



RADIUS Tunnel Attribute Extensions

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The RADIUS Tunnel Attribute Extensions feature allows a name to be specified (other than the default) for the tunnel initiator and the tunnel terminator in order to establish a higher level of security when setting up VPN tunneling.

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Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Prerequisites for RADIUS Tunnel Attribute Extensions

To use RADIUS attributes 90 and 91, you must complete the following tasks:

- Configure your NAS to support AAA.
- Configure your NAS to support RADIUS.
- Configure your NAS to support VPN.



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Restrictions for RADIUS Tunnel Attribute Extensions

Your RADIUS server must support tagged attributes to use RADIUS tunnel attributes 90 and 91.

Information About RADIUS Tunnel Attribute Extensions

The RADIUS Tunnel Attribute Extensions feature introduces RADIUS attribute 90 (Tunnel-Client-Auth-ID) and RADIUS attribute 91 (Tunnel-Server-Auth-ID). Both attributes help support the provision of compulsory tunneling in virtual private networks (VPNs) by allowing the user to specify authentication names for the network access server (NAS) and the RADIUS server.

- [How RADIUS Tunnel Attribute Extensions Work, page 2](#)

How RADIUS Tunnel Attribute Extensions Work

Once a NAS has set up communication with a RADIUS server, you can enable a tunneling protocol. Some applications of tunneling protocols are voluntary, but others involve compulsory tunneling; that is, a tunnel is created without any action from the user and without allowing the user any choice in the matter. In those cases, new RADIUS attributes are needed to carry the tunneling information from the NAS to the RADIUS server to establish authentication. These new RADIUS attributes are listed in the table below.



Note

In compulsory tunneling, any security measures in place apply only to traffic between the tunnel endpoints. Encryption or integrity protection of tunneled traffic must not be considered as a replacement for end-to-end security.

Table 1 *RADIUS Tunnel Attributes*

Number	IETF RADIUS Tunnel Attribute	Equivalent TACACS+ Attribute	Supported Protocols	Description
90	Tunnel-Client-Auth-ID	tunnel-id	<ul style="list-style-type: none"> • Layer 2 Forwarding (L2F) • Layer 2 Tunneling Protocol (L2TP) 	Specifies the name used by the tunnel initiator (also known as the NAS ¹) when authenticating tunnel setup with the tunnel terminator.

¹ When L2TP is used, the NAS is referred to as an L2TP access concentrator (LAC).

Number	IETF RADIUS Tunnel Attribute	Equivalent TACACS+ Attribute	Supported Protocols	Description
91	Tunnel-Server-Auth-ID	gw-name	<ul style="list-style-type: none"> Layer 2 Forwarding (L2F) Layer 2 Tunneling Protocol (L2TP) 	Specifies the name used by the tunnel terminator (also known as the Home Gateway ²) when authenticating tunnel setup with the tunnel initiator.

RADIUS attribute 90 and RADIUS attribute 91 are included in the following situations:

- If the RADIUS server accepts the request and the desired authentication name is different from the default, they must be included it.
- If an accounting request contains Acct-Status-Type attributes with values of either start or stop and pertains to a tunneled session, they should be included in.

How to Verify RADIUS Attribute 90 and RADIUS Attribute 91

To verify that RADIUS attribute 90 and RADIUS attribute 91 are being sent in access accepts and accounting requests, use the following command in privileged EXEC mode:

Command	Purpose
Router# debug radius	Displays information associated with RADIUS. The output of this command shows whether attribute 90 and attribute 91 are being sent in access accepts and accounting requests.

Configuration Examples for RADIUS Tunnel Attribute Extensions

- [L2TP Network Server Configuration Example, page 3](#)
- [RADIUS User Profile with RADIUS Tunneling Attributes 90 and 91 Example, page 4](#)

L2TP Network Server Configuration Example

The following example shows how to configure the LNS with a basic L2F and L2TP configuration using RADIUS tunneling attributes 90 and 91:

```
aaa new-model
aaa authentication login default none
aaa authentication login console none
aaa authentication ppp default local group radius
aaa authorization network default group radius if-authenticated
```

² When L2TP is used, the Home Gateway is referred to as an L2TP network server (LNS).

```

!
username l2f-cli-auth-id password 0 l2f-cli-pass
username l2f-svr-auth-id password 0 l2f-svr-pass
username l2tp-svr-auth-id password 0 l2tp-tnl-pass
!
vpdn enable
vpdn search-order domain
!
vpdn-group 1
accept-dialin
protocol l2f
virtual-template 1
terminate-from hostname l2f-cli-auth-id
local name l2f-svr-auth-id
!
vpdn-group 2
accept-dialin
protocol l2tp
virtual-template 2
terminate-from hostname l2tp-cli-auth-id
local name l2tp-svr-auth-id
!
interface Ethernet1/0
ip address 10.0.0.3 255.255.255.0
no ip route-cache
no ip mroute-cache
!
interface Virtual-Template1
ip unnumbered Ethernet1/0
ppp authentication pap
!
interface Virtual-Template2
ip unnumbered Ethernet1/0
ppp authentication pap
!
radius-server host 1.1.1.1 auth-port 1645 acct-port 1646
radius-server key <deleted>
!

```

RADIUS User Profile with RADIUS Tunneling Attributes 90 and 91 Example

The following is an example of a RADIUS user profile that includes RADIUS tunneling attributes 90 and 91. This entry supports two tunnels, one for L2F and the other for L2TP. The tag entries with :1 support L2F tunnels, and the tag entries with :2 support L2TP tunnels.

```

cisco.com Password = "cisco", Service-Type = Outbound
Service-Type = Outbound,
Tunnel-Type = :1:L2F,
Tunnel-Medium-Type = :1:IP,
Tunnel-Client-Endpoint = :1:"10.0.0.2",
Tunnel-Server-Endpoint = :1:"10.0.0.3",
Tunnel-Client-Auth-Id = :1:"l2f-cli-auth-id",
Tunnel-Server-Auth-Id = :1:"l2f-svr-auth-id",
Tunnel-Assignment-Id = :1:"l2f-assignment-id",
Cisco-Avpair = "vpdn:nas-password=l2f-cli-pass",
Cisco-Avpair = "vpdn:gw-password=l2f-svr-pass",
Tunnel-Preference = :1:1,
Tunnel-Type = :2:L2TP,
Tunnel-Medium-Type = :2:IP,
Tunnel-Client-Endpoint = :2:"10.0.0.2",
Tunnel-Server-Endpoint = :2:"10.0.0.3",
Tunnel-Client-Auth-Id = :2:"l2tp-cli-auth-id",
Tunnel-Server-Auth-Id = :2:"l2tp-svr-auth-id",
Tunnel-Assignment-Id = :2:"l2tp-assignment-id",
Cisco-Avpair = "vpdn:l2tp-tunnel-password=l2tp-tnl-pass",
Tunnel-Preference = :2:2

```

Additional References

The following sections provide references related to RADIUS Tunnel Attribute Extensions.

Related Documents

Related Topic	Document Title
Authentication	“ Configuring Authentication ” module.
RADIUS Attributes	“ RADIUS Attributes Overview and RADIUS IETF Attributes ” module.
Virtual private dialup networks (VPDN)	<i>Cisco IOS VPDN Configuration Guide</i> , Release 15.0.

Standards

Standard	Title
None.	--

MIBs

MIB	MIBs Link
None.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
RFC 2868	RADIUS Attributes for Tunnel Protocol Support

Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	http://www.cisco.com/techsupport

Feature Information for RADIUS Tunnel Attribute Extensions

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Table 2 *Feature Information for RADIUS Tunnel Attribute Extensions*

Feature Name	Releases	Feature Information
Feature Information for RADIUS Tunnel Attribute Extensions	12.1(5)T 12.2(4)B3 12.2(13)T	<p>The RADIUS Tunnel Attribute Extensions feature allows a name to be specified (other than the default) for the tunnel initiator and the tunnel terminator in order to establish a higher level of security when setting up VPN tunneling.</p> <p>This feature was introduced in Cisco IOS Release 12.1(5)T.</p> <p>This feature was integrated into Cisco IOS Release 12.2(4)B3.</p> <p>This feature was integrated into Cisco IOS Release 12.2(13)T.</p>

Glossary

Layer 2 Forwarding (L2F) --A Layer 2 tunneling protocol that enables an ISP or other access service to create a virtual tunnel to link customer remote sites or remote users with corporate home networks. In particular, a network access server (NAS) at the ISP point of presence (POP) exchanges PPP messages with the remote users and communicates by L2F or L2TP requests and responses with the customer tunnel server to set up tunnels.

Layer 2 Tunnel Protocol (L2TP) --A Layer 2 tunneling protocol that enables an ISP or other access service to create a virtual tunnel to link customer remote sites or remote users with corporate home networks. In particular, a network access server (NAS) at the ISP point of presence (POP) exchanges PPP messages with the remote users and communicates by L2F or L2TP requests and responses with the customer tunnel server to set up tunnels.

L2TP access concentrator (LAC) --A network access server (NAS) to which the client directly connects and through which PPP frames are tunneled to the L2TP network server (LNS). The LAC need only implement the media over which L2TP is to operate to pass traffic to one or more LNSs. The LAC may tunnel any protocol carried within PPP. The LAC initiates incoming calls and receives outgoing calls. A LAC is analogous to an L2F network access server.

L2TP network server (LNS) --A termination point for L2TP tunnels, and an access point where PPP frames are processed and passed to higher-layer protocols. An LNS can operate on any platform that terminates PPP. The LNS handles the server side of the L2TP protocol. L2TP relies only on the single medium over which L2TP tunnels arrive. The LNS initiates outgoing calls and receives incoming calls. An LNS is analogous to a home gateway in L2F technology.

network access server (NAS) --A Cisco platform, or collection of platforms, such as an AccessPath system, that interfaces between the packet world (such as the Internet) and the circuit-switched world (such as the PSTN).

tunnel--A virtual pipe between the L2TP access concentrator (LAC) and L2TP network server (LNS) that can carry multiple PPP sessions.

virtual private network (VPN)--A system that permits dial-in networks to exist remotely to home networks, while giving the appearance of being directly connected. VPNs use L2TP and L2F to terminate the Layer 2 and higher parts of the network connection at the L2TP network server (LNS) instead of the L2TP access concentrator (LAC).

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