APPENDIX C

Configuring an External Server for Authorization and Authentication

This appendix describes how to configure an external LDAP, RADIUS, or TACACS+ server to support AAA on the adaptive security appliance. Before you configure the adaptive security appliance to use an external server, you must configure the server with the correct adaptive security appliance authorization attributes and, from a subset of these attributes, assign specific permissions to individual users.

This appendix includes the following sections:

Understanding Policy Enforcement of Permissions and Attributes

The adaptive security appliance supports several methods of applying user authorization attributes (also called user entitlements or permissions) to VPN connections. You can configure the adaptive security appliance to obtain user attributes from a Dynamic Access Policy (DAP) on the adaptive security appliance, from an external authentication and/or authorization AAA server (RADIUS or LDAP), from a group policy on the security appliance, or from all three.

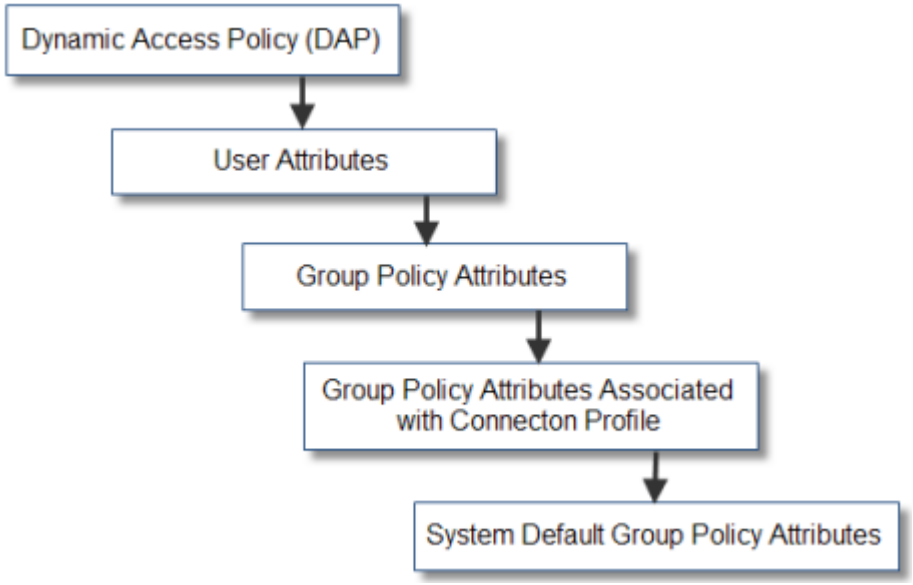
If the security appliance receives attributes from all sources, the attributes are evaluated, merged, and applied to the user policy. If there are conflicts between attributes coming from the DAP, the AAA server, or the group policy, those attributes obtained from the DAP always take precedence.

The security appliance applies attributes in the following order (also illustrated in Figure C-1:

1. DAP attributes on the adaptive security appliance—Introduced in Version 8.0, take precedence over all others. If you set a bookmark/URL list in DAP, it overrides a bookmark/URL list set in the group policy.
2. User attributes on the AAA server—The server returns these after successful user authentication and/or authorization. Do not confuse these with attributes that are set for individual users in the local AAA database on the adaptive security appliance (User Accounts in ASDM).
3. Group policy configured on the adaptive security appliance—If a RADIUS server returns the value of the RADIUS CLASS attribute IETF-Class-25 (OU=<group-policy>) for the user, the adaptive security appliance places the user in the group policy of the same name and enforces any attributes in the group policy that are not returned by the server.

   For LDAP servers, any attribute name can be used to set the group policy for the session. The LDAP attribute map you configure on the adaptive security appliance maps the LDAP attribute to the Cisco attribute IETF-Radius-Class.
4. Group policy assigned by the Connection Profile (called tunnel-group in CLI)—The Connection Profile has the preliminary settings for the connection, and includes a default group policy applied to the user before authentication. All users connecting to the adaptive security appliance initially belong to this group which provides any attributes that are missing from the DAP, user attributes returned by the server, or the group policy assigned to the user.
5. Default group policy assigned by the adaptive security appliance (DfltGrpPolicy)—System default attributes provide any values that are missing from the DAP, user attributes, group policy, or connection profile.

Figure C-1 Policy Enforcement Flow



Configuring an External LDAP Server

The VPN 3000 Concentrator and the ASA/PIX 7.0 required a Cisco LDAP schema for authorization operations. Beginning with Version 7.1.x, the adaptive security appliance performs authentication *and* authorization, using the native LDAP schema, and the Cisco schema is no longer needed.

You configure authorization (permission policy) using an LDAP attribute map. For examples, see Active Directory/LDAP VPN Remote Access Authorization Use Cases, page C-16.

This section describes the structure, schema, and attributes of an LDAP server. It includes the following topics:

- Organizing the Security Appliance for LDAP Operations, page C-3
- Defining the Security Appliance LDAP Configuration, page C-6
- Active Directory/LDAP VPN Remote Access Authorization Use Cases, page C-16

The specific steps of these processes vary, depending on which type of LDAP server you are using.

Note For more information on the LDAP protocol, see RFCs 1777, 2251, and 2849.

Organizing the Security Appliance for LDAP Operations

This section describes how to perform searches within the LDAP hierarchy and authenticated binding to the LDAP server on the adaptive security appliance. It includes the following topics:

- Searching the Hierarchy, page C-4
- Binding the Security Appliance to the LDAP Server, page C-5
- Login DN Example for Active Directory, page C-5

Your LDAP configuration should reflect the logical hierarchy of your organization. For example, suppose an employee at your company, Example Corporation, is named Terry. Terry works in the Engineering group. Your LDAP hierarchy could have one or many levels. You might decide to set up a shallow, single-level hierarchy in which Terry is considered a member of Example Corporation. Or, you could set up a multi-level hierarchy in which Terry is considered to be a member of the department Engineering, which is a member of an organizational unit called People, which is itself a member of Example Corporation. See Figure C-2 for an example of this multi-level hierarchy.

A multi-level hierarchy has more granularity, but a single level hierarchy is quicker to search.

Figure C-2 A Multi-Level LDAP Hierarchy

Searching the Hierarchy

The adaptive security appliance lets you tailor the search within the LDAP hierarchy. You configure the following three fields on the adaptive security appliance to define where in the LDAP hierarchy your search begins, the extent, and the type of information it is looking for. Together these fields allow you to limit the search of the hierarchy to only the part of the tree that contains the user permissions.

- LDAP Base DN defines where in the LDAP hierarchy the server should begin searching for user information when it receives an authorization request from the adaptive security appliance.
- Search Scope defines the extent of the search in the LDAP hierarchy. The search proceeds this many levels in the hierarchy below the LDAP Base DN. You can choose to have the server search only the level immediately below, or it can search the entire subtree. A single level search is quicker, but a subtree search is more extensive.
- Naming Attribute(s) defines the RDN that uniquely identifies an entry in the LDAP server. Common naming attributes can include cn (Common Name), sAMAccountName, and userPrincipalName.

Figure C-2 shows a possible LDAP hierarchy for Example Corporation. Given this hierarchy, you could define your search in different ways. Table C-1 shows two possible search configurations.

In the first example configuration, when Terry establishes the IPSec tunnel with LDAP authorization required, the adaptive security appliance sends a search request to the LDAP server indicating it should search for Terry in the Engineering group. This search is quick.

In the second example configuration, the adaptive security appliance sends a search request indicating the server should search for Terry within Example Corporation. This search takes longer.

Table C-1 Example Search Configurations

#	LDAP Base DN	Search Scope	Naming Attribute	Result
1	group= Engineering,ou=People,dc=ExampleCorporation, dc=com	One Level	cn=Terry	Quicker search
2	dc=ExampleCorporation,dc=com	Subtree	cn=Terry	Longer search

Binding the Security Appliance to the LDAP Server

Some LDAP servers (including the Microsoft Active Directory server) require the adaptive security appliance to establish a handshake via authenticated binding before they accept requests for any other LDAP operations. The adaptive security appliance uses the Login Distinguished Name (DN) and Login Password to establish trust (bind) with an LDAP server. The Login DN represents a user record in the LDAP server that the administrator uses for binding.

When binding, the adaptive security appliance authenticates to the server using the Login DN and the Login Password. When performing a Microsoft Active Directory read-only operation (such as for authentication, authorization, or group-search), the security appliance can bind with a Login DN with less privileges. For example, the Login DN can be a user whose AD "Member Of" designation is part of Domain Users. For VPN password management operations, the Login DN needs elevated privileges and must be part of the Account Operators AD group.

An example of a Login DN includes:

cn=Binduser1,ou=Admins,ou=Users,dc=company_A,dc=com

The security appliance supports:

- Simple LDAP authentication with an unencrypted password on port 389
- Secure LDAP (LDAP-S) on port 636
- Simple Authentication and Security Layer (SASL) MD5
- SASL Kerberos.

The security appliance does not support anonymous authentication.

Note As an LDAP client, the adaptive security appliance does not support sending anonymous binds or requests.

Login DN Example for Active Directory

The Login DN is a username on the LDAP server that the adaptive security appliance uses to establish a trust between itself (the LDAP client) and the LDAP server during the Bind exchange, before a user search can take place.

For VPN authentication/authorization operations, and beginning with version 8.0.4 for retrieval of AD Groups, (which are read operations only when password-management changes are not required), the you can use the Login DN with fewer privileges. For example, the Login DN can be a user who is a memberOf the Domain Users group.

For VPN password-management changes, the Login DN must have Account Operators privileges.

In either of these cases, Super-user level privileges are not required for the Login/Bind DN. Refer to your LDAP Administrator guide for specific Login DN requirements.

Defining the Security Appliance LDAP Configuration

This section describes how to define the LDAP AV-pair attribute syntax. It includes the following topics:

Note The adaptive security appliance enforces the LDAP attributes based on attribute name, not numeric ID. RADIUS attributes, on the other hand, are enforced by numeric ID, not by name.

Authorization refers to the process of enforcing permissions or attributes. An LDAP server defined as an authentication or authorization server will enforce permissions or attributes if they are configured.

For software Version 7.0, LDAP attributes include the cVPN3000 prefix. For Version 7.1 and later, this prefix was removed.

Supported Cisco Attributes for LDAP Authorization

This section provides a complete list of attributes (Table C-2) for the ASA 5500, VPN 3000, and PIX 500 series adaptive security appliances. The table includes attribute support information for the VPN 3000 and PIX 500 series to assist you configure networks with a mixture of these adaptive security appliances.

Table C-2 Security Appliance Supported Cisco Attributes for LDAP Authorization

Attribute Name/	VPN 3000	ASA	PIX	Syntax/ Type	Single or Multi-Valued	Possible Values
Access-Hours	Y	Y	Y	String	Single	Name of the time-range (for example, Business-Hours)
Allow-Network-Extension- Mode	Y	Y	Y	Boolean	Single	0 = Disabled 1 = Enabled
Authenticated-User-Idle- Timeout	Y	Y	Y	Integer	Single	1 - 35791394 minutes
Authorization-Required	Y			Integer	Single	0 = No 1 = Yes
Authorization-Type	Y			Integer	Single	0 = None 1 = RADIUS 2 = LDAP
Banner1	Y	Y	Y	String	Single	Banner string for clientless and client SSL VPN, and IPSec clients.
Banner2	Y	Y	Y	String	Single	Banner string for clientless and client SSL VPN, and IPSec clients.

Table C-2 Security Appliance Supported Cisco Attributes for LDAP Authorization (continued)

Attribute Name/	VPN 3000	ASA	PIX	Syntax/ Type	Single or Multi-Valued	Possible Values
Cisco-AV-Pair	Y	Y	Y	String	Multi	An octet string in the following format: [Prefix] [Action] [Protocol] [Source] [Source Wildcard Mask] [Destination] [Destination Wildcard Mask] [Established] [Log] [Operator] [Port] For more information, see "Cisco AV Pair Attribute Syntax."
Cisco-IP-Phone-Bypass	Y	Y	Y	Integer	Single	0 = Disabled 1 = Enabled
Cisco-LEAP-Bypass	Y	Y	Y	Integer	Single	0 = Disabled 1 = Enabled
Client-Intercept-DHCP-Configure-Msg	Y	Y	Y	Boolean	Single	0 = Disabled 1 = Enabled
Client-Type-Version-Limiting	Y	Y	Y	String	Single	IPSec VPN client version number string
Confidence-Interval	Y	Y	Y	Integer	Single	10 - 300 seconds
DHCP-Network-Scope	Y	Y	Y	String	Single	IP address
DN-Field	Y	Y	Y	String	Single	Possible values: UID, OU, O, CN, L, SP, C, EA, T, N, GN, SN, I, GENQ, DNQ, SER, use-entire-name.
Firewall-ACL-In		Y	Y	String	Single	Access list ID
Firewall-ACL-Out		Y	Y	String	Single	Access list ID
Group-Policy		Y	Y	String	Single	Sets the group policy for the remote access VPN session. For version 8.2 and later, use this attribute instead of IETF-Radius-Class. You can use one of the three following formats: • <group policy name> • OU=<group policy name> • OU=<group policy name>;
IE-Proxy-Bypass-Local				Boolean	Single	0=Disabled 1=Enabled
IE-Proxy-Exception-List				String	Single	A list of DNS domains. Entries must be separated by the new line character sequence (\n).

Table C-2 Security Appliance Supported Cisco Attributes for LDAP Authorization (continued)

Attribute Name/	VPN 3000	ASA	PIX	Syntax/ Type	Single or Multi-Valued	Possible Values
IE-Proxy-Method	Y	Y	Y	Integer	Single	1 = Do not modify proxy settings 2 = Do not use proxy 3 = Auto detect 4 = Use adaptive security appliance setting
IE-Proxy-Server	Y	Y	Y	Integer	Single	IP Address
IETF-Radius-Class	Y	Y	Y		Single	Sets the group policy for the remote access VPN session. For version 8.2 and later, we recommend that you use the Group-Policy attribute. You can use one of the three following formats: • <group policy name> • OU=<group policy name> • OU=<group policy name>;
IETF-Radius-Filter-Id	Y	Y	Y	String	Single	access list name that is defined on the adaptive security appliance
IETF-Radius-Framed-IP-Address	Y	Y	Y	String	Single	An IP address
IETF-Radius-Framed-IP-Netmask	Y	Y	Y	String	Single	An IP address mask
IETF-Radius-Idle-Timeout	Y	Y	Y	Integer	Single	seconds
IETF-Radius-Service-Type	Y	Y	Y	Integer	Single	1 = Login 2 = Framed 6 = Administrative 7 = NAS Prompt
IETF-Radius-Session-Timeout	Y	Y	Y	Integer	Single	seconds
IKE-Keep-Alives	Y	Y	Y	Boolean	Single	0 = Disabled 1 = Enabled
IPSec-Allow-Passwd-Store	Y	Y	Y	Boolean	Single	0 = Disabled 1 = Enabled
IPSec-Authentication	Y	Y	Y	Integer	Single	0 = None 1 = RADIUS 2 = LDAP (authorization only) 3 = NT Domain 4 = SDI (RSA) 5 = Internal 6 = RADIUS with Expiry 7 = Kerberos/Active Directory
IPSec-Auth-On-Rekey	Y	Y	Y	Boolean	Single	0 = Disabled 1 = Enabled
IPSec-Backup-Server-List	Y	Y	Y	String	Single	Server Addresses (space delimited)

Table C-2 Security Appliance Supported Cisco Attributes for LDAP Authorization (continued)

Attribute Name/	VPN 3000	ASA	PIX	Syntax/ Type	Single or Multi-Valued	Possible Values
IPSec-Backup-Servers	Y	Y	Y	String	Single	1 = Use Client-Configured list 2 = Disabled and clear client list 3 = Use Backup Server list
IPSec-Client-Firewall-Filter- Name	Y			String	Single	Specifies the name of the filter to be pushed to the client as firewall policy.
IPSec-Client-Firewall-Filter-Optional	Y	Y	Y	Integer	Single	0 = Required 1 = Optional
IPSec-Default-Domain	Y	Y	Y	String	Single	Specifies the single default domain name to send to the client (1 - 255 characters).
IPSec-Extended-Auth-On-Rekey		Y	Y	String	Single	
IPSec-IKE-Peer-ID-Check	Y	Y	Y	Integer	Single	1 = Required 2 = If supported by peer certificate 3 = Do not check
IPSec-IP-Compression	Y	Y	Y	Integer	Single	0 = Disabled 1 = Enabled
IPSec-Mode-Config	Y	Y	Y	Boolean	Single	0 = Disabled 1 = Enabled
IPSec-Over-UDP	Y	Y	Y	Boolean	Single	0 = Disabled 1 = Enabled
IPSec-Over-UDP-Port	Y	Y	Y	Integer	Single	4001 - 49151; default = 10000
IPSec-Required-Client-Firewall-Capability	Y	Y	Y	Integer	Single	0 = None 1 = Policy defined by remote FW Are-You-There (AYT) 2 = Policy pushed CPP 4 = Policy from server
IPSec-Sec-Association	Y			String	Single	Name of the security association
IPSec-Split-DNS-Names	Y	Y	Y	String	Single	Specifies the list of secondary domain names to send to the client (1 - 255 characters).
IPSec-Split-Tunneling-Policy	Y	Y	Y	Integer	Single	0 = Tunnel everything 1 = Split tunneling 2 = Local LAN permitted
IPSec-Split-Tunnel-List	Y	Y	Y	String	Single	Specifies the name of the network or access list that describes the split tunnel inclusion list.
IPSec-Tunnel-Type	Y	Y	Y	Integer	Single	1 = LAN-to-LAN 2 = Remote access
IPSec-User-Group-Lock	Y			Boolean	Single	0 = Disabled 1 = Enabled

Table C-2 Security Appliance Supported Cisco Attributes for LDAP Authorization (continued)

Attribute Name/	VPN 3000	ASA	PIX	Syntax/ Type	Single or Multi-Valued	Possible Values
L2TP-Encryption	Y			Integer	Single	Bitmap: 1 = Encryption required 2 = 40 bit 4 = 128 bits 8 = Stateless-Req 15 = 40/128-Encr/Stateless-Req
L2TP-MPPC-Compression	Y			Integer	Single	0 = Disabled 1 = Enabled
MS-Client-Subnet-Mask	Y	Y	Y	String	Single	An IP address
PFS-Required	Y	Y	Y	Boolean	Single	0 = No 1 = Yes
Port-Forwarding-Name	Y	Y		String	Single	Name string (for example, "Corporate-Apps")
PPTP-Encryption	Y			Integer	Single	Bitmap: 1 = Encryption required 2 = 40 bits 4 = 128 bits 8 = Stateless-Required Example: 15 = 40/128-Encr/Stateless-Req
PPTP-MPPC-Compression	Y			Integer	Single	0 = Disabled 1 = Enabled
Primary-DNS	Y	Y	Y	String	Single	An IP address
Primary-WINS	Y	Y	Y	String	Single	An IP address
Privilege-Level						
Required-Client-Firewall-Vendor-Code	Y	Y	Y	Integer	Single	1 = Cisco Systems (with Cisco Integrated Client) 2 = Zone Labs 3 = NetworkICE 4 = Sygate 5 = Cisco Systems (with Cisco Intrusion Prevention Security Agent)
Required-Client-Firewall-Description	Y	Y	Y	String	Single	String

Table C-2 Security Appliance Supported Cisco Attributes for LDAP Authorization (continued)

Attribute Name/	VPN 3000	ASA	PIX	Syntax/ Type	Single or Multi-Valued	Possible Values
Required-Client-Firewall-Product-Code	Y	Y	Y	Integer	Single	Cisco Systems Products: 1 = Cisco Intrusion Prevention Security Agent or Cisco Integrated Client (CIC) Zone Labs Products: 1 = Zone Alarm 2 = Zone AlarmPro 3 = Zone Labs Integrity NetworkICE Product: 1 = BlackIce Defender/Agent Sygate Products: 1 = Personal Firewall 2 = Personal Firewall Pro 3 = Security Agent
Require-HW-Client-Auth	Y	Y	Y	Boolean	Single	0 = Disabled 1 = Enabled
Require-Individual-User-Auth	Y	Y	Y	Integer	Single	0 = Disabled 1 = Enabled
Secondary-DNS	Y	Y	Y	String	Single	An IP address
Secondary-WINS	Y	Y	Y	String	Single	An IP address
SEP-Card-Assignment				Integer	Single	Not used
Simultaneous-Logins	Y	Y	Y	Integer	Single	0-2147483647
Strip-Realm	Y	Y	Y	Boolean	Single	0 = Disabled 1 = Enabled
TACACS-Authtype	Y	Y	Y	Interger	Single	
TACACS-Privilege-Level	Y	Y	Y	Interger	Single	
Tunnel-Group-Lock		Y	Y	String	Single	Name of the tunnel group or “none”
Tunneling-Protocols	Y	Y	Y	Integer	Single	1 = PPTP 2 = L2TP 4 = IPSec 8 = L2TP/IPSec 16 = WebVPN 32 = SVC 8 and 4 are mutually exclusive (0 - 11, 16 - 27, 32 - 43, 48 - 59 are legal values).
Use-Client-Address	Y			Boolean	Single	0 = Disabled 1 = Enabled
User-Auth-Server-Name	Y			String	Single	IP address or hostname
User-Auth-Server-Port	Y			Integer	Single	Port number for server protocol

Table C-2 Security Appliance Supported Cisco Attributes for LDAP Authorization (continued)

Attribute Name/	VPN 3000	ASA	PIX	Syntax/ Type	Single or Multi-Valued	Possible Values
User-Auth-Server-Secret	Y			String	Single	Server password
WebVPN-ACL-Filters		Y		String	Single	Webtype Access-List name
WebVPN-Apply-ACL-Enable	Y	Y		Integer	Single	0 = Disabled 1 = Enabled With version 8.0 and later, this attribute is not required.
WebVPN-Citrix-Support-Enable	Y	Y		Integer	Single	0 = Disabled 1 = Enabled With version 8.0 and later, this attribute is not required.
WebVPN-Enable-functions				Integer	Single	Not used - deprecated
WebVPN-Exchange-Server-Address				String	Single	Not used - deprecated
WebVPN-Exchange-Server-NETBIOS-Name				String	Single	Not used - deprecated
WebVPN-File-Access-Enable	Y	Y		Integer	Single	0 = Disabled 1 = Enabled
WebVPN-File-Server-Browsing-Enable	Y	Y		Integer	Single	0 = Disabled 1 = Enabled
WebVPN-File-Server-Entry-Enable	Y	Y		Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Forwarded-Ports		Y		String	Single	Port-Forward list name
WebVPN-Homepage	Y	Y		String	Single	A URL such as http://example-portal.com.
WebVPN-Macro-Substitution-Value1	Y	Y		String	Single	See *SSL VPN Deployment Guide* for examples and use cases at this URL: http://supportwiki.cisco.com/ViewWiki/index.php/Cisco_ASA_5500_SSL_VPN_Deployment_Guide%2C_Version_8.x
WebVPN-Macro-Substitution-Value2	Y	Y		String	Single	See *SSL VPN Deployment Guide* for examples and use cases at this URL: http://supportwiki.cisco.com/ViewWiki/index.php/Cisco_ASA_5500_SSL_VPN_Deployment_Guide%2C_Version_8.x
WebVPN-Port-Forwarding-Auto-Download-Enable	Y	Y		Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Port-Forwarding- Enable	Y	Y		Integer	Single	0 = Disabled 1 = Enabled

Table C-2 Security Appliance Supported Cisco Attributes for LDAP Authorization (continued)

Attribute Name/	VPN 3000	ASA	PIX	Syntax/ Type	Single or Multi-Valued	Possible Values
WebVPN-Port-Forwarding-Exchange-Proxy-Enable	Y	Y		Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Port-Forwarding-HTTP-Proxy-Enable	Y	Y		Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Single-Sign-On-Server-Name		Y		String	Single	Name of the SSO Server (1 - 31 characters).
WebVPN-SVC-Client-DPD	Y	Y		Integer	Single	0 = Disabled n = Dead Peer Detection value in seconds (30 - 3600)
WebVPN-SVC-Compression	Y	Y		Integer	Single	0 = None 1 = Deflate Compression
WebVPN-SVC-Enable	Y	Y		Integer	Single	0 = Disabled 1 = Enabled
WebVPN-SVC-Gateway-DPD	Y	Y		Integer	Single	0 = Disabled n = Dead Peer Detection value in seconds (30 - 3600)
WebVPN-SVC-Keepalive	Y	Y		Integer	Single	0 = Disabled n = Keepalive value in seconds (15 - 600)
WebVPN-SVC-Keep-Enable	Y	Y		Integer	Single	0 = Disabled 1 = Enabled
WebVPN-SVC-Rekey-Method	Y	Y		Integer	Single	0 = None 1 = SSL 2 = New tunnel 3 = Any (sets to SSL)
WebVPN-SVC-Rekey-Period	Y	Y		Integer	Single	0 = Disabled n = Retry period in minutes (4 - 10080)
WebVPN-SVC-Required-Enable	Y	Y		Integer	Single	0 = Disabled 1 = Enabled
WebVPN-URL-Entry-Enable	Y	Y		Integer	Single	0 = Disabled 1 = Enabled
WebVPN-URL-List		Y		String	Single	URL-list name

Cisco AV Pair Attribute Syntax

The Cisco Attribute Value (AV) pair (ID# 26/9/1) can be used to enforce access lists from a Radius server (like Cisco ACS), or from an LDAP server via an ldap-attribute-map.

The syntax of each Cisco-AV-Pair rule is as follows:

[Prefix] [Action] [Protocol] [Source] [Source Wildcard Mask] [Destination] [Destination Wildcard Mask] [Established] [Log] [Operator] [Port]

Table C-3 describes the syntax rules.

Table C-3 AV-Pair Attribute Syntax Rules

Field	Description
Prefix	A unique identifier for the AV pair. For example: `ip:inacl#1=` (for standard access lists) or `webvpn:inacl#` (for clientless SSL VPN access lists). This field only appears when the filter has been sent as an AV pair.
Action	Action to perform if rule matches: deny, permit.
Protocol	Number or name of an IP protocol. Either an integer in the range 0 - 255 or one of the following keywords: icmp, igmp, ip, tcp, udp.
Source	Network or host that sends the packet. Specify it as an IP address, a hostname, or the keyword “any.” If using an IP address, the source wildcard mask must follow. This field does not apply to Clientless SSL VPN because the adaptive security appliance plays the role of the source/proxy
Source Wildcard Mask	The wildcard mask that applies to the source address. This field does not apply to Clientless SSL VPN because the adaptive security appliance plays the role of the source/proxy
Destination	Network or host that receives the packet. Specify as an IP address, a hostname, or the keyword “any.” If using an IP address, the source wildcard mask must follow.
Destination Wildcard Mask	The wildcard mask that applies to the destination address.
Log	Generates a FILTER log message. You must use this keyword to generate events of severity level 9.
Operator	Logic operators: greater than, less than, equal to, not equal to.
Port	The number of a TCP or UDP port in the range 0 - 65535.

Cisco AV Pairs ACL Examples

Table C-4 shows examples of Cisco AV pairs and describes the allow or deny actions that result.

Note Each ACL # in `inacl#` must be unique. However, they do not need to be sequential (i.e. 1, 2, 3, 4). For example, they could be 5, 45, 135.

Table C-4 Examples of Cisco AV Pairs and their Permitting or Denying Action

Cisco AV Pair Example	Permitting or Denying Action
`ip:inacl#1=deny ip 10.155.10.0 0.0.0.255 10.159.2.0 0.0.0.255 log`	Allows IP traffic between the two hosts using full tunnel IPsec or SSL VPN client.
`ip:inacl#2=permit TCP any host 10.160.0.1 eq 80 log`	Allows TCP traffic from all hosts to the specific host on port 80 only using full tunnel IPsec or SSL VPN client.

`webvpn:inacl#1=permit url http://www.website.com`
`webvpn:inacl#2=deny url smtp://server`
`webvpn:inacl#3=permit url cifs://server/share`
	Allows clientless traffic to the URL specified, denies smtp traffic to a specific server, and allows file share access (CIFS) to the specified server.

`webvpn:inacl#1=permit tcp 10.86.1.2 eq 2222 log` `webvpn:inacl#2=deny tcp 10.86.1.2 eq 2323 log`	Denies telnet and permits SSH on non-default ports 2323 and 2222, respectively.

`webvpn:inacl#1=permit url ssh://10.86.1.2`
`webvpn:inacl#35=permit tcp 10.86.1.5 eq 22 log`
`webvpn:inacl#48=deny url telnet://10.86.1.2`
`webvpn:inacl#100=deny tcp 10.86.1.6 eq 23`
	Allows SSH to default port 22 and 23, respectively. For this example, we assume you are using telnet/ssh java plugins enforced by these ACLs.

URL Types supported in ACLs

The URL may be a partial URL, contain wildcards for the server, or contain a port.

The following URL types are supported:

any All URLs	http://	nfs://	sametime://	telnet://
cifs://	https://	pop3://	smart-tunnel://	tn3270://
citrix://	ica://	post://	smtp://	tn5250://
citrixs://	imap4://	rdp://	ssh://	vnc://
ftp://				

Note The URLs listed above appear in CLI or ASDM menus based on whether the associated plugin is enabled.

Guidelines for using Cisco-AV Pairs (ACLs)

- Use Cisco-AV pair entries with the ip:inacl# prefix to enforce access lists for remote IPSec and SSL VPN Client (SVC) tunnels.
- Use Cisco-AV pair entries with the webvpn:inacl# prefix to enforce access lists for SSL VPN clientless (browser-mode) tunnels.
- For Webtype ACLs, you don't specify the source because the adaptive security appliance is the source.

Table C-5 lists the tokens for the Cisco-AV-pair attribute:

Table C-5 Security Appliance-Supported Tokens

Token	Syntax Field	Description
ip:inacl#*Num*=	N/A (Identifier)	(Where *Num* is a unique integer.) Starts all AV pair access control lists. Enforces access lists for remote IPSec and SSL VPN (SVC) tunnels.
webvpn:inacl#*Num*=	N/A (Identifier)	(Where *Num* is a unique integer.) Starts all clientless SSL AV pair access control lists. Enforces access lists for clientless (browser-mode) tunnels.
deny	Action	Denies action. (Default)
permit	Action	Allows action.
icmp	Protocol	Internet Control Message Protocol (ICMP)
1	Protocol	Internet Control Message Protocol (ICMP)
IP	Protocol	Internet Protocol (IP)
0	Protocol	Internet Protocol (IP)
TCP	Protocol	Transmission Control Protocol (TCP)
6	Protocol	Transmission Control Protocol (TCP)
UDP	Protocol	User Datagram Protocol (UDP)
17	Protocol	User Datagram Protocol (UDP)
any	Hostname	Rule applies to any host.
host	Hostname	Any alpha-numeric string that denotes a hostname.
log	Log	When the event is hit, a filter log message appears. (Same as permit and log or deny and log.)
lt	Operator	Less than value
gt	Operator	Greater than value
eq	Operator	Equal to value
neq	Operator	Not equal to value
range	Operator	Inclusive range. Should be followed by two values.

Active Directory/LDAP VPN Remote Access Authorization Use Cases

This section presents example procedures for configuring authentication and authorization on the adaptive security appliance using the Microsoft Active Directory server. It includes the following use cases:

- User-Based Attributes Policy Enforcement, page C-18
- Placing LDAP users in a specific Group-Policy, page C-20
- Enforcing Static IP Address Assignment for AnyConnect Tunnels, page C-22
- Enforcing Dial-in Allow or Deny Access, page C-25
- Enforcing Logon Hours and Time-of-Day Rules, page C-28

Other configuration examples available on Cisco.com include the following TechNotes:

- *ASA/PIX: Mapping VPN Clients to VPN Group Policies Through LDAP Configuration Example* at:

http://www.cisco.com/en/US/products/ps6120/products_configuration_example09186a008089149d.shtml

- *PIX/ASA 8.0: Use LDAP Authentication to Assign a Group Policy at Login* at:

  http://www.cisco.com/en/US/partner/products/ps6120/products_configuration_example09186a00808d1a7c.shtml

User-Based Attributes Policy Enforcement

Any standard LDAP attribute can be mapped to a well-known Vendor Specific Attribute (VSA) Likewise, one or more LDAP attribute(s) can be mapped to one or more Cisco LDAP attributes.

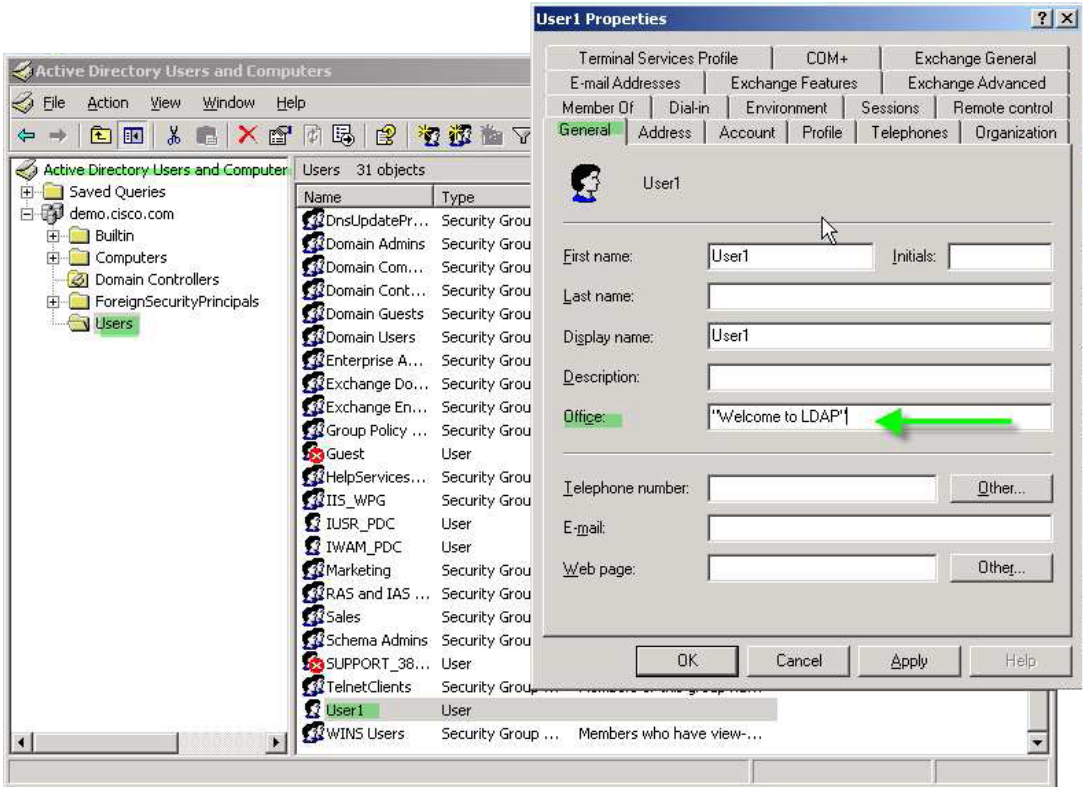
In this use case we configure the adaptive security appliance to enforce a simple banner for a user configured on an AD LDAP server. For this case, on the server, we use the Office field in the General tab to enter the banner text. This field uses the attribute named *physicalDeliveryOfficeName*. On the adaptive security appliance, we create an attribute map that maps *physicalDeliveryOfficeName* to the Cisco attribute *Banner1*. During authentication, the adaptive security appliance retrieves the value of physicalDeliveryOfficeName from the server, maps the value to the Cisco attribute Banner1, and displays the banner to the user.

This case applies to any connection type, including the IPSec VPN client, AnyConnect SSL VPN client, or clientless SSL VPN. For the purposes of this case, User1 is connecting through a clientless SSL VPN connection.

Step 1 Configure the attributes for a user on the AD/LDAP Server.

Right-click a user. The properties window displays (Figure C-3). Click the General tab and enter some banner text in the Office field. The Office field uses the AD/LDAP attribute *physicalDeliveryOfficeName*.

Figure C-3 Figure 3 LDAP User configuration



Step 2 Create an LDAP attribute map on the adaptive security appliance:

The following example creates the map *Banner*, and maps the AD/LDAP attribute *physicalDeliveryOfficeName* to the Cisco attribute *Banner1*:

```
hostname(config)# ldap attribute-map Banner
hostname(config-ldap-attribute-map)# map-name physicalDeliveryOfficeName Banner1
```

Step 3 Associate the LDAP attribute map to the AAA server.

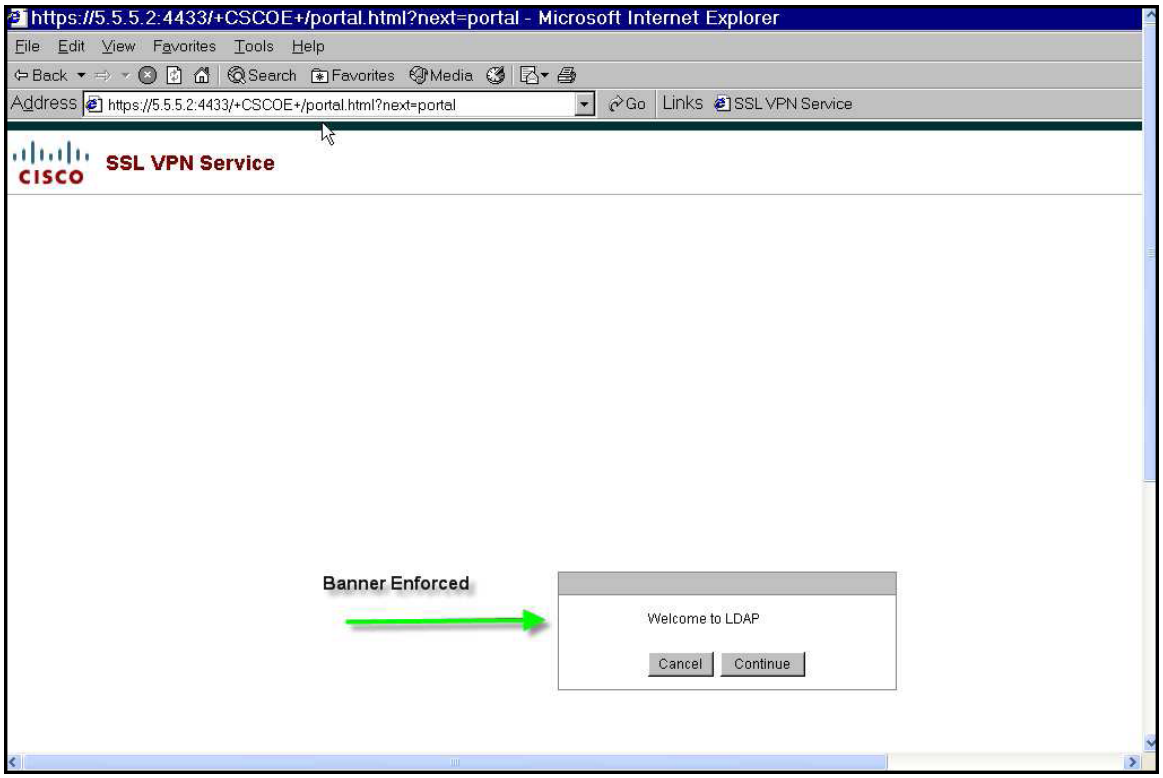
The following example enters the aaa server host configuration more for the host *3.3.3.4*, in the AAA server group *MS_LDAP*, and associates the attribute map *Banner* that you created in step 2:

```
hostname(config)# aaa-server MS_LDAP host 3.3.3.4
hostname(config-aaa-server-host)# ldap-attribute-map Banner
```

Step 4 Test the banner enforcement.

This example shows a clientless SSL connection and the banner enforced through the attribute map after the user authenticates (Figure C-4).

Figure C-4 Banner Displayed



Placing LDAP users in a specific Group-Policy

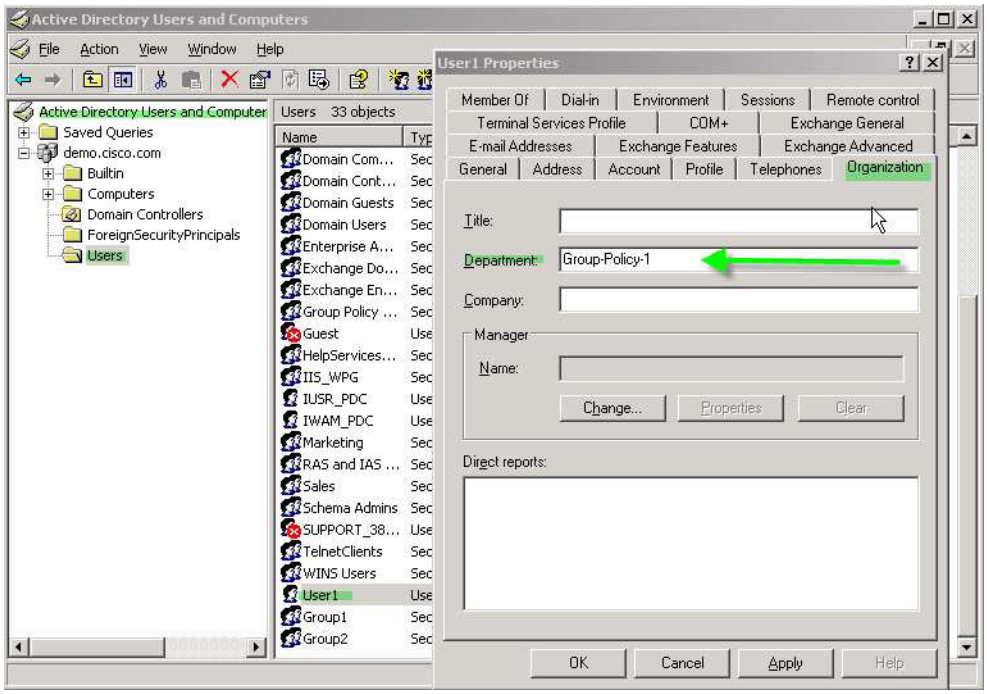
In this case we authenticate User1 on the AD LDAP server to a specific group policy on the adaptive security appliance. On the server, we use the *Department* field of the Organization tab to enter the name of the group policy. Then we create an attribute map and map Department to the Cisco attribute *IETF-Radius-Class*. During authentication, the adaptive security appliance retrieves the value of Department from the server, maps the value to the IETF-Radius-Class, and places User1 in the group policy.

This case applies to any connection type, including the IPSec VPN client, AnyConnect SSL VPN client, or clientless SSL VPN. For the purposes of this case, user1 is connecting through a clientless SSL VPN connection.

Step 1 Configure the attributes for the user on the AD LDAP Server.

Right-click the user. The Properties window displays (Figure C-5). Click the Organization tab and enter *Group-Policy-1* in the Department field.

Figure C-5 AD LDAP Department attribute



Step 2 Define an attribute map for the LDAP configuration shown in Step 1.

In this case we map the AD attribute Department to the Cisco attribute IETF-Radius-Class. For example:

```
hostname(config)# ldap attribute-map group_policy
hostname(config-ldap-attribute-map)# map-name Department IETF-Radius-Class
```

Step 3 Associate the LDAP attribute map to the AAA server.

The following example enters the aaa server host configuration mode for the host *3.3.3.4*, in the AAA server group *MS_LDAP*, and associates the attribute map *group_policy* that you created in step 2:

```
hostname(config)# aaa-server MS_LDAP host 3.3.3.4
hostname(config-aaa-server-host)# ldap-attribute-map group_policy
```

Step 4 Add the new group-policy on the adaptive security appliance and configure the required policy attributes that will be assigned to the user. For this case, we created the Group-policy-1, the name entered in the Department field on the server:

```
hostname(config)# group-policy Group-policy-1 external server-group LDAP_demo
hostname(config-aaa-server-group)#
```

Step 5 Establish the VPN connection as the user would, and verify that the session inherits the attributes from Group-Policy1 (and any other applicable attributes from the default group-policy)

You can monitor the communication between the adaptive security appliance and the server by enabling the **debug ldap 255** command from privileged EXEC mode. Below is sample output of this command. The output has been edited to provide the key messages:

[29] Authentication successful for user1 to 3.3.3.4

[29] Retrieving user attributes from server 3.3.3.4

[29] Retrieved Attributes:

[29] department: value = Group-Policy-1

[29] mapped to IETF-Radius-Class: value = Group-Policy-1

Enforcing Static IP Address Assignment for AnyConnect Tunnels

In this case we configure the AnyConnect client user *Web1* to receive a static IP Address. We enter the address in the *Assign Static IP Address* field of the Dialin tab on the AD LDAP server. This field uses the *msRADIUSFramedIPAddress* attribute. We create an attribute map that maps it to the Cisco attribute *IETF-Radius-Framed-IP-Address*.

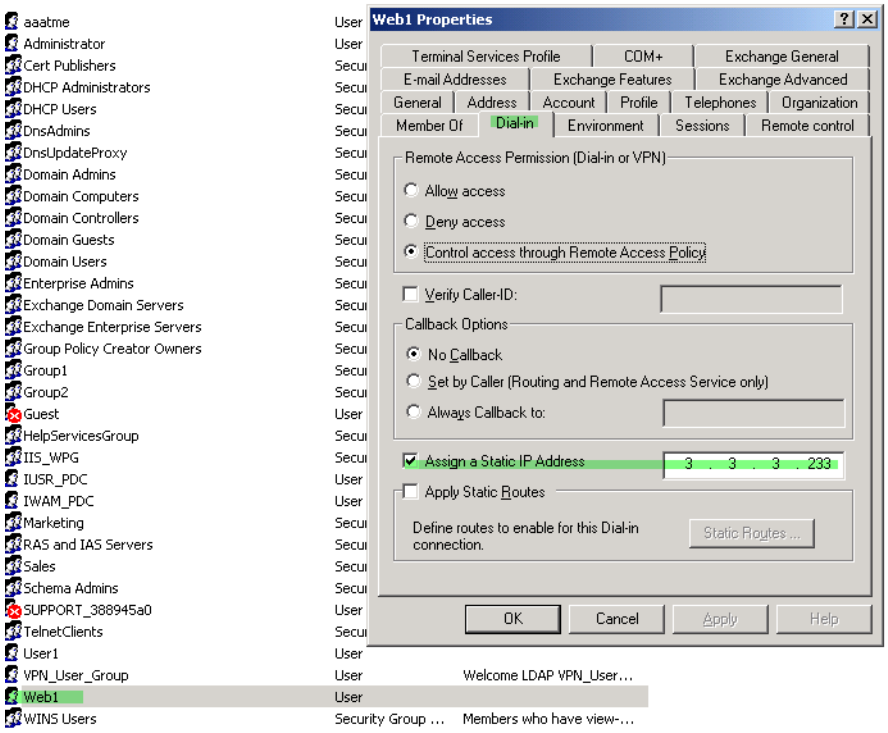
During authentication, the adaptive security appliance retrieves the value of msRADIUSFramedIPAddress from the server, maps the value to the Cisco attribute IETF-Radius-Framed-IP-Address, and provides the static address to User1 .

This case applies to full-tunnel clients, including the IPSec client and the SSL VPN clients (AnyConnect client 2.x and the legacy SSL VPN client).

Step 1 Configure the user attributes on the AD LDAP server.

Right-click on the user name. The Properties window displays (Figure C-6). Click the Dialin tab, check *Assign Static IP Address*, and enter an IP address. For this case we use 3.3.3.233.

Figure C-6 Assign Static IP Address



Step 2 Create an attribute map for the LDAP configuration shown in Step 1.

In this case we map the AD attribute *msRADIUSFramedIPAddress* used by the Static Address field to the Cisco attribute *IETF-Radius-Framed-IP-Address*.

For example:

```
hostname(config)# ldap attribute-map static_address
hostname(config-ldap-attribute-map)# map-name msRADIUSFramedIPAddress
IETF-Radius-Framed-IP-Address
```

Step 3 Associate the LDAP attribute map to the AAA server.

The following example enters the aaa server host configuration mode for the host *3.3.3.4*, in the AAA server group *MS_LDAP*, and associates the attribute map *static_address* that you created in step 2:

```
hostname(config)# aaa-server MS_LDAP host 3.3.3.4
hostname(config-aaa-server-host)# ldap-attribute-map static_address
```

Step 4 Verify the **vpn-address-assigment** command is configured to specify aaa by viewing this part of the configuration with the **show run all vpn-addr-assign command**:

vpn-addr-assign aaa

```
hostname(config)# show run all vpn-addr-assign
vpn-addr-assign aaa    <<<< ensure this configured.
no vpn-addr-assign dhcp
vpn-addr-assign local
hostname(config)#
```

Step 5 Establish a connection to the adaptive security appliance with the AnyConnect client. Observe the following:

- The banner is received in the same sequence as a clientless connection (Figure C-7).
- The user receives the IP address configured on the server and mapped to the adaptive security appliance (Figure C-8).

Figure C-7 Verify the Banner for the AnyConnect Session

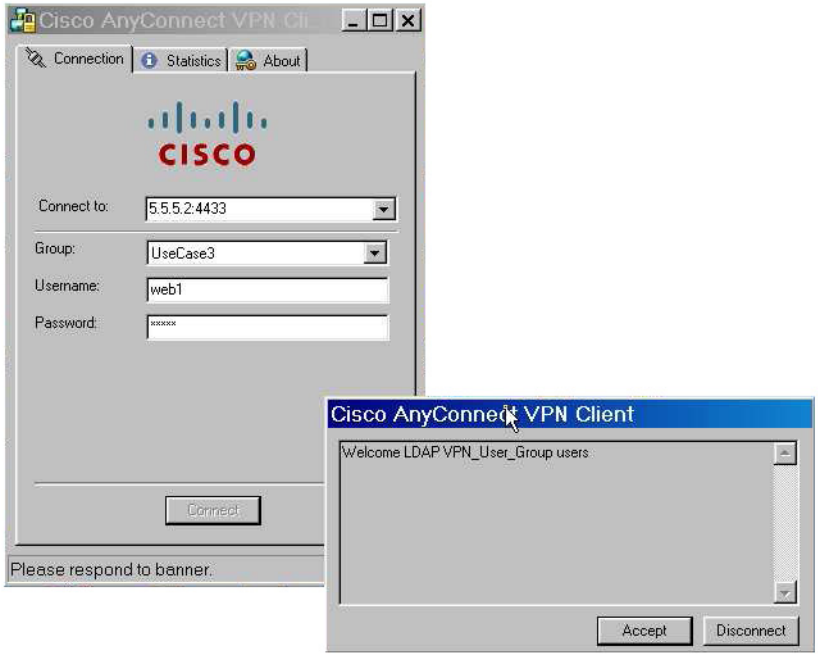
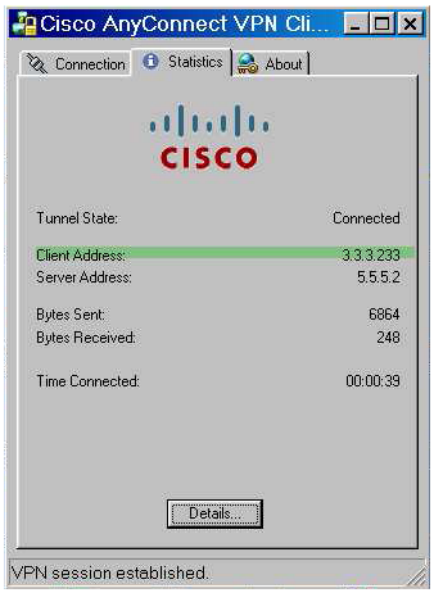


Figure C-8 AnyConnect Session Established



You can use the **show vpn-sessiondb svc** command to view the session details and verify the address assigned:

```
hostname# show vpn-sessiondb svc

Session Type: SVC
Username     : web1                   Index        : 31
Assigned IP  : 3.3.3.233              Public IP    : 10.86.181.70
Protocol     : Clientless SSL-Tunnel DTLS-Tunnel
Encryption   : RC4 AES128             Hashing      : SHA1
Bytes Tx     : 304140                 Bytes Rx     : 470506
Group Policy : VPN_User_Group         Tunnel Group : UseCase3_TunnelGroup
Login Time   : 11:13:05 UTC Tue Aug 28 2007
Duration     : 0h:01m:48s
NAC Result   : Unknown
VLAN Mapping : N/A                    VLAN         : none

BXB-ASA5540#
```

Enforcing Dial-in Allow or Deny Access

In this case, we create an LDAP attribute map that specifies the tunneling protocols allowed by the user. We map the Allow Access and Deny Access settings on the Dialin tab to the Cisco attribute Tunneling-Protocols. The Cisco Tunneling-Protocols supports the bit-map values shown in Table C-6:

Table C-6 Bitmap Values for Cisco Tunneling-Protocol Attribute

Value	Tunneling Protocol
1	PPTP
2	L2TP
4[1]	IPSec
8[2]	L2TP/IPSEC
16	clientless SSL
32	SSL Client—AnyConnect or legacy SSL VPN client

1. IPSec and L2TP over IPSec are not supported simultaneously. Therefore, the values 4 and 8 are mutually exclusive.
2. See note 1.

Using this attribute, we create an Allow Access (TRUE) or a Deny Access (FALSE) condition for the protocols and enforce what method the user is allowed access with.

For this simplified example, by mapping the tunnel-protocol IPSec (4), we can create an allow (true) condition for the IPSec Client. We also map WebVPN (16) and SVC/AC (32) which is mapped as value of 48 (16+32) and create a deny (false) condition. This allows the user to connect to the adaptive security appliance using IPSec, but any attempt to connect using clientless SSL or the AnyConnect client is denied.

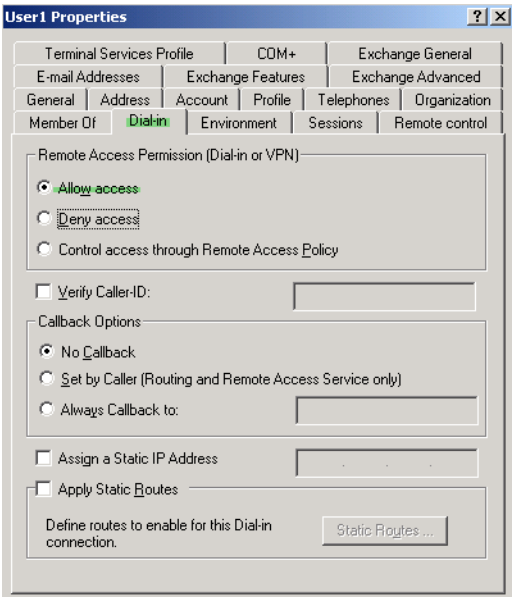
Another example of enforcing Dial-in Allow Acess or Deny Access can be found in the Tech Note *ASA/PIX: Mapping VPN Clients to VPN Group Policies Through LDAP Configuration Example,* at this URL:

http://www.cisco.com/en/US/products/ps6120/products_configuration_example09186a008089149d.shtml

Step 1 Configure the user attributes on the AD LDAP server.

Right-click on the user. The Properties window displays. Click the Dial-in tab. Select **Allow Access** (Figure C-9).

Figure C-9 AD-LDAP user1 - Allow access



Note If you select the third option "Control access through the Remote Access Policy", then a value is not returned from the server, and the permissions that are enforced are based on the internal group policy settings of the adaptive security appliance.

Step 2 Create an attribute map to allow both an IPSec and AnyConnect connection, but deny a clientless SSL connection.

In this case we create the map *tunneling_protocols*, and map the AD attribute *msNPAllowDialin* used by the Allow Access setting to the Cisco attribute *Tunneling-Protocols* using the **map-name** command, and add map values with the **map-value** command,

For example:

```
hostname(config)# ldap attribute-map tunneling_protocols
hostname(config-ldap-attribute-map)# map-name msNPAllowDialin Tunneling-Protocols
hostname(config-ldap-attribute-map)# map-value msNPAllowDialin FALSE  48
hostname(config-ldap-attribute-map)# map-value msNPAllowDialin TRUE 4
```

Step 3 Associate the LDAP attribute map to the AAA server.

The following example enters the aaa server host configuration mode for the host *3.3.3.4*, in the AAA server group *MS_LDAP*, and associates the attribute map *tunneling_protocols* that you created in step 2:

```
hostname(config)# aaa-server MS_LDAP host 3.3.3.4
hostname(config-aaa-server-host)# ldap-attribute-map tunneling_protocols
```

Step 4 Verify the attribute map works as configured.

Using a PC as a remote user would, attempt connections using clientless SSL, the AnyConnect client, and the IPSec client. The clientless and AnyConnect connections should fail and the user should be informed that an unauthorized connection mechanism was the reason for the failed connection. The IPSec client should connect because IPSec is an allowed tunneling protocol according to attribute map.

Figure C-10 Login Denied Message for Clientless User

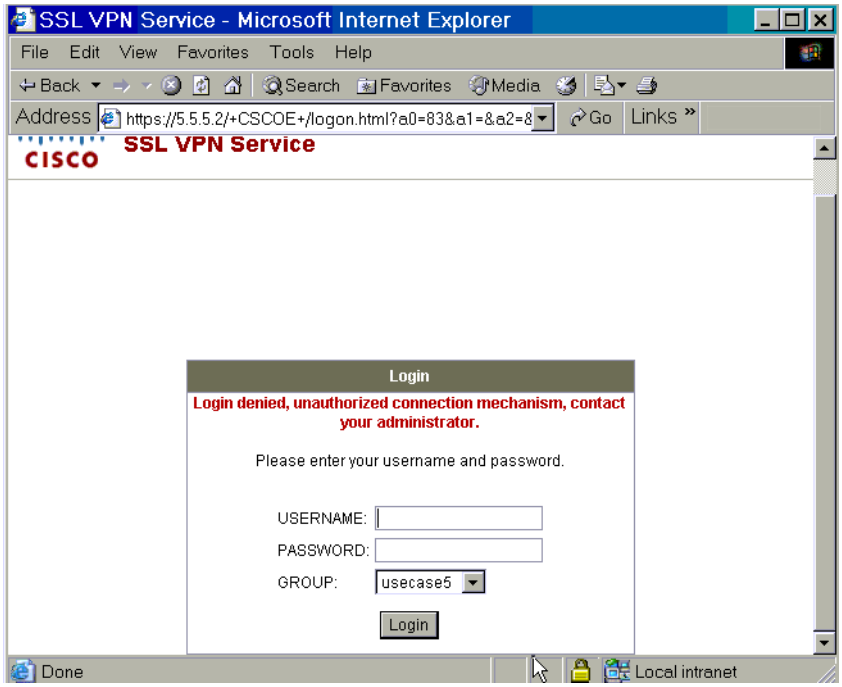
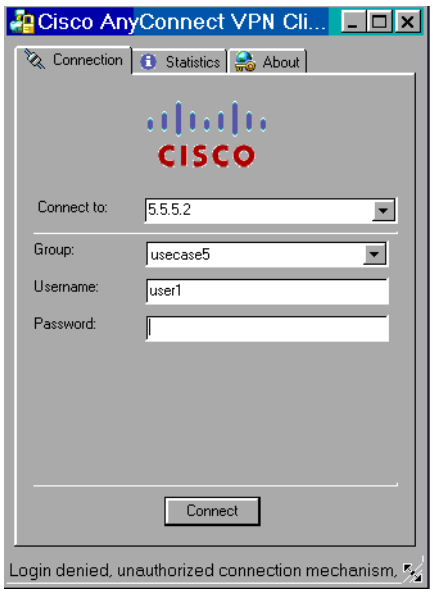


Figure C-11 Login Denied Message for AnyConnect Client User.



Enforcing Logon Hours and Time-of-Day Rules

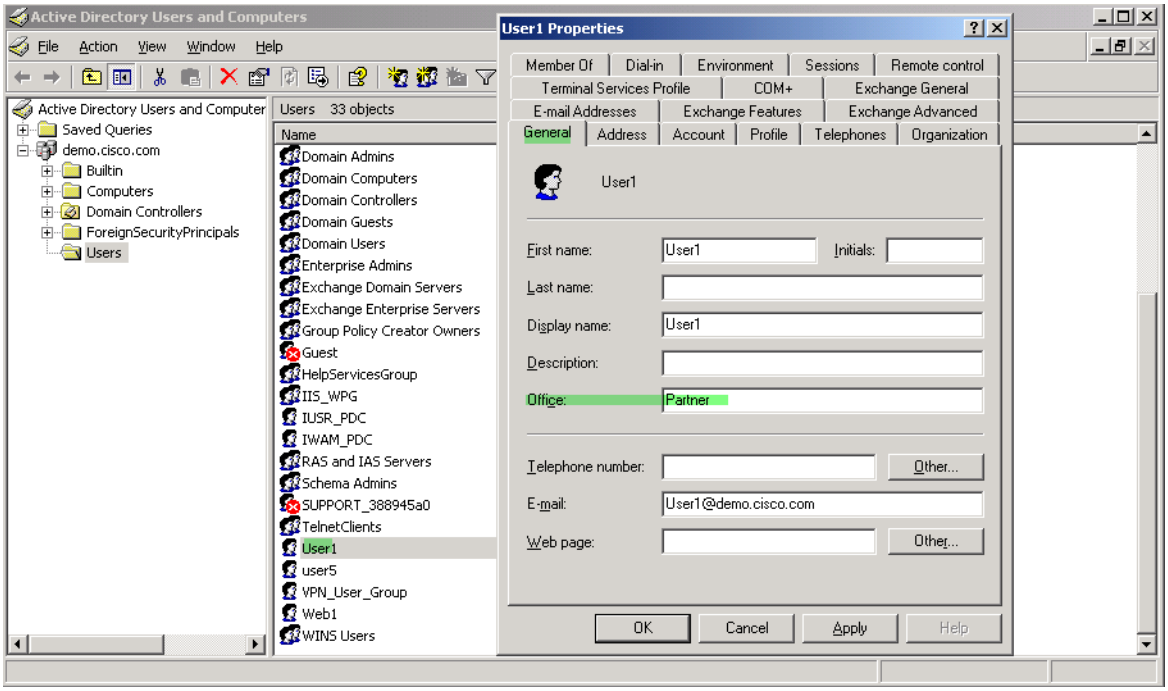
In this use case we configure and enforce the hours that a clientless SSL user is allowed to access the network. A good example of this is when you want to allow a business partner access to the network only during normal business hours.

For this case, on the AD server, we use the *Office* field to enter the name of the partner. This field uses the *physicalDeliveryOfficeName* attribute. Then we create an attribute map on the adaptive security appliance to map that attribute to the Cisco attribute *Access-Hours*. During authentication, the adaptive security appliance retrieves the value of physicalDeliveryOfficeName (the Office field) and maps it to Access-Hours.

Step 1 Configure the user attributes on the AD LDAP server.

Select the user. Right click on Properties. The Properties window displays (Figure C-12). For this case, we use the Office field of the General tab:

Figure C-12 Active Directory Properties Window



Step 2 Create an attribute map.

In this case we create the attribute map access_hours and map the AD attribute *physicalDeliveryOfficeName* used by the Office field to the Cisco attribute *Access-Hours*.

For example:

```
hostname(config)# ldap attribute-map access_hours
hostname(config-ldap-attribute-map)# map-name physicalDeliveryOfficeName Access-Hours
```

Step 3 Associate the LDAP attribute map to the AAA server.

The following example enters the aaa server host configuration mode for the host *3.3.3.4*, in the AAA server group *MS_LDAP*, and associates the attribute map *access_hours* that you created in step 2:

```
hostname(config)# aaa-server MS_LDAP host 3.3.3.4
```

```
hostname(config-aaa-server-host)# ldap-attribute-map access_hours
```

Step 4 Configure time ranges for each value allowed on the server. In this case, we entered Partner in the Office field for User1. Therefore, there must be a time range configured for Partner. The following example configures Partner access hours from 9am to 5pm Monday through Friday:

```
hostname(config)# time-range Partner
hostname(config-time-range)# periodic weekdays 09:00 to 17:00
```

Configuring an External RADIUS Server

This section presents an overview of the RADIUS configuration procedure and defines the Cisco RADIUS attributes. It includes the following topics:

Reviewing the RADIUS Configuration Procedure

This section describes the RADIUS configuration steps required to support authentication and authorization of the adaptive security appliance users. Follow these steps to set up the RADIUS server to inter operate with the adaptive security appliance.

Step 1 Load the adaptive security appliance attributes into the RADIUS server. The method you use to load the attributes depends on which type of RADIUS server you are using:

- If you are using Cisco ACS: the server already has these attributes integrated. You can skip this step.
- If you are using a FUNK RADIUS server: Cisco supplies a dictionary file that contains all the adaptive security appliance attributes. Obtain this dictionary file, `cisco3k.dct`, from Software Center on CCO or from the adaptive security appliance CD-ROM. Load the dictionary file on your server.
- For other vendors' RADIUS servers (for example, Microsoft Internet Authentication Service): you must manually define each adaptive security appliance attribute. To define an attribute, use the attribute name or number, type, value, and vendor code (3076). For a list of adaptive security appliance RADIUS authorization attributes and values, see

Step 2 Set up the users or groups with the permissions and attributes to send during IPSec or SSL tunnel establishment.

Security Appliance RADIUS Authorization Attributes

Authorization refers to the process of enforcing permissions or attributes. A RADIUS server defined as an authentication server enforces permissions or attributes if they are configured.

Table C-7 lists all the possible adaptive security appliance supported RADIUS attributes that can be used for user authorization.

Note RADIUS attribute names do not contain the cVPN3000 prefix. Cisco Secure ACS 4.x supports this new nomenclature, but attribute names in pre-4.0 ACS releases still include the cVPN3000 prefix. The appliances enforce the RADIUS attributes based on attribute numeric ID, not attribute name. LDAP attributes are enforced by their name, not by the ID.

Table C-7 Security Appliance Supported RADIUS Attributes and Values

Attribute Name	VPN 3000	ASA	PIX	Attr. #	Syntax/ Type	Single or Multi-Valued	Description or Value
Access-Hours	Y	Y	Y	1	String	Single	Name of the time range, for example, Business-hours
Simultaneous-Logins	Y	Y	Y	2	Integer	Single	An integer 0 to 2147483647
Primary-DNS	Y	Y	Y	5	String	Single	An IP address
Secondary-DNS	Y	Y	Y	6	String	Single	An IP address
Primary-WINS	Y	Y	Y	7	String	Single	An IP address
Secondary-WINS	Y	Y	Y	8	String	Single	An IP address
SEP-Card-Assignment				9	Integer	Single	Not used
Tunneling-Protocols	Y	Y	Y	11	Integer	Single	1 = PPTP 2 = L2TP 4 = IPSec 8 = L2TP/IPSec 16 = WebVPN 32 = SVC 8 and 4 are mutually exclusive (0 - 11, 16 - 27, 32 - 43, 48 - 59 are legal values).
IPSec-Sec-Association	Y			12	String	Single	Name of the security association
IPSec-Authentication	Y			13	Integer	Single	0 = None 1 = RADIUS 2 = LDAP (authorization only) 3 = NT Domain 4 = SDI 5 = Internal 6 = RADIUS with Expiry 7 = Kerberos/Active Directory
Banner1	Y	Y	Y	15	String	Single	Banner string
IPSec-Allow-Passwd-Store	Y	Y	Y	16	Boolean	Single	0 = Disabled 1 = Enabled
Use-Client-Address	Y			17	Boolean	Single	0 = Disabled 1 = Enabled
PPTP-Encryption	Y			20	Integer	Single	Bitmap: 1 = Encryption required 2 = 40 bits 4 = 128 bits 8 = Stateless-Required 15= 40/128-Encr/Stateless-Req

Table C-7 Security Appliance Supported RADIUS Attributes and Values (continued)

Attribute Name	VPN 3000	ASA	PIX	Attr. #	Syntax/ Type	Single or Multi-Valued	Description or Value
L2TP-Encryption	Y			21	Integer	Single	Bitmap: 1 = Encryption required 2 = 40 bit 4 = 128 bits 8 = Stateless-Req 15= 40/128-Encr/Stateless-Req
Group-Policy		Y	Y	25	String	Single	Sets the group policy for the remote access VPN session. For version 8.2 and later, use this attribute instead of IETF-Radius-Class. You can use one of the three following formats: • <group policy name> • OU=<group policy name> • OU=<group policy name>;
IPSec-Split-Tunnel-List	Y	Y	Y	27	String	Single	Specifies the name of the network/access list that describes the split tunnel inclusion list
IPSec-Default-Domain	Y	Y	Y	28	String	Single	Specifies the single default domain name to send to the client (1-255 characters)
IPSec-Split-DNS-Names	Y	Y	Y	29	String	Single	Specifies the list of secondary domain names to send to the client (1-255 characters)
IPSec-Tunnel-Type	Y	Y	Y	30	Integer	Single	1 = LAN-to-LAN 2 = Remote access
IPSec-Mode-Config	Y	Y	Y	31	Boolean	Single	0 = Disabled 1 = Enabled
IPSec-User-Group-Lock	Y			33	Boolean	Single	0 = Disabled 1 = Enabled
IPSec-Over-UDP	Y	Y	Y	34	Boolean	Single	0 = Disabled 1 = Enabled
IPSec-Over-UDP-Port	Y	Y	Y	35	Integer	Single	4001 - 49151, default = 10000
Banner2	Y	Y	Y	36	String	Single	A banner string that is concatenated to the Banner1 string, if configured.
PPTP-MPPC-Compression	Y			37	Integer	Single	0 = Disabled 1 = Enabled

Table C-7 Security Appliance Supported RADIUS Attributes and Values (continued)

Attribute Name	VPN 3000	ASA	PIX	Attr. #	Syntax/ Type	Single or Multi-Valued	Description or Value
L2TP-MPPC-Compression	Y			38	Integer	Single	0 = Disabled 1 = Enabled
IPSec-IP-Compression	Y	Y	Y	39	Integer	Single	0 = Disabled 1 = Enabled
IPSec-IKE-Peer-ID-Check	Y	Y	Y	40	Integer	Single	1 = Required 2 = If supported by peer certificate 3 = Do not check
IKE-Keep-Alives	Y	Y	Y	41	Boolean	Single	0 = Disabled 1 = Enabled
IPSec-Auth-On-Rekey	Y	Y	Y	42	Boolean	Single	0 = Disabled 1 = Enabled
Required-Client- Firewall-Vendor-Code	Y	Y	Y	45	Integer	Single	1 = Cisco Systems (with Cisco Integrated Client) 2 = Zone Labs 3 = NetworkICE 4 = Sygate 5 = Cisco Systems (with Cisco Intrusion Prevention Security Agent)
Required-Client-Firewall-Product-Code	Y	Y	Y	46	Integer	Single	Cisco Systems Products: 1 = Cisco Intrusion Prevention Security Agent or Cisco Integrated Client (CIC) Zone Labs Products: 1 = Zone Alarm 2 = Zone AlarmPro 3 = Zone Labs Integrity NetworkICE Product: 1 = BlackIce Defender/Agent Sygate Products: 1 = Personal Firewall 2 = Personal Firewall Pro 3 = Security Agent
Required-Client-Firewall-Description	Y	Y	Y	47	String	Single	String
Require-HW-Client-Auth	Y	Y	Y	48	Boolean	Single	0 = Disabled 1 = Enabled
Required-Individual-User-Auth	Y	Y	Y	49	Integer	Single	0 = Disabled 1 = Enabled
Authenticated-User-Idle-Timeout	Y	Y	Y	50	Integer	Single	1-35791394 minutes

Table C-7 Security Appliance Supported RADIUS Attributes and Values (continued)

Attribute Name	VPN 3000	ASA	PIX	Attr. #	Syntax/ Type	Single or Multi-Valued	Description or Value
Cisco-IP-Phone-Bypass	Y	Y	Y	51	Integer	Single	0 = Disabled 1 = Enabled
IPSec-Split-Tunneling-Policy	Y	Y	Y	55	Integer	Single	0 = No split tunneling 1 = Split tunneling 2 = Local LAN permitted
IPSec-Required-Client-Firewall-Capability	Y	Y	Y	56	Integer	Single	0 = None 1 = Policy defined by remote FW Are-You-There (AYT) 2 = Policy pushed CPP 4 = Policy from server
IPSec-Client-Firewall-Filter-Name	Y			57	String	Single	Specifies the name of the filter to be pushed to the client as firewall policy
IPSec-Client-Firewall-Filter-Optional	Y	Y	Y	58	Integer	Single	0 = Required 1 = Optional
IPSec-Backup-Servers	Y	Y	Y	59	String	Single	1 = Use Client-Configured list 2 = Disable and clear client list 3 = Use Backup Server list
IPSec-Backup-Server-List	Y	Y	Y	60	String	Single	Server Addresses (space delimited)
DHCP-Network-Scope	Y	Y	Y	61	String	Single	IP Address
Intercept-DHCP-Configure-Msg	Y	Y	Y	62	Boolean	Single	0 = Disabled 1 = Enabled
MS-Client-Subnet-Mask	Y	Y	Y	63	Boolean	Single	An IP address
Allow-Network-Extension-Mode	Y	Y	Y	64	Boolean	Single	0 = Disabled 1 = Enabled
Authorization-Type	Y	Y	Y	65	Integer	Single	0 = None 1 = RADIUS 2 = LDAP
Authorization-Required	Y			66	Integer	Single	0 = No 1 = Yes
Authorization-DN-Field	Y	Y	Y	67	String	Single	Possible values: UID, OU, O, CN, L, SP, C, EA, T, N, GN, SN, I, GENQ, DNQ, SER, use-entire-name
IKE-KeepAlive-Confidence-Interval	Y	Y	Y	68	Integer	Single	10-300 seconds
WebVPN-Content-Filter-Parameters	Y	Y		69	Integer	Single	1 = Java ActiveX 2 = Java Script 4 = Image 8 = Cookies in images

Table C-7 Security Appliance Supported RADIUS Attributes and Values (continued)

Attribute Name	VPN 3000	ASA	PIX	Attr. #	Syntax/ Type	Single or Multi-Valued	Description or Value
WebVPN-URL-List		Y		71	String	Single	URL-List name
WebVPN-Port-Forward-List		Y		72	String	Single	Port-Forward list name
WebVPN-Access-List		Y		73	String	Single	Access-List name
Cisco-LEAP-Bypass	Y	Y	Y	75	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Homepage	Y	Y		76	String	Single	A URL such as http://example-portal.com
Client-Type-Version-Limiting	Y	Y	Y	77	String	Single	IPSec VPN version number string
WebVPN-Port-Forwarding-Name	Y	Y		79	String	Single	String name (example, “Corporate-Apps”). This text replaces the default string, “Application Access,” on the clientless portal home page.
IE-Proxy-Server	Y			80	String	Single	IP address
IE-Proxy-Server-Policy	Y			81	Integer	Single	1 = No Modify 2 = No Proxy 3 = Auto detect 4 = Use Concentrator Setting
IE-Proxy-Exception-List	Y			82	String	Single	newline (\n) separated list of DNS domains
IE-Proxy-Bypass-Local	Y			83	Integer	Single	0 = None 1 = Local
IKE-Keepalive-Retry-Interval	Y	Y	Y	84	Integer	Single	2 - 10 seconds
Tunnel-Group-Lock		Y	Y	85	String	Single	Name of the tunnel group or “none”
Access-List-Inbound		Y	Y	86	String	Single	Access list ID
Access-List-Outbound		Y	Y	87	String	Single	Access list ID
Perfect-Forward-Secrecy-Enable	Y	Y	Y	88	Boolean	Single	0 = No 1 = Yes
NAC-Enable	Y			89	Integer	Single	0 = No 1 = Yes
NAC-Status-Query-Timer	Y			90	Integer	Single	30 - 1800 seconds
NAC-Revalidation-Timer	Y			91	Integer	Single	300 - 86400 seconds
NAC-Default-ACL	Y			92	String		Access list
WebVPN-URL-Entry-Enable	Y	Y		93	Integer	Single	0 = Disabled 1 = Enabled

Table C-7 Security Appliance Supported RADIUS Attributes and Values (continued)

Attribute Name	VPN 3000	ASA	PIX	Attr. #	Syntax/ Type	Single or Multi-Valued	Description or Value
WebVPN-File-Access-Enable	Y	Y		94	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-File-Server-Entry-Enable	Y	Y		95	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-File-Server-Browsing-Enable	Y	Y		96	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Port-Forwarding-Enable	Y	Y		97	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Outlook-Exchange-Proxy-Enable	Y	Y		98	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Port-Forwarding-HTTP-Proxy	Y	Y		99	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Auto-Applet-Download-Enable	Y	Y		100	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Citrix-Metaframe-Enable	Y	Y		101	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Apply-ACL	Y	Y		102	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-SSL-VPN-Client-Enable	Y	Y		103	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-SSL-VPN-Client-Required	Y	Y		104	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-SSL-VPN-Client-Keep-Installation	Y	Y		105	Integer	Single	0 = Disabled 1 = Enabled
SVC-Keepalive	Y	Y		107	Integer	Single	0 = Off 15 - 600 seconds
SVC-DPD-Interval-Client	Y	Y		108	Integer	Single	0 = Off 5 - 3600 seconds
SVC-DPD-Interval-Gateway	Y	Y		109	Integer	Single	0 = Off) 5 - 3600 seconds
SVC-Rekey-Time		Y		110	Integer	Single	0 = Disabled 1- 10080 minutes
WebVPN-Deny-Message		Y		116	String	Single	Valid string(up to 500 characters)
Extended-Authentication-On-Rekey		Y	Y	122	Integer	Single	0 = Disabled 1 = Enabled
SVC-DTLS		Y		123	Integer	Single	0 = False 1 = True

Table C-7 Security Appliance Supported RADIUS Attributes and Values (continued)

Attribute Name	VPN 3000	ASA	PIX	Attr. #	Syntax/ Type	Single or Multi-Valued	Description or Value
SVC-MTU		Y		125	Integer	Single	MTU value 256 - 1406 in bytes
SVC-Modules		Y		127	String	Single	String (name of a module)
SVC-Profiles		Y		128	String	Single	String (name of a profile)
SVC-Ask		Y		131	String	Single	0 = Disabled 1 = Enabled 3 = Enable default service 5 = Enable default clientless (2 and 4 not used)
SVC-Ask-Timeout		Y		132	Integer	Single	5 - 120 seconds
IE-Proxy-PAC-URL		Y		133	String	Single	PAC Address String
Strip-Realm	Y	Y	Y	135	Boolean	Single	0 = Disabled 1 = Enabled
Smart-Tunnel		Y		136	String	Single	Name of a Smart Tunnel
WebVPN-ActiveX-Relay		Y		137	Integer	Single	0 = Disabled Otherwise = Enabled
Smart-Tunnel-Auto		Y		138	Integer	Single	0 = Disabled 1 = Enabled 2 = AutoStart
Smart-Tunnel-Auto-Signon-Enable		Y		139	String	Single	Name of a Smart Tunnel Auto Signon list appended by the domain name
VLAN		Y		140	Integer	Single	0 - 4094
NAC-Settings		Y		141	String	Single	Name of NAC policy
Member-Of		Y	Y	145	String	Single	Comma delimited string, for example: `Engineering, Sales` This is an administrative attribute that can be used in dynamic access policies. It does not set a group policy.
Address-Pools		Y	Y	217	String	Single	Name of IP local pool
IPv6-Address-Pools		Y		218	String	Single	Name of IP local pool-IPv6
IPv6-VPN-Filter		Y		219	String	Single	ACL value
Privilege-Level		Y	Y	220	Integer	Single	An integer between 0 and 15.

Table C-7 Security Appliance Supported RADIUS Attributes and Values (continued)

Attribute Name	VPN 3000	ASA	PIX	Attr. #	Syntax/ Type	Single or Multi-Valued	Description or Value
WebVPN-Macro-Value1		Y		223	String	Single	Unbounded. See the *SSL VPN Deployment Guide* for examples and use cases at this URL: http://supportwiki.cisco.com/ViewWiki/index.php/Cisco_ASA_5500_SSL_VPN_Deployment_Guide%2C_Version_8.x
WebVPN-Macro-Value2		Y		224	String	Single	Unbounded. See the *SSL VPN Deployment Guide* for examples and use cases at this URL: http://supportwiki.cisco.com/ViewWiki/index.php/Cisco_ASA_5500_SSL_VPN_Deployment_Guide%2C_Version_8.x

Security Appliance IETF RADIUS Authorization Attributes

Table C-8 list all the possible IETF Radius attributes.

Table C-8 Security Appliance Supported IETF RADIUS Attributes and Values

Attribute Name	VPN 3000	ASA	PIX	Attr. #	Syntax/ Type	Single or Multi-Valued	Description or Value
IETF-Radius-Class	Y	Y	Y	25		Single	Sets the group policy for the remote access VPN session. For 8.2 and later, we recommend that you use the Group-Policy attribute. You can use one of the three following formats: • <group policy name> • OU=<group policy name> • OU=<group policy name>;
IETF-Radius-Filter-Id	Y	Y	Y	11	String	Single	Access list name that is defined on the adaptive security appliance. This applies only to full tunnel IPsec and SSL VPN clients
IETF-Radius-Framed-IP-Address	Y	Y	Y	n/a	String	Single	An IP address
IETF-Radius-Framed-IP-Netmask	Y	Y	Y	n/a	String	Single	An IP address mask

Table C-8 Security Appliance Supported IETF RADIUS Attributes and Values

IETF-Radius-Idle-Timeout	Y	Y	Y	28	Integer	Single	seconds
IETF-Radius-Service-Type	Y	Y	Y	6	Integer	Single	seconds. Possible Service Type values: .Administrative—user is allowed access to configure prompt. .NAS-Prompt—user is allowed access to exec prompt. .remote-access—user is allowed network access
IETF-Radius-Session-Timeout	Y	Y	Y	27	Integer	Single	seconds

Configuring an External TACACS+ Server

The adaptive security appliance provides support for TACACS+ attributes. TACACS+ separates the functions of authentication, authorization, and accounting. The protocol supports two types of attributes: mandatory and optional. Both the server and client must understand a mandatory attribute, and the mandatory attribute must be applied to the user. An optional attribute may or may not be understood or used.

Note To use TACACS+ attributes, make sure you have enabled AAA services on the NAS.

Table C-9 lists supported TACACS+ authorization response attributes for cut-through-proxy connections. Table C-10 lists supported TACACS+ accounting attributes.

Table C-9 Supported TACACS+ Authorization Response Attributes

Attribute	Description
acl	Identifies a locally configured access list to be applied to the connection.
idletime	Indicates the amount of inactivity in minutes that is allowed before the authenticated user session is terminated.
timeout	Specifies the absolute amount of time in minutes that authentication credentials remain active before the authenticated user session is terminated.

Table C-10 Supported TACACS+ Accounting Attributes

Attribute	Description
bytes_in	Specifies the number of input bytes transferred during this connection (stop records only).
bytes_out	Specifies the number of output bytes transferred during this connection (stop records only).
cmd	Defines the command executed (command accounting only).
disc-cause	Indicates the numeric code that identifies the reason for disconnecting (stop records only).

Table C-10 Supported TACACS+ Accounting Attributes (continued)

Attribute	Description
elapsed_time	Defines the elapsed time in seconds for the connection (stop records only).
foreign_ip	Specifies the IP address of the client for tunnel connections. Defines the address on the lowest security interface for cut-through-proxy connections.
local_ip	Specifies the IP address that the client connected to for tunnel connections. Defines the address on the highest security interface for cut-through-proxy connections.
NAS port	Contains a session ID for the connection.
packs_in	Specifies the number of input packets transferred during this connection.
packs_out	Specifies the number of output packets transferred during this connection.
priv-level	Set to the user's privilege level for command accounting requests or to 1 otherwise.
rem_iddr	Indicates the IP address of the client.
service	Specifies the service used. Always set to "shell" for command accounting only.
task_id	Specifies a unique task ID for the accounting transaction.
username	Indicates the name of the user.