Profile"
00 00 00 00	PreferredSettingFlags: Broadcast
01 00 00 00	PreAuthModePresent: True
00 00 00 00	PreAuthThrottlePresent: False
01 00 00 00	PreAuthMode: 802.11i pre-authentication invoked
03 00 00 00	PreAuthThrottle: Ignored due to PreAuthThrottlePresent
01 00 00 00	PmkCacheModePresent: True
01 00 00 00	PmkCacheSizePresent: True
01 00 00 00	PmkCacheTTLSecPresent: True
02 00 00 00	PmkCacheMode: PMK caching invoked
80 00 00 00	PmkCacheSize: 0x80 = 128 entries
C0 A8 00 00	PmkCacheTTLSec: 0xA8C0 = 43200 seconds = 12 hours

4.3.6 PEAP_CONN_PROP Token Streams

The following table shows token streams relating to PEAP_CONN_PROP, the EAPData field for PEAP ([2.2.3.1.2](#)).

Token Stream	Description
01 00 00 00	Version: 1
6E 00 00 00	Size: 0x6E = 110 bytes
01 00 00 00	NumberOfEAPTypes: 1
01 00 00 00	Flags: PeapFastRoaming: True

Token Stream	Description
	PeapInnerEAPOptional: False PeapEnforceCryptoBinding: False PeapEnableQuarantine: False
01 00 ... 00 00 (66 bytes)	PeapTlsProperties: see section 4.3.7
01 00 ... 00 00 (20 bytes)	InnerMethodProperties: see section 4.3.8
00 00 00 00 00 00 00 00	Padding

4.3.7 PEAP_TLS_PHASE1_CONN_PROPERTIES Field Token Streams

The following table shows token streams relating to [PEAP_TLS_PHASE1_CONN_PROPERTIES](#) (section 2.2.3.1.2.1), the PeapTlsProperties field from PEAP_CONN_PROP.

Token Stream	Description
01 00 00 00	Version: 1
45 00 00 00	Size: 0x45 = 69 bytes -> 66-byte PeapTlsProperties
04 00 00 00	Flags: PeapTlsPhase1NoValidateServerCert: False PeapTlsPhase1NoValidateName: True PeapTlsPhase1DisablePromptValidation: False
02 00 00 00	NumberOfCAs: 2
14 00 00 00	TrustedCertHashInfo\HashSize: 0x14 = 20 bytes
74 2C 31 92 E6 07 E4 24 EB 45 49 54 2B E1 BB C5 3E 61 74 E2	TrustedCertHashInfo\CertHash
14 00 00 00	TrustedCertHashInfo\HashSize: 0x14 = 20 bytes
A4 34 89 15 9A 52 0F 0D 93 D0 32 CC AF 37 E7 FE 20 A8 B4 19	TrustedCertHashInfo\CertHash
00 00	ServerName: Null

4.3.8 PEAP_INNER_METHOD_PROPERTY Token Streams

The following table shows token streams relating to [PEAP_INNER_METHOD_PROPERTY](#) (section 2.2.3.1.2.2), the InnerMethodProperties field from PEAP_CONN_PROP.

Token Stream	Description
01 00 00 00	Version: 1
17 00 00 00	Size: 0x17 = 23 bytes - 3 bytes -> 20 byte PEAP_INNER_METHOD_PROPERTY
1A 00 00 00	InnerEapType: The format of InnerEapData is EAPMSCHAPv2_CONN_PROPERTIES

Token Stream	Description
00 00 00 00	Guest Authentication: No
03 00 00 00	802.1XMaxStart
05 00 00 00	802.1XStartPeriod
12 00 00 00	802.1XAuthPeriod
01 00 00 00	802.1XHeldPeriod
24 00 00 00	DescriptionLen: 0x24 = 36 characters
53 00 61 00 6D 00 70 00 6C 00 65 00 20 00 44 00 65 00 73 00 63 00 72 00 69 00 70 00 74 00 69 00 6F 00 6E 00 20 00 66 00 6F 00 72 00 20 00 54 00 68 00 69 00 72 00 64 00 20 00 50 00 72 00 6F 00 66 00 69 00 6C 00 65 00	Description: "Sample Description for Third Profile"
00 00 00 00	PreferredSettingFlags - Broadcast
00 00 00 00	PreAuthModePresent: False
00 00 00 00	PreAuthThrottlePresent: False
01 00 00 00	PreAuthMode: Ignored due to PreAuthModePresent
03 00 00 00	PreAuthThrottle - Ignored due to PreAuthThrottlePresent
00 00 00 00	PmkCacheModePresent: False
00 00 00 00	PmkCacheSizePresent: False
00 00 00 00	PmkCacheTTLSecPresent: False
02 00 00 00	PmkCacheMode: Ignored due to PmkCacheModePresent
80 00 00 00	PmkCacheSize: Ignored due to PmkCacheSizePresent
C0 A8 00 00	PmkCacheTTLSec: Ignored due to PmkCacheTTLSecPresent

4.4 Updating the SSID

In the following example, a scenario is considered in which the IT administrator has changed the service set identifier (SSID) of the corporate wireless network from CORPWLAN to HQWLAN. The administrator requires the client computers in his domain, "testDomain", to use the new SSID HQWLAN as their preferred SSID to connect to the wireless network. Consider that the domain already has an XML-based wireless Group Policy to be applied to domain clients. The name of the policy is "DomainWirelessPolicy".

On the **domain controller (DC)**:

1. The IT administrator launches an administrative-side tool to modify the wireless Group Policy within the GPO. The administrative-side plug-in is invoked with the path of computer GPO – "testdomain\policies\defaultPolicy\Machine".

The administrative-side plug-in is invoked with the path of the computer's GPO, "testdomain\policies\defaultPolicy\Machine".
2. The administrative-side plug-in creates an LDAP distinguished name for this search "CN=IEEE80211, CN=Windows, CN=Microsoft, CN=Machine, CN=defaultPolicy, CN=policies, DC=testDomain, DC=com" and performs a "search" operation by searching for CN= ms-net-ieee-80211-GP-PolicyData with objectClass= ms-net-ieee-80211-GroupPolicy and baseObject scope.
3. This search returns the following object: "CN=DomainWirelessPolicy, CN=IEEE80211, CN=Windows, CN=Microsoft, CN=Machine, CN=defaultPolicy, CN=policies, DC=testDomain, DC=com". The administrative-side plug-in enumerates attributes of this Active Directory object. It interprets the value of ms-net-ieee-80211-GP-PolicyData as the XML policy string according to the syntax indicated in section [2.2.1.2](#).
4. The administrative-side plug-in creates a new policy XML string that contains HQLAN as the preferred SSID. The new policy XML string conforms to the syntax described in section [2.2.1.2](#).
5. The administrative-side plug-in uses LDAP modify to set the newly created policy XML string as the value for ms-net-ieee-80211-GP-PolicyData for the policy object "CN=DomainWirelessPolicy, CN=IEEE80211, CN=Windows, CN=Microsoft, CN=Machine, CN=defaultPolicy, CN=policies, DC=testDomain, DC=com".
6. The administrative-side plug-in is informed, as described in [\[MS-GPOL\]](#), that the wireless Group Policy has been updated for the GPO with the path indicated by "testdomain\policies\defaultPolicy\Machine".

Later, the following steps happen on a client computer:

1. On a domain client computer that is a member of the test domain, the client-side plug-in is informed, as described in [\[MS-GPOL\]](#), that there is a new wireless policy for the computer GPO associated with the domain and indicated by the path "testdomain\policies\defaultPolicy\Machine".
2. The client-side plug-in determines that it should apply this new policy. It queries the currently assigned policy by performing an LDAP search. It creates an LDAP distinguished name for this search, "CN=IEEE80211, CN=Windows, CN=Microsoft, CN=Machine, CN=defaultPolicy, CN=policies, DC=testDomain, DC=com", and performs a "search" operation by searching for the objectClass= ms-net-ieee-80211-GroupPolicy and baseObject scope.
3. This search returns the following object: CN=DomainWirelessPolicy, CN=IEEE80211, CN=Windows, CN=Microsoft, CN=Machine, CN=defaultPolicy, CN=policies, DC=testDomain, DC=com. The client-side plug-in enumerates the attributes of this Active Directory object that include ms-net-ieee-80211-GP-PolicyData, which it interprets as the XML policy string according to the syntax described in section [2.2.1.2](#).
4. The client-side plug-in interprets the fields indicated in the XML policy string that includes the new preferred SSID HQLAN. The client-side plug-in provides all the wireless settings indicated in the policy XML string to the wireless connection component on the client.
5. The wireless connection component gets the wireless settings from the client-side plug-in and updates its configuration to use HQLAN as a preferred SSID to connect to the wireless network, instead of the previously used CORPWLAN.

5 Security

5.1 Security Considerations for Implementers

Section [Transport](#) recommends that the administrative-side and client-side plug-ins use the LDAP bind mechanism for authentication, and that they use the LDAP message security layer for confidentiality and integrity of the protocol messages (as specified in [\[MS-ADTS\]](#) section 5.1.1). The Wireless/Wired Group Policy Protocol does not have any security considerations beyond those specified in [\[MS-GPOL\]](#), section [5.1](#) for the Group Policy Protocol.

5.2 Index of Security Parameters

There are no security parameters for the Wireless/Wired Group Policy Protocol. The following security parameters are accessed by the wireless and wired connection components in the operating system. They do not have any impact on the Wireless/Wired Group Policy Protocol plug-ins.

Security parameter	Section
IEEE 802.11i parameters, as specified in [IEEE802.11i] .	2.2.1
IEEE 802.1X parameters, as specified in [IEEE802.1X] .	2.2.1 and 2.2.2

6 Appendix A: Schemas

6.1 Wireless Policy Schema

```
<?xml version="1.0" encoding="utf-8" ?>

<xs:schema

  targetNamespace="http://www.microsoft.com/networking/WLAN/policy/v1"

  xmlns="http://www.microsoft.com/networking/WLAN/policy/v1"

  xmlns:xs="http://www.w3.org/2001/XMLSchema"

  elementFormDefault="qualified">

  <!--

  #####

  #                type definitions section                #

  #####

  -->

  <!-- type definition for policy name and description -->

  <xs:simpleType name="nameType">

    <xs:restriction base="xs:string">

      <xs:minLength value="1" />

      <xs:maxLength value="255" />

    </xs:restriction>

  </xs:simpleType>

  <!-- type definition for SSID -->

  <xs:simpleType name="networkNameType">

    <xs:restriction base="xs:string">

      <xs:minLength value="1" />

      <xs:maxLength value="32" />

    </xs:restriction>

  </xs:simpleType>
```

```

<!-- type definition for 802.11 network types, adhoc (IBSS) vs infrastructure (ESS) -->
<xs:simpleType name="networkTypeType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="IBSS" />
    <xs:enumeration value="ESS" />
  </xs:restriction>
</xs:simpleType>

<!-- type definition for a list item in either allow or block list -->
<xs:complexType name="networkItemType">
  <xs:sequence>
    <xs:element name="networkName" type="networkNameType" />
    <xs:element name="networkType" type="networkTypeType" />

    <!-- extension point for other namespaces -->
    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"
  />
  </xs:sequence>
</xs:complexType>

<!--
#####
#           element definitions section           #
#####
-->

<xs:element name="WLANPolicy">
  <xs:complexType>
    <xs:sequence>
      <!-- this is the name of the policy -->

```

```

<xs:element name="name" type="nameType" />

<!-- brief description of the policy, optional -->

<xs:element name="description" type="nameType" minOccurs="0" />

<!-- Wireless LAN global settings -->

<!-- A/C flags, currently there is only one -->

<xs:element name="globalFlags">
  <xs:complexType>
    <xs:sequence>
      <!-- flag to indicate whether A/C is used or not -->
      <xs:element name="enableAutoConfig" type="xs:boolean" />
      <!-- flag to indicate whether A/C shall show denied network in VAN UI -->
      <xs:element name="showDeniedNetwork" type="xs:boolean" />
      <!-- flag to indicate whether A/C shall allow everyone to create all user
profiles -->
      <xs:element name="allowEveryoneToCreateAllUserProfiles" type="xs:boolean" />
      <!-- flag to indicate whether to restrict networks configured by GP to use GP
profiles only (V2 namespace) -->
      <!-- flag to indicate whether to restrict networks configured by GP to use GP
profiles only (namespace: http://www.microsoft.com/networking/WLAN/policy/v2) -->
      <xs:element name="onlyUseGPProfilesForAllowedNetworks" type="xs:boolean"
minOccurs="0" maxOccurs="1"/>
      <!-- flag to indicate whether to enable software access point (namespace:
http://www.microsoft.com/networking/WLAN/policy/v3) -->
      <xs:element name="enableSoftAP" type="xs:boolean" minOccurs="0" maxOccurs="1"/>
      <!-- flag to indicate whether to enable explicit credentials (namespace:
http://www.microsoft.com/networking/WLAN/policy/v3) -->
      <xs:element name="enableExplicitCreds" type="xs:boolean" minOccurs="0"
maxOccurs="1"/>
      <!-- extension point for other namespaces -->
      <!-- value of block timeout period (namespace:
http://www.microsoft.com/networking/WLAN/policy/v3) -->
      <xs:element name="blockPeriod" minOccurs="0" maxOccurs="1">
        <xs:simpleType>
          <xs:restriction base="xs:integer">
            <xs:minInclusive value="0" />
            <xs:maxInclusive value="60" />
          </xs:restriction>
        </xs:simpleType>
      </xs:element>
    </xs:sequence>
  </xs:complexType>
</xs:element>

```

```

        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded" />

    </xs:sequence>

</xs:complexType>

</xs:element>

<!-- network filter list specification, could be empty -->

<xs:element name="networkFilter" minOccurs="0">

    <xs:complexType>

        <xs:sequence>

-->

            <!-- Allow list of networks, always take precedence over block list or deny all
-->

            <xs:element name="allowList" minOccurs="0">

                <xs:complexType>

                    <xs:sequence>

                        <xs:element name="network" type="networkItemType" maxOccurs="unbounded"
/>

                                <!-- extension point for future namespaces -->

                                <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded" />

                                    </xs:sequence>

                                </xs:complexType>

                            </xs:element>

-->

            <!-- Block list of networks, specified one by one -->

            <xs:element name="blockList" minOccurs="0">

                <xs:complexType>

                    <xs:sequence>

                        <xs:element name="network" type="networkItemType" maxOccurs="unbounded"
/>

```

```

        <!-- extension point for future namespaces -->
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded" />
    </xs:sequence>
</xs:complexType>
</xs:element>

<!-- flag for denying access to any adhoc network, default is "false" -->
<xs:element name="denyAllIBSS" type="xs:boolean" minOccurs="0" />

-->
<!-- flag for denying access to any infrastructure network, default is "false"
-->
<xs:element name="denyAllESS" type="xs:boolean" minOccurs="0" />

<!-- extension point for other namespaces -->
<xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded" />
    </xs:sequence>
</xs:complexType>
</xs:element>

<!--
    List of profiles within the policy. It is optional.
    When present, it shall contain at least one profile.
-->
<xs:element name="profileList" minOccurs="0">
    <xs:complexType>
        <xs:sequence>
            <!--
                Placeholder to hook in profile namespace, code must enforce only the
profile

```

```

        namespace is imported here. All other namespaces shall be ignored.

        -->

        <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded" />

    </xs:sequence>

    </xs:complexType>

</xs:element>

    <!-- extension point for other namespaces -->

    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"
/>

    </xs:sequence>

    </xs:complexType>

</xs:element>

</xs:schema>

```

6.2 Wired Policy Schema

```

<?xml version="1.0" encoding="utf-8" ?>
<xs:schema targetNamespace="http://www.microsoft.com/networking/LAN/policy/v1"
  xmlns="http://www.microsoft.com/networking/LAN/policy/v1"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">

  <!-- type definitions section -->
  <!-- type definition for name and description -->
  <xs:simpleType name="nameType">
    <xs:restriction base="xs:string">
      <xs:minLength value="1" />
      <xs:maxLength value="255" />
    </xs:restriction>
  </xs:simpleType>

  <!-- element definitions section -->
  <xs:element name="LANPolicy">
    <xs:complexType>
      <xs:sequence>
        <!-- this is the name of the policy -->
        <xs:element name="name" type="nameType" />
        <!-- brief description of the policy, optional -->
        <xs:element name="description" type="nameType" minOccurs="0" />

        <!-- A/C flags -->

```

```

<xs:element name="globalFlags">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="enableAutoConfig" type="xs:boolean" />

      <!-- flag to indicate whether to disable explicit credentials (namespace:
http://www.microsoft.com/networking/LAN/policy/v2) -->
      <xs:element name="enableExplicitCreds" type="xs:boolean" minOccurs="0"
maxOccurs="1"/>

      <!-- value of block timeout period (namespace:
http://www.microsoft.com/networking/LAN/policy/v2) -->
      <!-- the default value is 20 minutes when element not present -->
      <xs:element name="blockPeriod" minOccurs="0" maxOccurs="1">
        <xs:simpleType>
          <xs:restriction base="xs:integer">
            <xs:minInclusive value="0" />
            <xs:maxInclusive value="60" />
          </xs:restriction>
        </xs:simpleType>
      </xs:element>

      <!-- extension point for other namespaces -->
      <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

<!--
  List of profiles within the policy. It is optional.
  When enableAutoConfig is set to "false", this element shall be absent.
  When present, the list shall contain at least one profile.
-->
<xs:element name="profileList" minOccurs="0">
  <xs:complexType>
    <xs:sequence>
      <!--
profile
  Placeholder to hook in profile namespace, the code must enforce only the
namespace that is imported here. All other namespaces shall be ignored.
The current implementation only allows one profile in the list. The code
must enforce
  that only one profile exists in the policy. If more than one profile exists
in the policy, only the first one in the list will be applied.
-->
      <xs:any namespace="##other" processContents="lax" maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

  <!-- extension placeholder for future LAN policy settings, not used in this version -
->
  <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"
/>

  </xs:sequence>
</xs:complexType>
</xs:element>
</xs:schema>

```

6.3 Wireless LAN Profile Schema

```
<?xml version="1.0" encoding="UTF-8" ?>

<xs:schema

  targetNamespace="http://www.microsoft.com/networking/WLAN/profile/v1"

  xmlns="http://www.microsoft.com/networking/WLAN/profile/v1"

  xmlns:xs="http://www.w3.org/2001/XMLSchema"

  elementFormDefault="qualified">

  <!-- type definition section -->

  <xs:simpleType name="nameType">

    <xs:restriction base="xs:string">

      <xs:minLength value="1" />

      <xs:maxLength value="255" />

    </xs:restriction>

  </xs:simpleType>

  <xs:element name="WLANProfile">

    <xs:complexType>

      <xs:sequence>

        <!-- Profile name is required. -->

        <xs:element name="name" type="nameType" />

        <!-- WLAN network settings -->

        <!-- SSID's and connectionType are required. -->

        <xs:element name="SSIDConfig" maxOccurs="256">

          <xs:complexType>

            <xs:sequence>
```



```

<!-- In this version, only one <SSID> is supported from UI -->
<xs:element name="SSID" maxOccurs="256">
  <xs:complexType>
    <xs:sequence>
      <!-- Either Hex or named SSID must be present. -->
      <!-- Hex SSID takes precedence over named SSID. -->
      <xs:element name="hex" minOccurs="0">
        <xs:simpleType>
          <xs:restriction base="xs:hexBinary">
            <xs:minLength value="1" />
            <xs:maxLength value="32" />
          </xs:restriction>
        </xs:simpleType>
      </xs:element>

      <xs:element name="name" minOccurs="0">
        <xs:simpleType>
          <xs:restriction base="xs:string">
            <xs:minLength value="1" />
            <xs:maxLength value="32" />
          </xs:restriction>
        </xs:simpleType>
      </xs:element>

      <!-- extension point for other namespaces -->
      <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded" />
    </xs:sequence>
  </xs:complexType>
</xs:element>

```

```

        <!--
            Flag to indicate whether SSIDs within the same SSIDConfig group will be
            broadcasted or not. Default value is "false"
        -->
        <xs:element name="nonBroadcast" type="xs:boolean" minOccurs="0" />

        <!-- extension point for other namespaces -->
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded" />
    </xs:sequence>
</xs:complexType>
</xs:element>

<xs:element name="connectionType">
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="IBSS" />
            <xs:enumeration value="ESS" />
        </xs:restriction>
    </xs:simpleType>
</xs:element>

<!--
    Specify connection mode when a network is in range
    Default value = "auto"
-->
<xs:element name="connectionMode" minOccurs="0">
    <xs:simpleType>
        <xs:restriction base="xs:string">

```

```

        <xs:enumeration value="auto" />

        <xs:enumeration value="manual" />

    </xs:restriction>

</xs:simpleType>

</xs:element>

<!--
    Flag to determine roaming behavior when a more preferred network is in range
    Default value = "true"
-->

<xs:element name="autoSwitch" type="xs:boolean" minOccurs="0" />

<!-- wireless LAN MSM settings -->

<xs:element name="MSM" minOccurs="0">

    <xs:complexType>

        <xs:sequence>

            <xs:element name="connectivity" minOccurs="0">

                <xs:complexType>

                    <xs:sequence>

                        <xs:element name="phyType" minOccurs="0" maxOccurs="4">

                            <xs:simpleType>

                                <xs:restriction base="xs:string">

                                    <xs:enumeration value="a" />

                                    <xs:enumeration value="b" />

                                    <xs:enumeration value="g" />

                                    <!-- this value is reserved for future use -->

                                    <xs:enumeration value="n" />

                                </xs:restriction>

                            </xs:simpleType>

                        </xs:element>

```

```

        <!-- extension point for other namespaces -->
        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded" />

        </xs:sequence>
    </xs:complexType>
</xs:element>

<!-- security settings -->
<xs:element name="security" minOccurs="0">
    <xs:complexType>
        <xs:sequence>
            <xs:element name="authEncryption" minOccurs="0">
                <xs:complexType>
                    <xs:sequence>
                        <!-- valid authentication methods -->
                        <xs:element name="authentication">
                            <xs:simpleType>
                                <xs:restriction base="xs:string">
                                    <xs:enumeration value="open" />
                                    <xs:enumeration value="shared" />
                                    <xs:enumeration value="WPA" />
                                    <xs:enumeration value="WPAPSK" />
                                    <xs:enumeration value="WPA2" />
                                    <xs:enumeration value="WPA2PSK" />
                                </xs:restriction>
                            </xs:simpleType>
                        </xs:element>

                        <!-- valid encryption methods -->

```

```

<xs:element name="encryption">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="none" />
      <xs:enumeration value="WEP" />
      <xs:enumeration value="TKIP" />
      <xs:enumeration value="AES" />
    </xs:restriction>
  </xs:simpleType>
</xs:element>

<!-- flag indicating use of 802.1X -->
<xs:element name="useOneX" type="xs:boolean" minOccurs="0" />

<!-- flag indicating FIPS mode (v2 namespace) -->
<!--
<xs:element name="FIPSMode" type="xs:boolean" minOccurs="0"
  namespace =
"http://www.microsoft.com/networking/WLAN/profile/v2"/>
-->

<!-- extension point for other namespaces -->
<xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded" />
</xs:sequence>
</xs:complexType>
</xs:element>

<!-- Optional MSM security settings. -->
<!--

```

```
For WPA2, the default value is "enabled"
for all others, the default value is "disabled"
-->
<xs:element name="PMKCacheMode" minOccurs="0">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="disabled" />
      <xs:enumeration value="enabled" />
    </xs:restriction>
  </xs:simpleType>
</xs:element>

<!-- the default value is 720 minutes -->
<xs:element name="PMKCacheTTL" minOccurs="0">
  <xs:simpleType>
    <xs:restriction base="xs:integer">
      <xs:minInclusive value="5" />
      <xs:maxInclusive value="1440" />
    </xs:restriction>
  </xs:simpleType>
</xs:element>

<!-- the default value is 128 entries -->
<xs:element name="PMKCacheSize" minOccurs="0">
  <xs:simpleType>
    <xs:restriction base="xs:integer">
      <xs:minInclusive value="1" />
      <xs:maxInclusive value="255" />
    </xs:restriction>
  </xs:simpleType>
</xs:element>
```

```

</xs:element>

<!-- the default value is "disabled" -->
<xs:element name="preAuthMode" minOccurs="0">
  <xs:simpleType>
    <xs:restriction base="xs:string">
      <xs:enumeration value="disabled" />
      <xs:enumeration value="enabled" />
    </xs:restriction>
  </xs:simpleType>
</xs:element>

<!-- the default value is 3 times -->
<xs:element name="preAuthThrottle" minOccurs="0">
  <xs:simpleType>
    <xs:restriction base="xs:integer">
      <xs:minInclusive value="1" />
      <xs:maxInclusive value="16" />
    </xs:restriction>
  </xs:simpleType>
</xs:element>

<!-- extension point for other namespaces -->
<!-- this is also the insertion point for OneX namespace -->
<xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded" />
  </xs:sequence>
</xs:complexType>
</xs:element>

```

```

        <!-- extension point for other namespaces -->

        <xs:any namespace="##other" processContents="lax" minOccurs="0"
maxOccurs="unbounded" />

    </xs:sequence>

</xs:complexType>

</xs:element>

<!-- extension point for other namespaces -->

    <xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded"
/>

    </xs:sequence>

</xs:complexType>

</xs:element>

</xs:schema>

```

6.4 Wired LAN Profile Schema

```

<?xml version="1.0" encoding="UTF-8" ?>
<xs:schema targetNamespace="http://www.microsoft.com/networking/LAN/profile/v1"
xmlns="http://www.microsoft.com/networking/LAN/profile/v1"
xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified">
<!-- element definitions
-->
<xs:element name="LANProfile">
<xs:complexType>
<xs:sequence>
<!-- LAN network settings
-->
<xs:element name="MSM">
<xs:complexType>
<xs:sequence>
<xs:element name="security">
<xs:complexType>
<xs:sequence>
<!--

```

Flag to indicate whether 802.1X shall be used for security.

```

-->
<xs:element name="OneXEnforced" type="xs:boolean" />
<!--

```


Flag to indicate whether 802.1X shall be tried before falling back to no security.

```
-->
<xs:element name="OneXEnabled" type="xs:boolean" />
<!--
        Extension point for other namespaces, including the OneX
        namespace currently used for optional IEEE802.1X configuration.
        The OneX configuration parameters must be present if the
        <OneXEnforced> flag is set to "true" or
        the <OneXEnabled> flag is set to "true"

-->
<xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
</xs:sequence>
</xs:complexType>
</xs:element>
<!-- extension point for other namespaces
-->
<xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
</xs:sequence>
</xs:complexType>
</xs:element>
<!-- extension point for other namespaces
-->
<xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:schema>
```

6.5 802.1X Schema

```
<?xml version="1.0" encoding="utf-8" ?>
<xs:schema

    targetNamespace="http://www.microsoft.com/networking/OneX/v1"

    xmlns="http://www.microsoft.com/networking/OneX/v1"

    xmlns:xs="http://www.w3.org/2001/XMLSchema"

    elementFormDefault="qualified">

    <!-- top-level element
    -->
    <xs:element name="OneX">
    <xs:complexType>
    <!-- Optional 802.1X settings
    -->
    <xs:sequence>
    <!-- the default value is "false"
    -->
    <xs:element name="fallbackGuestAuth" type="xs:boolean" minOccurs="0" />
    <!-- the default value is "false"
    -->
```

```

    <xs:element name="clearUserData" type="xs:boolean" minOccurs="0" />
<!-- the default value is 60 seconds
-->
<xs:element name="heldPeriod" minOccurs="0">
<xs:simpleType>
<xs:restriction base="xs:integer">
  <xs:minInclusive value="1" />
  <xs:maxInclusive value="3600" />
</xs:restriction>
</xs:simpleType>
</xs:element>
<!-- the default value is 30 seconds
-->
<xs:element name="authPeriod" minOccurs="0">
<xs:simpleType>
<xs:restriction base="xs:integer">
  <xs:minInclusive value="1" />
  <xs:maxInclusive value="3600" />
</xs:restriction>
</xs:simpleType>
</xs:element>
<!-- the default value is 5 seconds
-->
<xs:element name="startPeriod" minOccurs="0">
<xs:simpleType>
<xs:restriction base="xs:integer">
  <xs:minInclusive value="1" />
  <xs:maxInclusive value="3600" />
</xs:restriction>
</xs:simpleType>
</xs:element>
<!-- the default value is 3 times
-->
<xs:element name="maxStart" minOccurs="0">
<xs:simpleType>
<xs:restriction base="xs:integer">
  <xs:minInclusive value="1" />
  <xs:maxInclusive value="100" />
</xs:restriction>
</xs:simpleType>
</xs:element>
<!-- the default value is 3 times
-->
<xs:element name="maxAuthFailures" minOccurs="0">
<xs:simpleType>
<xs:restriction base="xs:integer">
  <xs:minInclusive value="1" />
  <xs:maxInclusive value="100" />
</xs:restriction>
</xs:simpleType>
</xs:element>

<xs:element name="supplicantMode" minOccurs="0">
<xs:simpleType>
<xs:restriction base="xs:string">
  <xs:enumeration value="inhibitTransmission" />
  <xs:enumeration value="includeLearning" />
  <xs:enumeration value="compliant" />
</xs:restriction>

```

```

    </xs:simpleType>
  </xs:element>
<!-- default value is "machineOrUser"
-->
<xs:element name="authMode" minOccurs="0">
<xs:simpleType>
<xs:restriction base="xs:string">
  <xs:enumeration value="machineOrUser" />
  <xs:enumeration value="machine" />
  <xs:enumeration value="user" />
  <xs:enumeration value="guest" />
</xs:restriction>
</xs:simpleType>
</xs:element>
<!-- Optional Single Sign On parameters for 802.1X
-->
<xs:element name="singleSignOn" minOccurs="0">
<xs:complexType>
<xs:sequence>
<!-- Prelogon or Post Logon Integration
-->
<xs:element name="type">
<xs:simpleType>
<xs:restriction base="xs:string">
  <xs:enumeration value="preLogon" />
  <xs:enumeration value="postLogon" />
</xs:restriction>
</xs:simpleType>
</xs:element>
<!-- Maximum duration to wait for connection
-->
<xs:element name="maxDelay" minOccurs="0">
<xs:simpleType>
<xs:restriction base="xs:integer">
  <xs:minInclusive value="0" />
  <xs:maxInclusive value="120" />
</xs:restriction>
</xs:simpleType>
</xs:element>
<!-- whether the network uses different VLANs for machine and user authentication. The
default is false
-->
<xs:element name="userBasedVirtualLan" type="xs:boolean" minOccurs="0" />
</xs:sequence>
</xs:complexType>
</xs:element>
<!-- mandatory parameter for 802.1X
-->
<xs:element name="EAPConfig">
<xs:complexType>
<xs:sequence>
<!-- this is the insertion point for EapHostConfig Namespace
(http://www.microsoft.com/provisioning/EapHostConfignamespace) -->
  <xs:any namespace="##other" processContents="lax" minOccurs="1" maxOccurs="unbounded" />
</xs:sequence>
</xs:complexType>
</xs:element>
<!-- extension point for other namespaces
-->

```

```

<xs:any namespace="##other" processContents="lax" minOccurs="0" maxOccurs="unbounded" />
</xs:sequence>
</xs:complexType>
</xs:element>
</xs:schema>

```

6.6 EAPHostConfig Schema

```

<?xml version="1.0" ?>
<xs:schema
  targetNamespace="http://www.microsoft.com/provisioning/EapHostConfig"
  elementFormDefault="qualified"
  xmlns="http://www.microsoft.com/provisioning/EapHostConfig"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:baseEap="http://www.microsoft.com/provisioning/BaseEapMethodConfig"
  xmlns:eapCommon="http://www.microsoft.com/provisioning/EapCommon"
  version="1.0">

  <xs:import
    namespace="http://www.microsoft.com/provisioning/BaseEapMethodConfig"
    schemaLocation="BaseEapMethodConfig.xsd"/>

  <xs:import
    namespace="http://www.microsoft.com/provisioning/EapCommon"
    schemaLocation="EapCommon.xsd"/>

  <xs:element name="EapHostConfig">
    <xs:complexType>
      <xs:sequence>
        <!-- This element defines the EAP Method being configured -->
        <xs:element name="EapMethod" type="eapCommon:EapMethodType"/>
        <xs:choice>
          <!-- Use Config element when configuration is present in plain text -->
          <xs:element name="Config" type="baseEap:BaseEapMethodConfig"/>
          <!-- Use ConfigBlob element when configuration is present in blob format. MUST
be a BLOB specifying EAP configuration settings to be used while performing IEEE 802.1X
authentication. For the EAP method which is being configured via group policy, the EAP
configuration settings format is specific to the corresponding EAP method implementation on
the client machines. The EAPData blob format for Microsoft's implementation of PEAP, EAP-TLS
and Ms-ChapV2 is documented in section 2.2.5.1.6. For non-Microsoft EAP method
implementations, please contact the corresponding vendors.-->
          <xs:element name="ConfigBlob" type="xs:hexBinary"/>
        </xs:choice>
        <!-- extension point for other namespaces -->
        <xs:any processContents="lax" minOccurs="0" maxOccurs="unbounded"
namespace="##other"/>
      </xs:sequence>
    </xs:complexType>
  </xs:element>
</xs:schema>

```

6.6.1 EapCommon Schema

```

<?xml version="1.0" ?>
<xs:schema
  targetNamespace="http://www.microsoft.com/provisioning/EapCommon"

```

```

elementFormDefault="qualified"
xmlns="http://www.microsoft.com/provisioning/EapCommon"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
version="1.0">

  <xs:complexType name="EapMethodType">
    <xs:sequence>
      <xs:element name="Type" type="xs:unsignedByte" />
      <xs:element name="VendorId" type="xs:unsignedInt" default="0" minOccurs="0" />
      <xs:element name="VendorType" type="xs:unsignedInt" default="0" minOccurs="0" />
      <xs:element name="AuthorId" type="xs:unsignedInt" />
    </xs:sequence>
  </xs:complexType>

  <xs:complexType name="EapBlob">
  </xs:complexType>

</xs:schema>

```

6.6.2 BaseEapMethodConfig Schema

```

<?xml version="1.0" ?>
<xs:schema
targetNamespace="http://www.microsoft.com/provisioning/BaseEapMethodConfig"
elementFormDefault="qualified"
xmlns="http://www.microsoft.com/provisioning/BaseEapMethodConfig"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
version="1.0">

  <xs:complexType name="BaseEapMethodConfig" >
    <xs:sequence>
      <xs:any processContents="lax"
        minOccurs="0"
        maxOccurs="unbounded"
        namespace="##any" />
      <!-- One or more elements of the kind as follows should go in here. -->
      <!-- EAP configuration settings in XML format, that the clients MUST use while
performing IEEE 802.1X authentication using this EAP method. The schema for EAP configuration
settings is specific to the corresponding EAP method implementation on the client machines.
The schema for Microsoft's native implementation of PEAP, EAP-TLS and Ms-ChapV2 EAP methods
is documented in following sections. For non-Microsoft EAP method implementations, please
contact the corresponding vendors. !-->
    </xs:sequence>
  </xs:complexType>

</xs:schema>

```

6.6.3 BaseEapConnectionPropertiesV1 Schema

```

<?xml version="1.0" ?>
<xs:schema
targetNamespace="http://www.microsoft.com/provisioning/BaseEapConnectionPropertiesV1"
elementFormDefault="qualified"
xmlns="http://www.microsoft.com/provisioning/BaseEapConnectionPropertiesV1"
xmlns:xs="http://www.w3.org/2001/XMLSchema"

```

```

    version="1.0"
  >
  <xs:complexType name="BaseEapTypeParameters" abstract="true"/>
  <xs:complexType name="BaseEapParameters">
    <xs:sequence>
      <xs:element name="Type" type="xs:integer"/>
      <xs:any
        processContents="lax"
        minOccurs="0"
        maxOccurs="unbounded"
        namespace="##any"
      />
      <!-- One or more elements of the kind as follows should go in here. -->
      <!--
      <xs:element ref="EapType" maxOccurs="unbounded"/>
      -->
    </xs:sequence>
  </xs:complexType>
  <xs:element name="EapType" type="BaseEapTypeParameters" abstract="true"/>
  <xs:element name="Eap" type="BaseEapParameters"/>
</xs:schema>

```

6.7 Microsoft EAP MsChapV2 Schema

The following defines the XML schema for specifying configuration settings for Microsoft implementation of the MS-ChapV2 EAP method.

```

<?xml version="1.0" ?>
<xs:schema
  targetNamespace="http://www.microsoft.com/provisioning/MsChapV2ConnectionPropertiesV1"
  elementFormDefault="qualified"
  xmlns="http://www.microsoft.com/provisioning/MsChapV2ConnectionPropertiesV1"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:baseEap="http://www.microsoft.com/provisioning/BaseEapConnectionPropertiesV1"
  version="1.0"
  >
  <xs:import
    namespace="http://www.microsoft.com/provisioning/BaseEapConnectionPropertiesV1"
    schemaLocation="BaseEapConnectionPropertiesV1.xsd"
  />
  <xs:element name="EapType" substitutionGroup="baseEap:EapType">
    <xs:complexType>
      <xs:complexContent>
        <xs:extension base="baseEap:BaseEapTypeParameters">
          <xs:sequence>
            <!-- If true, specifies that EAP-MSCHAPv2 should use the logged on user's
            username and password -->
            <xs:element name="UseWinLogonCredentials" type="xs:boolean" minOccurs="0"
            default="true"/>
            <!-- extension point for other namespaces -->
            <xs:any processContents="lax" minOccurs="0" maxOccurs="unbounded"
            namespace="##other"/>
          </xs:sequence>
        </xs:extension>
      </xs:complexContent>
    </xs:complexType>
  </xs:element>

```

```
</xs:element>
</xs:schema>
```

6.8 Microsoft EAP TLS Schema

6.8.1 EapTlsConnectionPropertiesV1 Schema

The following defines the XML schema for specifying configuration settings for the Microsoft EAP implementation of the TLS method.

```
<?xml version="1.0" ?>
<xs:schema
  targetNamespace="http://www.microsoft.com/provisioning/EapTlsConnectionPropertiesV1"
  elementFormDefault="qualified"
  xmlns="http://www.microsoft.com/provisioning/EapTlsConnectionPropertiesV1"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:baseEap="http://www.microsoft.com/provisioning/BaseEapConnectionPropertiesV1"
  xmlns:extendedTLS="http://www.microsoft.com/provisioning/EapTlsConnectionPropertiesV2"
  version="1.0"
>
  <xs:import
    namespace="http://www.microsoft.com/provisioning/BaseEapConnectionPropertiesV1"
    schemaLocation="BaseEapConnectionPropertiesV1.xsd"
  />
  <!--Extended tags are available at EapTlsConnectionPropertiesV2.xsd -->
  <xs:import
    namespace="http://www.microsoft.com/provisioning/EapTlsConnectionPropertiesV2"
    schemaLocation="EapTlsConnectionPropertiesV2.xsd"
  />
  <xs:element name="EapType" substitutionGroup="baseEap:EapType">
    <xs:complexType>
      <xs:complexContent>
        <xs:extension base="baseEap:BaseEapTypeParameters">
          <xs:sequence>
            <xs:element
              name="CredentialsSource"
              type="CredentialsSourceParameters"
              minOccurs="0"
            />
            <xs:element
              name="ServerValidation"
              type="ServerValidationParameters"
              minOccurs="0"
            />
            <xs:element
              name="DifferentUsername"
              type="xs:boolean"
              minOccurs="0"
            />
            <xs:element ref="extendedTLS:PerformServerValidation" minOccurs="0"
              maxOccurs="1"/>
            <xs:element ref="extendedTLS:AcceptServerName" minOccurs="0"
              maxOccurs="1"/>
            <xs:element ref="extendedTLS:TLSExtensions" minOccurs="0" maxOccurs="1"/>
          </xs:sequence>
        </xs:extension>
      </xs:complexContent>
    </xs:complexType>
  </xs:element>
```

```

    </xs:complexType>
  </xs:element>
  <xs:complexType name="CredentialsSourceParameters">
    <xs:choice>
      <xs:element name="SmartCard" type="emptyString"/>
      <xs:element name="CertificateStore" type="CertSelection"/>
    </xs:choice>
  </xs:complexType>

  <xs:complexType name="ServerValidationParameters">
    <xs:sequence>
      <xs:element
        name="DisableUserPromptForServerValidation"
        type="xs:boolean"
        minOccurs="0"
      />
      <!-- A set of server names delimited by semicolons -->
      <!-- each server name can be represented by regular -->
      <!-- expressions -->
      <!-- If this tag exist and value inside this tag also exists then AcceptServerName's
value is TRUE or else it is FALSE-->
      <xs:element name="ServerNames" minOccurs="0">
        <xs:complexType>
          <xs:simpleContent>
            <xs:extension base="xs:string">
              <!--This is obsolete, instead use AcceptServerName tag defined in the
EapType tag.-->
              <xs:attribute
                name="AcceptServerName"
                type="xs:boolean"
                use="optional"
              />
            </xs:extension>
          </xs:simpleContent>
        </xs:complexType>
      </xs:element>

      <!-- The thumbprint of a trusted root CA is -->
      <!-- a hexadecimal string that contains -->
      <!-- the SHA-1 hash of the certificate. -->
      <xs:element
        name="TrustedRootCA"
        type="xs:hexBinary"
        minOccurs="0"
        maxOccurs="unbounded"
      />
    </xs:sequence>
    <!--This is obsolete, instead use PerformServerValidation tag defined in the EapType
tag.-->
    <xs:attribute
      name="PerformServerValidation"
      type="xs:boolean"
      use="optional"
      default="true"
    />
  </xs:complexType>

  <xs:complexType name="CertSelection">
    <xs:sequence>

```



```

    <xs:element name="SimpleCertSelection" type="xs:boolean" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="emptyString">
  <xs:restriction base="xs:string">
    <xs:maxLength value="0"/>
  </xs:restriction>
</xs:simpleType>
</xs:schema>

```

6.8.2 EapTlsConnectionPropertiesV2 Schema

The following defines the XML schema for specifying configuration settings for the Microsoft EAP implementation of the TLS method.

```

<?xml version="1.0" ?>
<xs:schema
  targetNamespace="http://www.microsoft.com/provisioning/EapTlsConnectionPropertiesV2"
  elementFormDefault="qualified"
  xmlns="http://www.microsoft.com/provisioning/EapTlsConnectionPropertiesV2"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  version="1.0"
>
  <xs:element name="TLSExtensions" type="TLSExtensionsType" />
  <xs:element name="PerformServerValidation" type="xs:boolean" />
  <xs:element name="AcceptServerName" type="xs:boolean" />
  <xs:complexType name="TLSExtensionsType">
    <xs:sequence>
      <xs:any processContents="lax" minOccurs="0" maxOccurs="unbounded"
        namespace="##other" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>

```

6.9 Microsoft EAP PEAP Schema

6.9.1 MsPeapConnectionPropertiesV1 Schema

The following defines the XML schema for specifying configuration settings for the Microsoft EAP implementation of the PEAP method.

```

<?xml version="1.0"?>
<xs:schema xmlns="http://www.microsoft.com/provisioning/MsPeapConnectionPropertiesV1"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  xmlns:baseEap="http://www.microsoft.com/provisioning/BaseEapConnectionPropertiesV1"
  xmlns:extendedPeap="http://www.microsoft.com/provisioning/MsPeapConnectionPropertiesV2"
  targetNamespace="http://www.microsoft.com/provisioning/MsPeapConnectionPropertiesV1"
  elementFormDefault="qualified" version="1.0">
  <xs:import namespace="http://www.microsoft.com/provisioning/BaseEapConnectionPropertiesV1"
    schemaLocation="BaseEapConnectionPropertiesV1.xsd"/>
  <!--Extended tags are available at EapTlsConnectionPropertiesV2.xsd -->
  <xs:import namespace="http://www.microsoft.com/provisioning/MsPeapConnectionPropertiesV2"
    schemaLocation="MsPeapConnectionPropertiesV2.xsd"/>
  <xs:element name="EapType" substitutionGroup="baseEap:EapType">
  <xs:complexType>
  <xs:complexContent>

```

```

<xs:extension base="baseEap:BaseEapTypeParameters">
  <xs:sequence>
    <xs:element name="ServerValidation" type="ServerValidationParameters" minOccurs="0"/>
    <!--This is obsolete, instead use IdentityPrivacy tag defined in the PeapExtensions tag.-->
      <xs:element name="IdentityPrivacy" type="IdentityPrivacyParameters"
minOccurs="0"/>
    <xs:element name="FastReconnect" type="xs:boolean" minOccurs="0"/>
    <xs:element name="InnerEapOptional" type="xs:boolean" minOccurs="0"/>
    <xs:element ref="baseEap:Eap" minOccurs="0" maxOccurs="unbounded"/>
    <xs:element name="EnableQuarantineChecks" type="xs:boolean" default="false" minOccurs="0"/>
    <xs:element name="RequireCryptoBinding" type="xs:boolean" default="false" minOccurs="0"/>
    <xs:element name="PeapExtensions" type="PeapExtensionsType" minOccurs="0"/>
  </xs:sequence>
</xs:extension>
</xs:complexContent>
</xs:complexType>
</xs:element>
<xs:complexType name="ServerValidationParameters">
  <xs:sequence>
    <xs:element name="DisableUserPromptForServerValidation" type="xs:boolean" minOccurs="0"/>
    <!-- A set of server names delimited by semicolons -->
    <!-- each server name can be represented by regular -->
    <!-- expressions -->
    <!-- If this tag exist and value inside this tag also exists then AcceptServerName's value is
TRUE or else it is FALSE-->
    <xs:element name="ServerNames" minOccurs="0">
      <xs:complexType>
        <xs:simpleContent>
          <xs:extension base="xs:string">
            <!--This is obsolete, instead use AcceptServerName tag defined in the PeapExtensions tag.-->
            <xs:attribute name="AcceptServerName" type="xs:boolean" use="optional"/>
          </xs:extension>
        </xs:simpleContent>
      </xs:complexType>
    </xs:element>
    <!-- The thumbprint of a trusted root CA is -->
    <!-- a hexadecimal string that contains -->
    <!-- the SHA-1 hash of the certificate. -->
    <xs:element name="TrustedRootCA" type="xs:hexBinary" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>
  <!--This is obsolete, instead use PerformServerValidation tag defined in the PeapExtensions
tag.-->
  <xs:attribute name="PerformServerValidation" type="xs:boolean" use="optional"
default="true"/>
</xs:complexType>
<xs:complexType name="IdentityPrivacyParameters">
  <xs:sequence>
    <xs:element name="EnableIdentityPrivacy" type="xs:boolean" minOccurs="0"/>
    <!-- Identity privacy username -->
    <xs:element name="AnonymousUserName" type="xs:string" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="PeapExtensionsType">
  <xs:sequence>
    <xs:element ref="extendedPeap:PerformServerValidation" minOccurs="0"/>
    <xs:element ref="extendedPeap:AcceptServerName" minOccurs="0"/>
    <xs:element ref="extendedPeap:IdentityPrivacy" minOccurs="0"/>
    <xs:element ref="extendedPeap:PeapExtensionsV2" minOccurs="0"/>
  </xs:sequence>

```

```
</xs:complexType>
</xs:schema>
```

6.9.2 MsPeapConnectionPropertiesV2 Schema

The following defines the XML schema for specifying configuration settings for the Microsoft EAP implementation of the PEAP method.

```
<?xml version="1.0" ?>
<xs:schema
  targetNamespace="http://www.microsoft.com/provisioning/MsPeapConnectionPropertiesV2"
  elementFormDefault="qualified"
  xmlns="http://www.microsoft.com/provisioning/MsPeapConnectionPropertiesV2"
  xmlns:xs="http://www.w3.org/2001/XMLSchema"
  version="1.0"
>
  <xs:element name="PeapExtensionsV2" type="PeapExtensionsTypeV2"/>
  <xs:element name="PerformServerValidation" type="xs:boolean" />
  <xs:element name="AcceptServerName" type="xs:boolean" />
  <xs:element
    name="IdentityPrivacy"
    type="IdentityPrivacyParameters"
  />
  <xs:complexType name="IdentityPrivacyParameters">
    <xs:sequence>
      <xs:element name="EnableIdentityPrivacy" type="xs:boolean" minOccurs="0" />
      <!-- Identity privacy username -->
      <xs:element name="AnonymousUserName" type="xs:string" minOccurs="0" />
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="PeapExtensionsTypeV2">
    <xs:sequence>
      <xs:any processContents="lax" minOccurs="0" maxOccurs="unbounded"
        namespace="##other" />
    </xs:sequence>
  </xs:complexType>
</xs:schema>
```

6.10 Active Directory Schema for Class ms-net-ieee-80211-GroupPolicy

```
# -----
#   define schemas for these attributes:
#ms-net-ieee-80211-GP-PolicyGUID
#ms-net-ieee-80211-GP-PolicyData
#ms-net-ieee-80211-GP-PolicyReserved
# -----

dn: CN=ms-net-ieee-80211-GP-PolicyGUID,CN=Schema,CN=Configuration,DC=X
changetype: ntdsSchemaAdd
objectClass: attributeSchema
ldapDisplayName: ms-net-ieee-80211-GP-PolicyGUID
adminDisplayName: ms-net-ieee-80211-GP-PolicyGUID
adminDescription: This attribute contains a GUID which identifies a specific 802.11 group
policy object on the domain.
attributeId: 1.2.840.113556.1.4.1951
```

```

attributeSyntax: 2.5.5.12
omSyntax: 64
isSingleValued: TRUE
systemOnly: FALSE
searchFlags: 0
rangeUpper: 64
schemaIdGuid:: YnBpNa8ei0SsHjiOC+T97g==
showInAdvancedViewOnly: TRUE
systemFlags: 16

dn: CN=ms-net-ieee-80211-GP-PolicyData,CN=Schema,CN=Configuration,DC=X
changetype: ntdsSchemaAdd
objectClass: attributeSchema
ldapDisplayName: ms-net-ieee-80211-GP-PolicyData
adminDisplayName: ms-net-ieee-80211-GP-PolicyData
adminDescription: This attribute contains all of the settings and data which comprise a group
policy configuration for 802.11 wireless networks.
attributeId: 1.2.840.113556.1.4.1952
attributeSyntax: 2.5.5.12
omSyntax: 64
isSingleValued: TRUE
systemOnly: FALSE
searchFlags: 0
rangeUpper: 4194304
schemaIdGuid:: pZUUnHZNjkaZHhQzsKZ4VQ==
showInAdvancedViewOnly: TRUE
systemFlags: 16

dn: CN=ms-net-ieee-80211-GP-PolicyReserved,CN=Schema,CN=Configuration,DC=X
changetype: ntdsSchemaAdd
objectClass: attributeSchema
ldapDisplayName: ms-net-ieee-80211-GP-PolicyReserved
adminDisplayName: ms-net-ieee-80211-GP-PolicyReserved
adminDescription: Reserved for future use
attributeId: 1.2.840.113556.1.4.1953
attributeSyntax: 2.5.5.10
omSyntax: 4
isSingleValued: TRUE
systemOnly: FALSE
searchFlags: 0
rangeUpper: 4194304
schemaIdGuid:: LsZpD44I9U+lOukjzsB8Cg==
showInAdvancedViewOnly: TRUE
systemFlags: 16

# -----
# Reload the schema cache to pick up altered classes and attributes
# -----
dn:
changetype: ntdsSchemaModify
add: schemaUpdateNow
schemaUpdateNow: 1
-

# -----
# define schemas for the parent class:
#ms-net-ieee-80211-GroupPolicy
# -----

```

```

dn: CN=ms-net-ieee-80211-GroupPolicy,CN=Schema,CN=Configuration,DC=X
changetype: ntdsSchemaAdd
objectClass: classSchema
ldapDisplayName: ms-net-ieee-80211-GroupPolicy
adminDisplayName: ms-net-ieee-80211-GroupPolicy
adminDescription: This class represents an 802.11 wireless network group policy object. This
class contains identifiers and configuration data relevant to an 802.11 wireless network.
governsId: 1.2.840.113556.1.5.251
objectClassCategory: 1
rdnAttId: 2.5.4.3
subClassOf: 2.5.6.0
systemMayContain: 1.2.840.113556.1.4.1953
systemMayContain: 1.2.840.113556.1.4.1952
systemMayContain: 1.2.840.113556.1.4.1951
systemPossSuperiors: 1.2.840.113556.1.3.30
systemPossSuperiors: 1.2.840.113556.1.3.23
systemPossSuperiors: 2.5.6.6
schemaIdGuid:: Yxi4HCK4eUOeol/3vcY4bQ==
defaultSecurityDescriptor:
D: (A;;RPWPCRCCDCLCLORCWOWSDSDTWSW;;;DA) (A;;RPWPCRCCDCLCLORCWOWSDSDTWSW;;;SY) (A;;RPLCLORC;;;AU)
showInAdvancedViewOnly: TRUE
defaultHidingValue: TRUE
systemOnly: FALSE
defaultObjectCategory: CN=ms-net-ieee-80211-GroupPolicy,CN=Schema,CN=Configuration,DC=X
systemFlags: 16

# -----
#   Reload the schema cache to pick up altered classes and attributes
# -----
dn:
changetype: ntdsSchemaModify
add: schemaUpdateNow
schemaUpdateNow: 1

```

6.11 Active Directory Schema for Class ms-net-ieee-8023-GroupPolicy

```

# -----
#   define schemas for these attributes:
#ms-net-ieee-8023-GP-PolicyGUID
#ms-net-ieee-8023-GP-PolicyData
#ms-net-ieee-8023-GP-PolicyReserved
# -----

dn: CN=ms-net-ieee-8023-GP-PolicyGUID,CN=Schema,CN=Configuration,DC=X
changetype: ntdsSchemaAdd
objectClass: attributeSchema
ldapDisplayName: ms-net-ieee-8023-GP-PolicyGUID
adminDisplayName: ms-net-ieee-8023-GP-PolicyGUID
adminDescription: This attribute contains a GUID which identifies a specific 802.3 group
policy object on the domain.
attributeId: 1.2.840.113556.1.4.1954
attributeSyntax: 2.5.5.12
omSyntax: 64
isSingleValued: TRUE
systemOnly: FALSE
searchFlags: 0
rangeUpper: 64
schemaIdGuid:: WrCn1LK4WU+cJTnmm6oWhA==

```

```

showInAdvancedViewOnly: TRUE
systemFlags: 16

dn: CN=ms-net-ieee-8023-GP-PolicyData,CN=Schema,CN=Configuration,DC=X
changetype: ntdsSchemaAdd
objectClass: attributeSchema
ldapDisplayName: ms-net-ieee-8023-GP-PolicyData
adminDisplayName: ms-net-ieee-8023-GP-PolicyData
adminDescription: This attribute contains all of the settings and data which comprise a group
policy configuration for 802.3 wired networks.
attributeId: 1.2.840.113556.1.4.1955
attributeSyntax: 2.5.5.12
omSyntax: 64
isSingleValued: TRUE
systemOnly: FALSE
searchFlags: 0
rangeUpper: 1048576
schemaIdGuid:: i5SYg1d0kU29TY1+lmnJ9w==
showInAdvancedViewOnly: TRUE
systemFlags: 16

dn: CN=ms-net-ieee-8023-GP-PolicyReserved,CN=Schema,CN=Configuration,DC=X
changetype: ntdsSchemaAdd
objectClass: attributeSchema
ldapDisplayName: ms-net-ieee-8023-GP-PolicyReserved
adminDisplayName: ms-net-ieee-8023-GP-PolicyReserved
adminDescription: Reserved for future use
attributeId: 1.2.840.113556.1.4.1956
attributeSyntax: 2.5.5.10
omSyntax: 4
isSingleValued: TRUE
systemOnly: FALSE
searchFlags: 0
rangeUpper: 1048576
schemaIdGuid:: xyfF0wYm602M/RhCb+7Izg==
showInAdvancedViewOnly: TRUE
systemFlags: 16

# -----
#   Reload the schema cache to pick up altered classes and attributes
# -----
dn:
changetype: ntdsSchemaModify
add: schemaUpdateNow
schemaUpdateNow: 1
-

# -----
#   define schemas for the parent class:
#ms-net-ieee-8023-GroupPolicy
# -----

dn: CN=ms-net-ieee-8023-GroupPolicy,CN=Schema,CN=Configuration,DC=X
changetype: ntdsSchemaAdd
objectClass: classSchema
ldapDisplayName: ms-net-ieee-8023-GroupPolicy
adminDisplayName: ms-net-ieee-8023-GroupPolicy
adminDescription: This class represents an 802.3 wired network group policy object. This
class contains identifiers and configuration data relevant to an 802.3 wired network.

```

```
governsId: 1.2.840.113556.1.5.252
objectClassCategory: 1
rdnAttId: 2.5.4.3
subClassOf: 2.5.6.0
systemMayContain: 1.2.840.113556.1.4.1956
systemMayContain: 1.2.840.113556.1.4.1955
systemMayContain: 1.2.840.113556.1.4.1954
systemPossSuperiors: 1.2.840.113556.1.3.30
systemPossSuperiors: 1.2.840.113556.1.3.23
systemPossSuperiors: 2.5.6.6
schemaIdGuid:: ajqgmRmrRkSTUay4e00tmw==
defaultSecurityDescriptor:
D: (A;;;RPWPCRCCDCLCLORCWOWSDDTSW;;;DA) (A;;;RPWPCRCCDCLCLORCWOWSDDTSW;;;SY) (A;;;RPLCLORC;;;AU)
showInAdvancedViewOnly: TRUE
defaultHidingValue: TRUE
systemOnly: FALSE
defaultObjectCategory: CN=ms-net-ieee-8023-GroupPolicy,CN=Schema,CN=Configuration,DC=X
systemFlags: 16

# -----
#   Reload the schema cache to pick up altered classes and attributes
# -----
dn:
changetype: ntdsSchemaModify
add: schemaUpdateNow
schemaUpdateNow: 1
-
```

7 Appendix B: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include released service packs:

- Windows® XP operating system Service Pack 1 (SP1)
- Windows Server® 2003 operating system
- Windows Vista® operating system
- Windows Server® 2008 operating system
- Windows® 7 operating system
- Windows Server® 2008 R2 operating system

Exceptions, if any, are noted below. If a service pack or Quick Fix Engineering (QFE) number appears with the product version, behavior changed in that service pack or QFE. The new behavior also applies to subsequent service packs of the product unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms SHOULD or SHOULD NOT implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies that the product does not follow the prescription.

[<1> Section 2.2.1.1.1:](#) If **MajorVersion** is 1, sub-BLOB is interpretable by the client-side plug-in on the following operating systems: Windows XP SP1, Windows XP SP2, Windows XP SP3, Windows Server 2003, Windows Vista, Windows Server 2008, Windows 7, and Windows Server 2008 R2.

If **MajorVersion** is 2, sub-BLOB is interpretable by the client-side plug-in on the following operating systems: Windows XP SP2, Windows XP SP3, Windows Server 2003, Windows Vista, Windows Server 2008, Windows 7, and Windows Server 2008 R2.

If **MajorVersion** is 3, sub-BLOB is interpretable by the client-side plug-in on the following operating systems: Windows XP SP3, Windows Server 2003, Windows Vista, Windows Server 2008, Windows 7, and Windows Server 2008 R2.

[<2> Section 2.2.1.1.2:](#) The client side plug-in on the following systems ignores this setting: Windows Vista, Windows Server 2008, Windows 7, and Windows Server 2008 R2.

The client-side plug-in checks for changes at this interval in addition to the polling mechanism used by the Group Policy framework on the following operating systems: Windows XP SP1, Windows XP SP2, Windows XP SP3, Windows Server 2003, and Windows Server 2003 with SP1.

[<3> Section 2.2.1.1.2:](#) The client-side plug-in on the following operating systems ignore this field: Windows XP SP1, Windows Vista, Windows Server 2008, Windows 7, and Windows Server 2008 R2.

[<4> Section 2.2.1.2:](#) The applicable operating system for the enableSoftAp flag are Windows 7 and Windows Server 2008 R2.

[<5> Section 2.2.1.2:](#) The applicable operating system for the enableExplicitCreds flag are Windows 7 and Windows Server 2008 R2.

[<6> Section 2.2.1.2:](#) The applicable operating system for the blockPeriod flag are Windows 7 and Windows Server 2008 R2. In the absence of this setting, the operating system may have a default block timeout period.

Most authentication failures (such as failures due to identity issues, UI display issues, or explicit EAP failures) are treated as long-term, and the block timeout period is 20 minutes. If authentication fails due to a lack of response from the IEEE 802.1X authenticator, the block timeout period is 1 minute. Some authentication failures (such as a timeout during an ongoing IEEE 802.1X exchange) result in no blocking period.

[<7> Section 2.2.1.2.1:](#) The administrative-side plug-in does not support creation/deletion/modification of XML-based wireless Group Policy on the following operating systems: Windows Server 2003, Windows Server 2003 with SP1, and Windows Server 2003 SP2.

The client-side plug-in does not support XML-based Wireless Group Policy on the following operating systems: Windows XP SP1, Windows XP SP2, Windows XP SP3, Windows Server 2003, Windows Server 2003 with SP1, and Windows Server 2003 SP2.

[<8> Section 2.2.2:](#) The applicable operating system for the blockPeriod flag are Windows 7 and Windows Server 2008 R2. In the absence of this setting, the operating system may have a default block timeout period.

Most authentication failures (such as failures due to identity issues, UI display issues, or explicit EAP failures) are treated as long-term, and the block timeout period is 20 minutes. If authentication fails due to a lack of response from the IEEE 802.1X authenticator, the block timeout period is 1 minute. Some authentication failures (such as a timeout during an ongoing IEEE 802.1X exchange) result in no blocking period.

[<9> Section 2.2.2:](#) The applicable operating systems for the enableExplicitCreds flag are Windows 7 and Windows Server 2008 R2.

[<10> Section 2.2.2.1:](#) The administrative-side plug-in supports creation/deletion/modification of XML-based wired Group Policy on the following operating systems: Windows Server 2008 and Windows Server 2008 R2.

The client-side plug-in supports XML-based wired Group Policy on the following operating Systems: Windows Vista, Windows Server 2008, Windows 7, and Windows Server 2008 R2.

[<11> Section 2.2.3.1.1:](#) The applicable operating systems for the EapTlsDisablePromptValidation flag are Windows Vista, Windows Vista SP1, and Windows Server 2008.

[<12> Section 2.2.3.1.1:](#) The client-side plug-in does not support regular expressions in serverName on the following operating systems: Windows XP SP1.

[<13> Section 2.2.3.1.2:](#) The client-side plug-in supports a NumberOfEapTypes value of 0 in following operating systems: Windows XP SP2 and Windows Server 2003 SP2.

The client-side plug-in supports a NumberOfEapTypes value of 1 in the following operating systems: Windows XP SP3, Windows Vista, Windows Vista SP1, and Windows Server 2008.

[<14> Section 2.2.3.1.2:](#) The client-side plug-in only supports PeapInnerEAPOptional in the following operating systems: Windows XP SP2 and Windows Server 2003 SP2. In all other versions of Windows that support this protocol, the value is ignored.

[<15> Section 2.2.3.1.2:](#) The client-side plug-in supports PeapEnforceCryptoBinding on the following operating systems: Windows Vista, Windows Vista SP1 and Windows Server 2008. In all other versions of Windows that support this protocol, this value is ignored.

[<16> Section 2.2.3.1.2:](#) The client-side plug-in supports PeapEnableQuarantine on the following operating systems: Windows Vista, Windows Vista SP1, and Windows Server 2008. In all other versions of Windows that support this protocol, this value is ignored.

[<17> Section 2.2.3.1.2:](#) The client-side plug-in supports PeapEnableIdentityPrivacy only on Windows 7 and Windows Server 2008 R2. In all the other versions that support this protocol, this value is ignored.

[<18> Section 2.2.3.1.2:](#) The client-side plug-in supports IdentityPrivacyString only on Windows 7 and Windows Server 2008 R2. In all the other versions that support this protocol, this value is ignored.

[<19> Section 2.2.3.1.2.1:](#) The client-side plug-in supports PeapTlsPhase1DisablePromptValidation on the following operating systems: Windows XP SP1, Windows XP SP2, Windows XP SP3, Windows Server 2003 with SP1, Windows Vista and Windows Server 2008. In all other versions of Windows that support this protocol, this value is ignored.

[<20> Section 2.2.3.1.2.1:](#) The client-side plug-in does not support regular expressions in following operating system: Windows XP SP1.

[<21> Section 2.2.3.2.5:](#) The client-side plug-in supports EapTlsConnectionPropertiesV2 only on Windows 7 and Windows Server 2008 R2. In all the other Windows versions that support this protocol, this value is ignored.

[<22> Section 2.2.3.2.6:](#) The client-side plug-in supports IdentityPrivacy, as an element of MsPeapConnectionProperties, only on Windows 7 and Windows Server 2008 R2. In all the other Windows versions that support this protocol, this value is not allowed.

[<23> Section 2.2.3.2.6:](#) The client-side plug-in supports MsPeapConnectionPropertiesV2 only on Windows 7 and Windows Server 2008 R2. In all the other Windows versions that support this protocol, this value is ignored.

[<24> Section 2.2.3.2.8:](#) The client-side plug-in supports PerformServerValidation only on Windows 7 and Windows Server 2008 R2. In all the other Windows versions that support this protocol, this value is not allowed.

[<25> Section 2.2.3.2.8:](#) The client-side plug-in supports AcceptServerName only on Windows 7 and Windows Server 2008 R2. In all the other Windows versions that support this protocol, this value is not allowed.

[<26> Section 3.1.3:](#) The administrative-side plug-in does not support creation, deletion, or modification of XML-based wireless Group Policy on the following operating systems: Windows Server 2003, Windows Server 2003 with SP1, and Windows Server 2003 SP2.

[<27> Section 3.1.5.1:](#) Time-out period is set to 2 minutes in Windows implementations.

[<28> Section 3.2.3:](#) The client-side plug-in does not support processing of XML-based wireless Group Policy on the following operating systems: Windows XP SP1, Windows XP SP2, Windows XP SP3, Windows Server 2003, Windows Server 2003 with SP1, and Windows Server 2003 SP2.

8 Change Tracking

This section identifies changes that were made to the [MS-GPWL] protocol document between the January 2011 and February 2011 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

The revision class **New** means that a new document is being released.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

- A document revision that incorporates changes to interoperability requirements or functionality.
- An extensive rewrite, addition, or deletion of major portions of content.
- The removal of a document from the documentation set.
- Changes made for template compliance.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **Editorial** means that the language and formatting in the technical content was changed. Editorial changes apply to grammatical, formatting, and style issues.

The revision class **No change** means that no new technical or language changes were introduced. The technical content of the document is identical to the last released version, but minor editorial and formatting changes, as well as updates to the header and footer information, and to the revision summary, may have been made.

Major and minor changes can be described further using the following change types:

- New content added.
- Content updated.
- Content removed.
- New product behavior note added.
- Product behavior note updated.
- Product behavior note removed.
- New protocol syntax added.
- Protocol syntax updated.
- Protocol syntax removed.
- New content added due to protocol revision.
- Content updated due to protocol revision.
- Content removed due to protocol revision.
- New protocol syntax added due to protocol revision.

- Protocol syntax updated due to protocol revision.
- Protocol syntax removed due to protocol revision.
- New content added for template compliance.
- Content updated for template compliance.
- Content removed for template compliance.
- Obsolete document removed.

Editorial changes are always classified with the change type **Editorially updated**.

Some important terms used in the change type descriptions are defined as follows:

- **Protocol syntax** refers to data elements (such as packets, structures, enumerations, and methods) as well as interfaces.
- **Protocol revision** refers to changes made to a protocol that affect the bits that are sent over the wire.

The changes made to this document are listed in the following table. For more information, please contact protocol@microsoft.com.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
1.1 Glossary	59216 Added the [MS-GPOL] term "directory string".	Y	Content updated.
1.2.1 Normative References	60078 Added reference to [MS-ADSO].	Y	Content updated.
1.2.2 Informative References	60078 Added reference to [MS-ADSO].	Y	Content updated.
3.1.1.1 ADConnection Handle	60078 Added section.	Y	New content added.
3.1.3 Initialization	60078 Specified that the administrative-side plug-in invokes the "Initialize an ADConnection" task.	Y	Content updated.
3.1.3 Initialization	60078 Updated the reference to [MS-ADSO].	Y	Content updated.
3.1.5.1 Reading a Wireless or Wired Policy Object from Active Directory	59324 Specified that the Kerberos credentials are in Unicode form.	Y	Content updated.
3.1.5.1 Reading a Wireless or Wired Policy Object from Active Directory	Changed "UnBindRequest" to "UnbindRequest" and specified the ADConnection handle will be reused.	Y	Content updated.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
3.1.5.2 Creating a Wireless or Wired Policy Object on Active Directory	59216 Replaced "UnicodeString" with "directory string".	Y	Content updated.
3.1.5.2 Creating a Wireless or Wired Policy Object on Active Directory	60920 Updated the processing rules regarding cases where the resultCode field of the addResponse message is non-zero.	Y	Content updated.
3.1.5.3 Modifying a Wireless or Wired Policy Object on Active Directory	60919 Specified the processing rules regarding the modifyResponse message.	Y	Content updated.
3.1.5.4 Deleting a Wireless or Wired Policy Object on Active Directory	60921 Specified the processing rules regarding the delResponse message.	Y	Content updated.
3.1.5.4 Deleting a Wireless or Wired Policy Object on Active Directory	Changed "UnBindRequest" to "UnbindRequest".	Y	Content updated.
3.2.1 Abstract Data Model	61895 Specified that the plug-ins receive a Filtered GPO List of the available Wireless/Wired Group Policy objects.	Y	Content updated.
3.2.4 Higher-Layer Triggered Events	61895 Added the statement regarding the initialization of the Filtered GPO List.	Y	Content updated.
3.2.4 Higher-Layer Triggered Events	59829 Updated the description regarding the abstract event interface implementation, and added the accepted parameters list.	Y	Content updated.
3.2.5 Message Processing Events and Sequencing Rules	61895 Updated the statement regarding the selection of a scoped GPO path from the Filtered GPO List.	Y	Content updated.
3.2.5 Message Processing Events and Sequencing Rules	59829 Updated the processing rules for cases regarding the notification and selection of the scoped GPO.	Y	Content updated.
3.2.5.1 Retrieving BLOB-Based Wireless Group Policy for a GPO	59829 Updated that the wireless Group Policy Protocol plug-in gets a scoped GPO path (Scoped GPO DN) from the Group Policy protocol client.	Y	Content updated.
3.2.5.2 Retrieving XML-Based Wireless Group Policy for a	59829 Updated that the wireless Group Policy Protocol plug-in gets a scoped GPO path (Scoped GPO	Y	Content updated.

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
GPO	DN) from the Group Policy protocol client.		
3.2.5.3 Retrieving XML-Based Wired Group Policy for a GPO	59829 Updated that the wired Group Policy Protocol plug-in gets a scoped GPO path (Scoped GPO DN) from the Group Policy protocol client.	Y	Content updated.

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