

RADIUS Servers for AAA

This chapter describes how to configure RADIUS servers for AAA.

- About RADIUS Servers for AAA, on page 1
- Guidelines for RADIUS Servers for AAA, on page 18
- Configure RADIUS Servers for AAA, on page 18
- Test RADIUS Server Authentication and Authorization, on page 23
- Monitoring RADIUS Servers for AAA, on page 24
- History for RADIUS Servers for AAA, on page 24

About RADIUS Servers for AAA

The Cisco ASA supports the following RFC-compliant RADIUS servers for AAA:

- Cisco Secure ACS 3.2, 4.0, 4.1, 4.2, and 5.x
- Cisco Identity Services Engine (ISE)
- RSA RADIUS in RSA Authentication Manager 5.2, 6.1, and 7.x
- Microsoft

Supported Authentication Methods

The ASA supports the following authentication methods with RADIUS servers:

- PAP—For all connection types.
- CHAP and MS-CHAPv1—For L2TP-over-IPsec connections.
- MS-CHAPv2—For L2TP-over-IPsec connections, and for regular IPsec remote access connections when the password management feature is enabled. You can also use MS-CHAPv2 with clientless connections.
- Authentication Proxy modes—For RADIUS-to Active-Directory, RADIUS-to-RSA/SDI, RADIUS-to-Token server, and RSA/SDI-to-RADIUS connections,



Note To enable MS-CHAPv2 as the protocol used between the ASA and the RADIUS server for a VPN connection, password management must be enabled in the tunnel group general attributes. Enabling password management generates an MS-CHAPv2 authentication request from the ASA to the RADIUS server. See the description of the **password-management** command for details.

If you use double authentication and enable password management in the tunnel group, then the primary and secondary authentication requests include MS-CHAPv2 request attributes. If a RADIUS server does not support MS-CHAPv2, then you can configure that server to send a non-MS-CHAPv2 authentication request by using the **no mschapv2-capable** command.

User Authorization of VPN Connections

The ASA can use RADIUS servers for user authorization of VPN remote access and firewall cut-through-proxy sessions using dynamic ACLs or ACL names per user. To implement dynamic ACLs, you must configure the RADIUS server to support them. When the user authenticates, the RADIUS server sends a downloadable ACL or ACL name to the ASA. Access to a given service is either permitted or denied by the ACL. The ASA deletes the ACL when the authentication session expires.

In addition to ACLs, the ASA supports many other attributes for authorization and setting of permissions for VPN remote access and firewall cut-through proxy sessions.

Supported Sets of RADIUS Attributes

The ASA supports the following sets of RADIUS attributes:

- Authentication attributes defined in RFC 2138.
- Accounting attributes defined in RFC 2139.
- RADIUS attributes for tunneled protocol support, defined in RFC 2868.
- Cisco IOS Vendor-Specific Attributes (VSAs), identified by RADIUS vendor ID 9.
- Cisco VPN-related VSAs, identified by RADIUS vendor ID 3076.
- Microsoft VSAs, defined in RFC 2548.

Supported 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. These attributes have vendor ID 3076.

The following table lists the 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 ASAs enforce the RADIUS attributes based on attribute numeric ID, not attribute name.

All attributes listed in the following table are downstream attributes that are sent from the RADIUS server to the ASA except for the following attribute numbers: 146, 150, 151, and 152. These attribute numbers are upstream attributes that are sent from the ASA to the RADIUS server. RADIUS attributes 146 and 150 are sent from the ASA to the RADIUS server for authentication and authorization requests. All four previously listed attributes are sent from the ASA to the RADIUS server for accounting start, interim-update, and stop requests. Upstream RADIUS attributes 146, 150, 151, and 152 were introduced in Version 8.4(3).

Table 1: Supported RADIUS Authorization Attributes

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
Access-Hours	Y	1	String	Single	Name of the time range, for example, Business-hours
Access-List-Inbound	Y	86	String	Single	ACL ID
Access-List-Outbound	Y	87	String	Single	ACL ID
Address-Pools	Y	217	String	Single	Name of IP local pool
Allow-Network-Extension-Mode	Y	64	Boolean	Single	0 = Disabled 1 = Enabled
Authenticated-User-Idle-Timeout	Y	50	Integer	Single	1-35791394 minutes
Authorization-DN-Field	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
Authorization-Required		66	Integer	Single	0 = No 1 = Yes
Authorization-Type	Y	65	Integer	Single	0 = None 1 = RADIUS 2 = LDAP
Banner1	Y	15	String	Single	Banner string to display for Cisco VPN remote access sessions: IPsec IKEv1, AnyConnect SSL-TLS/DTLS/IKEv2, and Clientless SSL

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
Banner2	Y	36	String	Single	Banner string to display for Cisco VPN remote access sessions: IPsec IKEv1, AnyConnect SSL-TLS/DTLS/IKEv2, and Clientless SSL. The Banner2 string is concatenated to the Banner1 string , if configured.
Cisco-IP-Phone-Bypass	Y	51	Integer	Single	0 = Disabled 1 = Enabled
Cisco-LEAP-Bypass	Y	75	Integer	Single	0 = Disabled 1 = Enabled
Client Type	Y	150	Integer	Single	1 = Cisco VPN Client (IKEv1) 2 = AnyConnect Client SSL VPN 3 = Clientless SSL VPN 4 = Cut-Through-Proxy 5 = L2TP/IPsec SSL VPN 6 = AnyConnect Client IPsec VPN (IKEv2)
Client-Type-Version-Limiting	Y	77	String	Single	IPsec VPN version number string
DHCP-Network-Scope	Y	61	String	Single	IP Address
Extended-Authentication-On-Rekey	Y	122	Integer	Single	0 = Disabled 1 = Enabled

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
Framed-Interface-Id	Y	96	String	Single	Assigned IPv6 interface ID. Combines with Framed-IPv6-Prefix to create a complete assigned IPv6 address. For example: Framed-Interface-ID=1:1:1:1 combined with Framed-IPv6-Prefix=2001:0db8::/64 gives the assigned IP address 2001:0db8::1:1:1:1.
Framed-IPv6-Prefix	Y	97	String	Single	Assigned IPv6 prefix and length. Combines with Framed-Interface-Id to create a complete assigned IPv6 address. For example: prefix 2001:0db8::/64 combined with Framed-Interface-Id=1:1:1:1 gives the IP address 2001:0db8::1:1:1:1. You can use this attribute to assign an IP address without using Framed-Interface-Id, by assigning the full IPv6 address with prefix length /128, for example, Framed-IPv6-Prefix=2001:0db8::1/128.

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
Group-Policy	Y	25	String	Single	Sets the group policy for the remote access VPN session. For Versions 8.2.x and later, use this attribute instead of IETF-Radius-Class. You can use one of the following formats: • *group policy name* • OU=*group policy name* • OU=*group policy name*;
IE-Proxy-Bypass-Local		83	Integer	Single	0 = None 1 = Local
IE-Proxy-Exception-List		82	String	Single	New line (\n) separated list of DNS domains
IE-Proxy-PAC-URL	Y	133	String	Single	PAC address string
IE-Proxy-Server		80	String	Single	IP address
IE-Proxy-Server-Policy		81	Integer	Single	1 = No Modify 2 = No Proxy 3 = Auto detect 4 = Use Concentrator Setting
IKE-KeepAlive-Confidence-Interval	Y	68	Integer	Single	10-300 seconds
IKE-Keepalive-Retry-Interval	Y	84	Integer	Single	2-10 seconds
IKE-Keep-Alives	Y	41	Boolean	Single	0 = Disabled 1 = Enabled
Intercept-DHCP-Configure-Msg	Y	62	Boolean	Single	0 = Disabled 1 = Enabled
IPsec-Allow-Passwd-Store	Y	16	Boolean	Single	0 = Disabled 1 = Enabled

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
IPsec-Authentication		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
IPsec-Auth-On-Rekey	Y	42	Boolean	Single	0 = Disabled 1 = Enabled
IPsec-Backup-Server-List	Y	60	String	Single	Server Addresses (space delimited)
IPsec-Backup-Servers	Y	59	String	Single	1 = Use Client-Configured list 2 = Disable and clear client list 3 = Use Backup Server list
IPsec-Client-Firewall-Filter-Name		57	String	Single	Specifies the name of the filter to be pushed to the client as firewall policy
IPsec-Client-Firewall-Filter-Optional	Y	58	Integer	Single	0 = Required 1 = Optional
IPsec-Default-Domain	Y	28	String	Single	Specifies the single default domain name to send to the client (1-255 characters).
IPsec-IKE-Peer-ID-Check	Y	40	Integer	Single	1 = Required 2 = If supported by peer certificate 3 = Do not check
IPsec-IP-Compression	Y	39	Integer	Single	0 = Disabled 1 = Enabled
IPsec-Mode-Config	Y	31	Boolean	Single	0 = Disabled 1 = Enabled
IPsec-Over-UDP	Y	34	Boolean	Single	0 = Disabled 1 = Enabled

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
IPsec-Over-UDP-Port	Y	35	Integer	Single	4001- 49151. The default is 10000.
IPsec-Required-Client-Firewall-Capability	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-Sec-Association		12	String	Single	Name of the security association
IPsec-Split-DNS-Names	Y	29	String	Single	Specifies the list of secondary domain names to send to the client (1-255 characters).
IPsec-Split-Tunneling-Policy	Y	55	Integer	Single	0 = No split tunneling 1 = Split tunneling 2 = Local LAN permitted
IPsec-Split-Tunnel-List	Y	27	String	Single	Specifies the name of the network or ACL that describes the split tunnel inclusion list.
IPsec-Tunnel-Type	Y	30	Integer	Single	1 = LAN-to-LAN 2 = Remote access
IPsec-User-Group-Lock		33	Boolean	Single	0 = Disabled 1 = Enabled
IPv6-Address-Pools	Y	218	String	Single	Name of IP local pool-IPv6
IPv6-VPN-Filter	Y	219	String	Single	ACL value
L2TP-Encryption		21	Integer	Single	Bitmap: 1 = Encryption required 2 = 40 bits 4 = 128 bits 8 = Stateless-Req 15= 40/128-Encr/Stateless-Req
L2TP-MPPC-Compression		38	Integer	Single	0 = Disabled 1 = Enabled

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
Member-Of	Y	145	String	Single	Comma-delimited string, for example: `Engineering, Sales` An administrative attribute that can be used in dynamic access policies. It does not set a group policy.
MS-Client-Subnet-Mask	Y	63	Boolean	Single	An IP address
NAC-Default-ACL		92	String		ACL
NAC-Enable		89	Integer	Single	0 = No 1 = Yes
NAC-Revalidation-Timer		91	Integer	Single	300-86400 seconds
NAC-Settings	Y	141	String	Single	Name of the NAC policy
NAC-Status-Query-Timer		90	Integer	Single	30-1800 seconds
Perfect-Forward-Secrecy-Enable	Y	88	Boolean	Single	0 = No 1 = Yes
PPTP-Encryption		20	Integer	Single	Bitmap: 1 = Encryption required 2 = 40 bits 4 = 128 bits 8 = Stateless-Required 15= 40/128-Encr/Stateless-Req
PPTP-MPPC-Compression		37	Integer	Single	0 = Disabled 1 = Enabled
Primary-DNS	Y	5	String	Single	An IP address
Primary-WINS	Y	7	String	Single	An IP address
Privilege-Level	Y	220	Integer	Single	An integer between 0 and 15.

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
Required-Client-Firewall-Vendor-Code	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-Description	Y	47	String	Single	String
Required-Client-Firewall-Product-Code	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-Individual-User-Auth	Y	49	Integer	Single	0 = Disabled 1 = Enabled
Require-HW-Client-Auth	Y	48	Boolean	Single	0 = Disabled 1 = Enabled
Secondary-DNS	Y	6	String	Single	An IP address
Secondary-WINS	Y	8	String	Single	An IP address
SEP-Card-Assignment		9	Integer	Single	Not used

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
Session Subtype	Y	152	Integer	Single	0 = None 1 = Clientless 2 = Client 3 = Client Only Session Subtype applies only when the Session Type (151) attribute has the following values: 1, 2, 3, and 4.
Session Type	Y	151	Integer	Single	0 = None 1 = AnyConnect Client SSL VPN 2 = AnyConnect Client IPSec VPN (IKEv2) 3 = Clientless SSL VPN 4 = Clientless Email Proxy 5 = Cisco VPN Client (IKEv1) 6 = IKEv1 LAN-LAN 7 = IKEv2 LAN-LAN 8 = VPN Load Balancing
Simultaneous-Logins	Y	2	Integer	Single	0-2147483647
Smart-Tunnel	Y	136	String	Single	Name of a Smart Tunnel
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
Strip-Realm	Y	135	Boolean	Single	0 = Disabled 1 = Enabled
SVC-Ask	Y	131	String	Single	0 = Disabled 1 = Enabled 3 = Enable default service 5 = Enable default clientless (2 and 4 not used)

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
SVC-Ask-Timeout	Y	132	Integer	Single	5-120 seconds
SVC-DPD-Interval-Client	Y	108	Integer	Single	0 = Off 5-3600 seconds
SVC-DPD-Interval-Gateway	Y	109	Integer	Single	0 = Off) 5-3600 seconds
SVC-DTLS	Y	123	Integer	Single	0 = False 1 = True
SVC-Keepalive	Y	107	Integer	Single	0 = Off 15-600 seconds
SVC-Modules	Y	127	String	Single	String (name of a module)
SVC-MTU	Y	125	Integer	Single	MTU value 256-1406 in bytes
SVC-Profiles	Y	128	String	Single	String (name of a profile)
SVC-Rekey-Time	Y	110	Integer	Single	0 = Disabled 1-10080 minutes
Tunnel Group Name	Y	146	String	Single	1-253 characters
Tunnel-Group-Lock	Y	85	String	Single	Name of the tunnel group or “none”
Tunneling-Protocols	Y	11	Integer	Single	1 = PPTP 2 = L2TP 4 = IPSec (IKEv1) 8 = L2TP/IPSec 16 = WebVPN 32 = SVC 64 = IPsec (IKEv2) 8 and 4 are mutually exclusive. 0 - 11, 16 - 27, 32 - 43, 48 - 59 are legal values.
Use-Client-Address		17	Boolean	Single	0 = Disabled 1 = Enabled
VLAN	Y	140	Integer	Single	0-4094
WebVPN-Access-List	Y	73	String	Single	Access-List name
WebVPN ACL	Y	73	String	Single	Name of a WebVPN ACL on the device
WebVPN-ActiveX-Relay	Y	137	Integer	Single	0 = Disabled Otherwise = Enabled

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
WebVPN-Apply-ACL	Y	102	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Auto-HTTP-Signon	Y	124	String	Single	Reserved
WebVPN-Citrix-Metaframe-Enable	Y	101	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Content-Filter-Parameters	Y	69	Integer	Single	1 = Java ActiveX 2 = Java Script 4 = Image 8 = Cookies in images
WebVPN-Customization	Y	113	String	Single	Name of the customization
WebVPN-Default-Homepage	Y	76	String	Single	A URL such as http://example-example.com
WebVPN-Deny-Message	Y	116	String	Single	Valid string (up to 500 characters)
WebVPN-Download_Max-Size	Y	157	Integer	Single	0x7fffffff
WebVPN-File-Access-Enable	Y	94	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-File-Server-Browsing-Enable	Y	96	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-File-Server-Entry-Enable	Y	95	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Group-Based-HTTP/HTTPS-Proxy-Exceptions	Y	78	String	Single	Comma-separated DNS/IP with an optional wildcard (*) (for example *.cisco.com, 192.168.1.*, wwwin.cisco.com)
WebVPN-Hidden-Shares	Y	126	Integer	Single	0 = None 1 = Visible
WebVPN-Home-Page-Use-Smart-Tunnel	Y	228	Boolean	Single	Enabled if clientless home page is to be rendered through Smart Tunnel.
WebVPN-HTML-Filter	Y	69	Bitmap	Single	1 = Java ActiveX 2 = Scripts 4 = Image 8 = Cookies

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
WebVPN-HTTP-Compression	Y	120	Integer	Single	0 = Off 1 = Deflate Compression
WebVPN-HTTP-Proxy-IP-Address	Y	74	String	Single	Comma-separated DNS/IP:port, with http= or https= prefix (for example http=10.10.10.10:80, https=11.11.11.11:443)
WebVPN-Idle-Timeout-Alert-Interval	Y	148	Integer	Single	0-30. 0 = Disabled.
WebVPN-Keepalive-Ignore	Y	121	Integer	Single	0-900
WebVPN-Macro-Substitution	Y	223	String	Single	Unbounded.
WebVPN-Macro-Substitution	Y	224	String	Single	Unbounded.
WebVPN-Port-Forwarding-Enable	Y	97	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Port-Forwarding-Exchange-Proxy-Enable	Y	98	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Port-Forwarding-HTTP-Proxy	Y	99	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-Port-Forwarding-List	Y	72	String	Single	Port forwarding list name
WebVPN-Port-Forwarding-Name	Y	79	String	Single	String name (example, “Corporate-Apps”). This text replaces the default string, “Application Access,” on the clientless portal home page.
WebVPN-Post-Max-Size	Y	159	Integer	Single	0x7fffffff
WebVPN-Session-Timeout-Alert-Interval	Y	149	Integer	Single	0-30. 0 = Disabled.
WebVPN SmartCard-Removal-Disconnect	Y	225	Boolean	Single	0 = Disabled 1 = Enabled
WebVPN-Smart-Tunnel	Y	136	String	Single	Name of a Smart Tunnel

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
WebVPN-SmartTunnel-AutoSignOn	Y	139	String	Single	Name of a Smart Tunnel auto sign-on list appended by the domain name
WebVPN-SmartTunnel-Auto-Start	Y	138	Integer	Single	0 = Disabled 1 = Enabled 2 = Auto Start
WebVPN-SmartTunnel-Tunnel-Policy	Y	227	String	Single	One of "e networkname," "i networkname," or "a," where networkname is the name of a Smart Tunnel network list, e indicates the tunnel excluded, i indicates the tunnel specified, and a indicates all tunnels.
WebVPN-SSL-VPN-Client-Enable	Y	103	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-SSL-VPN-Client-Keep-Installation	Y	105	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-SSL-VPN-Client-Required	Y	104	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-SSO-Server-Name	Y	114	String	Single	Valid string
WebVPN-Storage-Key	Y	162	String	Single	
WebVPN-Storage-Objects	Y	161	String	Single	
WebVPN-SVC-Keepalive-Frequency	Y	107	Integer	Single	15-600 seconds, 0=Off
WebVPN-SVC-Client-DPD-Frequency	Y	108	Integer	Single	5-3600 seconds, 0=Off
WebVPN-SVC-DTLS-Enable	Y	123	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-SVC-DTLS-MTU	Y	125	Integer	Single	MTU value is from 256-1406 bytes.
WebVPN-SVC-Gateway-DPD-Frequency	Y	109	Integer	Single	5-3600 seconds, 0=Off

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
WebVPN-SVC-Rekey-Time	Y	110	Integer	Single	4-10080 minutes, 0=Off
WebVPN-SVC-Rekey-Method	Y	111	Integer	Single	0 (Off), 1 (SSL), 2 (New Tunnel)
WebVPN-SVC-Compression	Y	112	Integer	Single	0 (Off), 1 (Deflate Compression)
WebVPN-UNIX-Group-ID (GID)	Y	222	Integer	Single	Valid UNIX group IDs
WebVPN-UNIX-User-ID (UIDs)	Y	221	Integer	Single	Valid UNIX user IDs
WebVPN-Upload-Max-Size	Y	158	Integer	Single	0x7fffffff
WebVPN-URL-Entry-Enable	Y	93	Integer	Single	0 = Disabled 1 = Enabled
WebVPN-URL-List	Y	71	String	Single	URL list name
WebVPN-User-Storage	Y	160	String	Single	
WebVPN-VDI	Y	163	String	Single	List of settings

Supported IETF RADIUS Authorization Attributes

The following table lists the supported IETF RADIUS attributes.

Table 2: Supported IETF RADIUS Attributes

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
IETF-Radius-Class	Y	25		Single	For Versions 8.2.x and later, we recommend that you use the Group-Policy attribute (VSA 3076, #25): • *group policy name* • OU=*group policy name* • OU=*group policy name*

Attribute Name	ASA	Attr. No.	Syntax/Type	Single or Multi-Valued	Description or Value
IETF-Radius-Filter-Id	Y	11	String	Single	ACL name that is defined on the ASA, which applies only to full tunnel IPsec and SSL VPN clients.
IETF-Radius-Framed-IP-Address	Y	n/a	String	Single	An IP address
IETF-Radius-Framed-IP-Netmask	Y	n/a	String	Single	An IP address mask
IETF-Radius-Idle-Timeout	Y	28	Integer	Single	Seconds
IETF-Radius-Service-Type	Y	6	Integer	Single	Seconds. Possible Service Type values: • Administrative—User is allowed access to the configure prompt. • NAS-Prompt—User is allowed access to the exec prompt. • remote-access—User is allowed network access
IETF-Radius-Session-Timeout	Y	27	Integer	Single	Seconds

RADIUS Accounting Disconnect Reason Codes

These codes are returned if the ASA encounters a disconnect when sending packets:

Disconnect Reason Code
ACCT_DISC_USER_REQ = 1
ACCT_DISC_LOST_CARRIER = 2
ACCT_DISC_LOST_SERVICE = 3
ACCT_DISC_IDLE_TIMEOUT = 4
ACCT_DISC_SESS_TIMEOUT = 5
ACCT_DISC_ADMIN_RESET = 6

Disconnect Reason Code
ACCT_DISC_ADMIN_REBOOT = 7
ACCT_DISC_PORT_ERROR = 8
ACCT_DISC_NAS_ERROR = 9
ACCT_DISC_NAS_REQUEST = 10
ACCT_DISC_NAS_REBOOT = 11
ACCT_DISC_PORT_UNNEEDED = 12
ACCT_DISC_PORT_PREEMPTED = 13
ACCT_DISC_PORT_SUSPENDED = 14
ACCT_DISC_SERV_UNAVAIL = 15
ACCT_DISC_CALLBACK = 16
ACCT_DISC_USER_ERROR = 17
ACCT_DISC_HOST_REQUEST = 18
ACCT_DISC_ADMIN_SHUTDOWN = 19
ACCT_DISC_SA_EXPIRED = 21
ACCT_DISC_MAX_REASONS = 22

Guidelines for RADIUS Servers for AAA

This section describes the guidelines and limitations that you should check before configuring RADIUS servers for AAA.

- You can have up to 100 server groups in single mode or 4 server groups per context in multiple mode.
- Each group can have up to 16 servers in single mode or 4 servers in multiple mode.

Configure RADIUS Servers for AAA

This section describes how to configure RADIUS servers for AAA.

Procedure

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

- If you are using Cisco ACS: the server already has these attributes integrated. You can skip this step.
- For RADIUS servers from other vendors (for example, Microsoft Internet Authentication Service): you must manually define each ASA attribute. To define an attribute, use the attribute name or number, type, value, and vendor code (3076).

Step 2 Configure RADIUS Server Groups, on page 19.

Step 3 Add a RADIUS Server to a Group, on page 21.

Step 4 (Optional) Add an Authentication Prompt, on page 23.

Configure RADIUS Server Groups

If you want to use an external RADIUS server for authentication, authorization, or accounting, you must first create at least one RADIUS server group per AAA protocol and add one or more servers to each group.

Procedure

Step 1 Choose **Configuration** > **Device Management** > **Users/AAA** > **AAA Server Groups**.

Step 2 Click **Add** in the **AAA Server Groups** area.

The **Add AAA Server Group** dialog box appears.

Step 3 Enter a name for the group in the **AAA Server Group** field.

Step 4 Choose the RADIUS server type from the **Protocol** drop-down list.

Step 5 Select the **Accounting Mode**.

- **Simultaneous**—Send accounting data to all servers in the group.
- **Single**—Send accounting data to only one server.

Step 6 Configure the method (**Reactivation Mode**) by which failed servers in a group are reactivated.

- **Depletion**, **Dead Time**—Reactivate failed servers only after all of the servers in the group are inactive. This is the default reactivation mode. Specify the amount of time, between 0 and 1440 minutes, that elapses between the disabling of the last server in the group and the subsequent reenabling of all servers. The default is 10 minutes.
- **Timed**—Reactivate failed servers after 30 seconds of down time.

Step 7 In **Max Failed Attempts**, specify the maximum number of failed AAA transactions with a RADIUS server in the group before trying the next server.

The range is from 1 and 5. The default is 3.

If you configure a fallback method using the local database (for management access only), and all the servers in the group fail to respond, or their responses are invalid, then the group is considered to be unresponsive, and the fallback method is tried. The server group remains marked as unresponsive for a period of 10 minutes (if you use the default reactivation mode and dead time), so that additional AAA requests within that period do not attempt to contact the server group, and the fallback method is used immediately. To change the unresponsive period from the default, see change the **Dead Time**.

If you do not have a fallback method, the ASA continues to retry the servers in the group.

Step 8 (Optional.) Enable the periodic generation of RADIUS interim-accounting-update messages by selecting the desired options.

These options are relevant only if you are using this server group for AnyConnect or clientless SSL VPN.

- **Enable interim accounting update**—If you use this command without selecting the **Update Interval** option, the ASA sends interim-accounting-update messages only when a VPN tunnel connection is added to a clientless VPN session. When this happens the accounting update is generated in order to inform the RADIUS server of the newly assigned IP address.
- **Update Interval**—Enables the periodic generation and transmission of accounting records for every VPN session that is configured to send accounting records to the server group in question. You can change the interval, in hours, for sending these updates. The default is 24 hours, the range is 1 to 120.

Note For server groups containing ISE servers, select both options. ISE maintains a directory of active sessions based on the accounting records that it receives from NAS devices like the ASA. However, if ISE does not receive any indication that the session is still active (accounting message or posture transactions) for a period of 5 days, it will remove the session record from its database. To ensure that long-lived VPN connections are not removed, configure the group to send periodic interim-accounting-update messages to ISE for all active sessions.

Step 9 (Optional.) If this group contains AD Agents or Cisco Directory Agent (CDA) servers only, select **Enable Active Directory Agent Mode**.

CDA or AD Agents are used in identity firewall, and are not full-featured RADIUS servers. If you select this option, you can use this group for identity firewall purposes only.

Step 10 (Optional) If you are using this server group for ISE Policy Enforcement in remote access VPN, configure the following options:

- **Enable dynamic authorization**—Enable the RADIUS Dynamic Authorization (ISE Change of Authorization, CoA) services for the AAA server group. When you use the server group in a VPN tunnel, the RADIUS server group will be registered for CoA notification and the ASA will listen to the port for the CoA policy updates from ISE. Enable dynamic authorization only if you are using this server group in a remote access VPN in conjunction with ISE.
- **Dynamic Authorization Port**—If you enable dynamic authorization, you can specify the listening port for RADIUS CoA requests. The default is 1700. The valid range is 1024 to 65535.
- **Use authorization only mode**—If you do not want to use ISE for authentication, enable authorize-only mode for the RADIUS server group. This indicates that when this server group is used for authorization, the RADIUS Access Request message will be built as an “Authorize Only” request as opposed to the configured password methods defined for the AAA server. If you do configure a common password for the RADIUS server, it will be ignored.

  For example, you would use authorize-only mode if you want to use certificates for authentication rather than this server group. You would still use this server group for authorization and accounting in the VPN tunnel.

Step 11 (Optional.) Configure the **VPN3K Compatibility Option** to specify whether or not a downloadable ACL received from a RADIUS packet should be merged with a Cisco AV pair ACL.

This option applies only to VPN connections. For VPN users, ACLs can be in the form of Cisco AV pair ACLs, downloadable ACLs, and an ACL that is configured on the ASA. This option determines whether or not the downloadable ACL and the AV pair ACL are merged, and does not apply to any ACLs configured on the ASA.

- **Do not merge** —Downloadable ACLs will not be merged with Cisco AV pair ACLs. If both an AV pair and a downloadable ACL are received, the AV pair has priority and is used. This is the default option.
- **Place the downloadable ACL after Cisco AV-pair ACL**
- **Place the downloadable ACL before Cisco AV-pair ACL**

Step 12 Click **OK**.

The **Add AAA Server Group** dialog box closes, and the new server group is added to the **AAA Server Groups** table.

Step 13 Click **Apply** to save the changes to the running configuration.

Add a RADIUS Server to a Group

To add a RADIUS server to a group, perform the following steps:

Procedure

Step 1 Choose **Configuration** > **Device Management** > **Users/AAA** > **AAA Server Groups**, and in the **AAA Server Groups** area, click the server group to which you want to add a server.

Step 2 Click **Add** in the **Servers in the Selected Group** area (lower pane).

The **Add AAA Server Group** dialog box appears for the server group.

Step 3 Choose the interface name on which the authentication server resides.

Step 4 Add either a server name or IP address for the server that you are adding to the group.

Step 5 Specify the timeout value for connection attempts to the server.

Specify the timeout interval (1-300 seconds) for the server; the default is 10 seconds. For each AAA transaction the ASA retries connection attempts (based on the retry interval) until the timeout is reached. If the number of consecutive failed transactions reaches the maximum-failed-attempts limit specified in the AAA server group, the AAA server is deactivated and the ASA starts sending requests to another AAA server if it is configured.

Step 6 Specify how you want the ASA to handle netmasks received in downloadable ACLs. Choose from the following options:

- **Detect automatically**—The ASA attempts to determine the type of netmask expression used. If the ASA detects a wildcard netmask expression, the ASA converts it to a standard netmask expression.

  Note Because some wildcard expressions are difficult to detect clearly, this setting may misinterpret a wildcard netmask expression as a standard netmask expression.

- **Standard**—The ASA assumes downloadable ACLs received from the RADIUS server contain only standard netmask expressions. No translation from wildcard netmask expressions is performed.
- **Wildcard**—The ASA assumes downloadable ACLs received from the RADIUS server contain only wildcard netmask expressions, and it converts them all to standard netmask expressions when the ACLs are downloaded.

Step 7 Specify a case-sensitive password that is common among users who access this RADIUS authorization server through this ASA. Be sure to provide this information to your RADIUS server administrator.

Note For an authentication RADIUS server (rather than authorization), do not configure a common password.

If you leave this field blank, the username is the password for accessing this RADIUS authorization server.

Never use a RADIUS authorization server for authentication. Common passwords or usernames as passwords are less secure than assigning unique user passwords.

Although the password is required by the RADIUS protocol and the RADIUS server, users do not need to know it.

Step 8 If you use double authentication and enable password management in the tunnel group, then the primary and secondary authentication requests include MS-CHAPv2 request attributes. If a RADIUS server does not support MS-CHAPv2, then you can configure that server to send a non-MS-CHAPv2 authentication request by unchecking this check box.

Step 9 Specify the length of time, from 1 to 10 seconds, that the ASA waits between attempts to contact the server.

Note For the RADIUS protocol, if the server responds with an ICMP Port Unreachable message, the retry-interval setting is ignored and the AAA server is immediately moved to the failed state. If this is the only server in the AAA group, it is reactivated and another request is sent to it. This is the intended behavior.

Step 10 Click **Simultaneous** or **Single**.

In Single mode, the ASA sends accounting data to only one server.

In Simultaneous mode, the ASA sends accounting data to all servers in the group.

Step 11 Specify the server port to be used for accounting of users. The default port is 1646.

Step 12 Specify the server port to be used for authentication of users. The default port is 1645.

Step 13 Specify the shared secret key used to authenticate the RADIUS server to the ASA. The server secret that you configure should match the one configured on the RADIUS server. If you do not know the server secret, ask the RADIUS server administrator. The maximum field length is 64 characters.

Step 14 Click **OK**.

The **Add AAA Server Group** dialog box closes, and the AAA server is added to the AAA server group.

Step 15 In the **AAA Server Groups** pane, click **Apply** to save the changes to the running configuration.

Add an Authentication Prompt

You can specify the AAA challenge text for HTTP, FTP, and Telnet access through the ASA when requiring user authentication from RADIUS servers. This text is primarily for cosmetic purposes and appears above the username and password prompts that users see when they log in. If you do not specify an authentication prompt, users see the following when authenticating with a RADIUS server:

Connection Type	Default Prompt
FTP	FTP authentication
HTTP	HTTP authentication
Telnet	None

To add an authentication prompt, perform the following steps:

Procedure

Step 1 Choose **Configuration** > **Device Management** > **Users/AAA** > **Authentication Prompt**.

Step 2 Enter text in the **Prompt** field to add as a message to appear above the username and password prompts that users see when they log in.

The following table shows the allowed character limits for authentication prompts:

Application	Character Limit
Microsoft Internet Explorer	37
Telnet	235
FTP	235

Step 3 Add messages in the **User accepted message** and **User rejected message** fields.

If the user authentication occurs from Telnet, you can use the **User accepted message** and **User rejected message** options to display different status prompts to indicate that the authentication attempt is either accepted or rejected by the RADIUS server.

If the RADIUS server authenticates the user, the ASA displays the **User accepted message** text, if specified, to the user; otherwise, the ASA displays the **User rejected message** text, if specified. Authentication of HTTP and FTP sessions displays only the challenge text at the prompt. The **User accepted message** and **User rejected message** text are not displayed.

Step 4 Click **Apply** to save the changes to the running configuration.

Test RADIUS Server Authentication and Authorization

To determine whether the ASA can contact a RADIUS server and authenticate or authorize a user, perform the following steps:

Procedure

Step 1 Choose **Configuration** > **Device Management** > **Users/AAA** > **AAA Server Groups**.

Step 2 Click the server group in which the server resides in the **AAA Server Groups** table.

Step 3 Click the server that you want to test in the **Servers in the Selected Group** table.

Step 4 Click **Test**.

The **Test AAA Server** dialog box appears for the selected server.

Step 5 Click the type of test that you want to perform—**Authentication** or **Authorization**.

Step 6 Enter a username.

Step 7 Enter the password for the username if you are testing authentication.

Step 8 Click **OK**.

The ASA sends an authentication or authorization test message to the server. If the test fails, an error message appears.

Monitoring RADIUS Servers for AAA

See the following commands for monitoring the status of RADIUS servers for AAA:

- **Monitoring > Properties > AAA Servers**

  This pane shows the RADIUS server running configuration.

- **Tools > Command Line Interface**

  This pane allows you to issue various non-interactive commands and view results.

History for RADIUS Servers for AAA

Table 3: History for RADIUS Servers for AAA

Feature Name	Platform Releases	Description
RADIUS Servers for AAA	7.0(1)	Describes how to configure RADIUS servers for AAA. We introduced the following screens: Configuration > Device Management > Users/AAA > AAA Server Groups Configuration > Device Management > Users/AAA > Authentication Prompt.

Feature Name	Platform Releases	Description
Key vendor-specific attributes (VSAs) sent in RADIUS access request and accounting request packets from the ASA	8.4(3)	Four New VSAs—Tunnel Group Name (146) and Client Type (150) are sent in RADIUS access request packets from the ASA. Session Type (151) and Session Subtype (152) are sent in RADIUS accounting request packets from the ASA. All four attributes are sent for all accounting request packet types: Start, Interim-Update, and Stop. The RADIUS server (for example, ACS and ISE) can then enforce authorization and policy attributes or use them for accounting and billing purposes.