

# Configuring Layer 2 Tunnel Protocol Authentication with RADIUS

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## Introduction

This document depicts how to configure a Layer 2 Tunnel Protocol (L2TP) Virtual Private Dialup Network (VPDN) scenario using tunnel attributes downloaded from a RADIUS server. In this example, the L2TP Access Concentrator (LAC) receives the incoming connection and contacts the LAC RADIUS server. The RADIUS server looks up the tunnel attributes for the user's domain (for example, cisco.com) and passes the tunnel attributes to the LAC. Based on these attributes, the LAC initiates a tunnel to the L2TP Network Server (LNS). Once the tunnel is established, the LNS authenticates the end user using its own RADIUS server.

**Note:** This document assumes that the NAS (LAC) has been configured for general Dial access. For more information on how to configure dial, refer to *Configuring Basic AAA RADIUS for Dial-in Clients*.

For more information on L2TP and VPDNs, refer to these documents:

- Understanding VPDN
- Configuring Virtual Private Networks
- Layer 2 Tunnel Protocol

# Prerequisites

## Requirements

There are no specific requirements for this document.

## Components Used

The information in this document is based on these software and hardware versions:

- Two Cisco 2511 routers
- Cisco IOS® Software Release 12.0(2).T
- Cisco Secure ACS for UNIX, Cisco Secure ACS for Windows, or Merit RADIUS

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

## Conventions

For more information on document conventions, refer to Cisco Technical Tips Conventions.

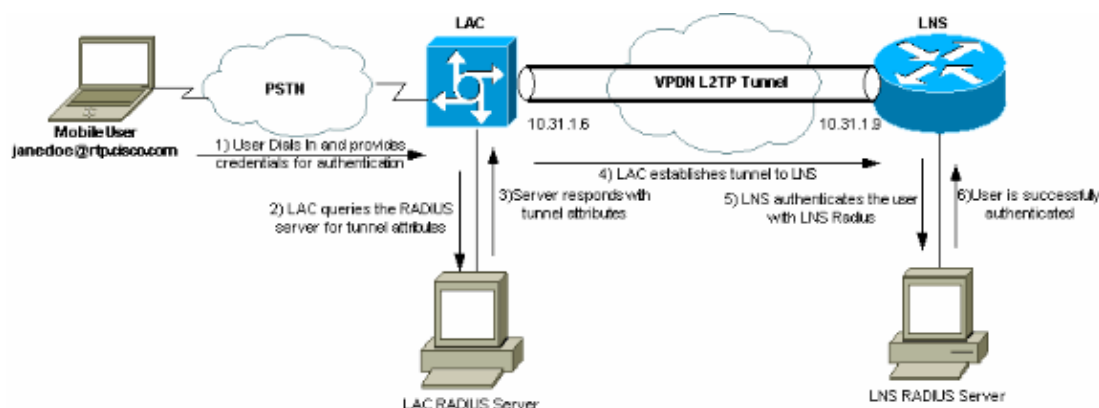
## RADIUS Server Configuration

In this section, you are presented with the information to configure the features described in this document.

**Note:** To find additional information on the commands used in this document, use the Command Lookup Tool (registered customers only) .

## Network Diagram

This document uses the network setup shown in this diagram.



## LAC RADIUS Configuration – Cisco Secure ACS for UNIX

The LAC RADIUS configuration includes the user "rtp.cisco.com" (which is the domain used by the client). The password for this user must be **cisco**.

```
# ./ViewProfile -p 9900 -u rtp.cisco.com
user = rtp.cisco.com{
```

```

radius=Cisco {
check_items= {
2="cisco"
}
reply_attributes= {
6=5
9,1="vpdn:tunnel-id=DEFGH"
9,1="vpdn:tunnel-type=l2tp"
9,1="vpdn:ip-addresses=10.31.1.9"
9,1="vpdn:l2tp-tunnel-password=ABCDE"
}
}
}

```

For more information on RADIUS configuration on the LAC, refer to the RADIUS Profile for Use by the LAC section within the Layer 2 Tunnel Protocol.

## LNS RADIUS Configuration – Cisco Secure ACS for UNIX

```

# ./ViewProfile -p 9900 -u janedoe@rtp.cisco.com
user = janedoe@rtp.cisco.com{
radius=Cisco {
check_items= {
2="rtp"
}
reply_attributes= {
6=2
7=1
}
}
}
}

```

## LAC RADIUS Configuration – Cisco Secure ACS for Windows

Complete these steps:

1. In the Network Configuration area, set up the LAC Network Access Server (NAS) authentication to use **RADIUS (Cisco IOS/PIX)**.
2. Configure the user 'rtp.cisco.com' with password **cisco** for both plain and CHAP. This is the username that is used for the tunnel attributes.
3. Click on the **Group Setting** button in the left navigation bar. Select the Group the user belongs to and click **Edit Settings**. Scroll down to the **IETF RADIUS** section and select Attribute 6 **Service-Type** as **Outbound**.

*If all checkable options do not appear, go into **Interface Configuration** and check the various boxes to make them appear in the group area.*

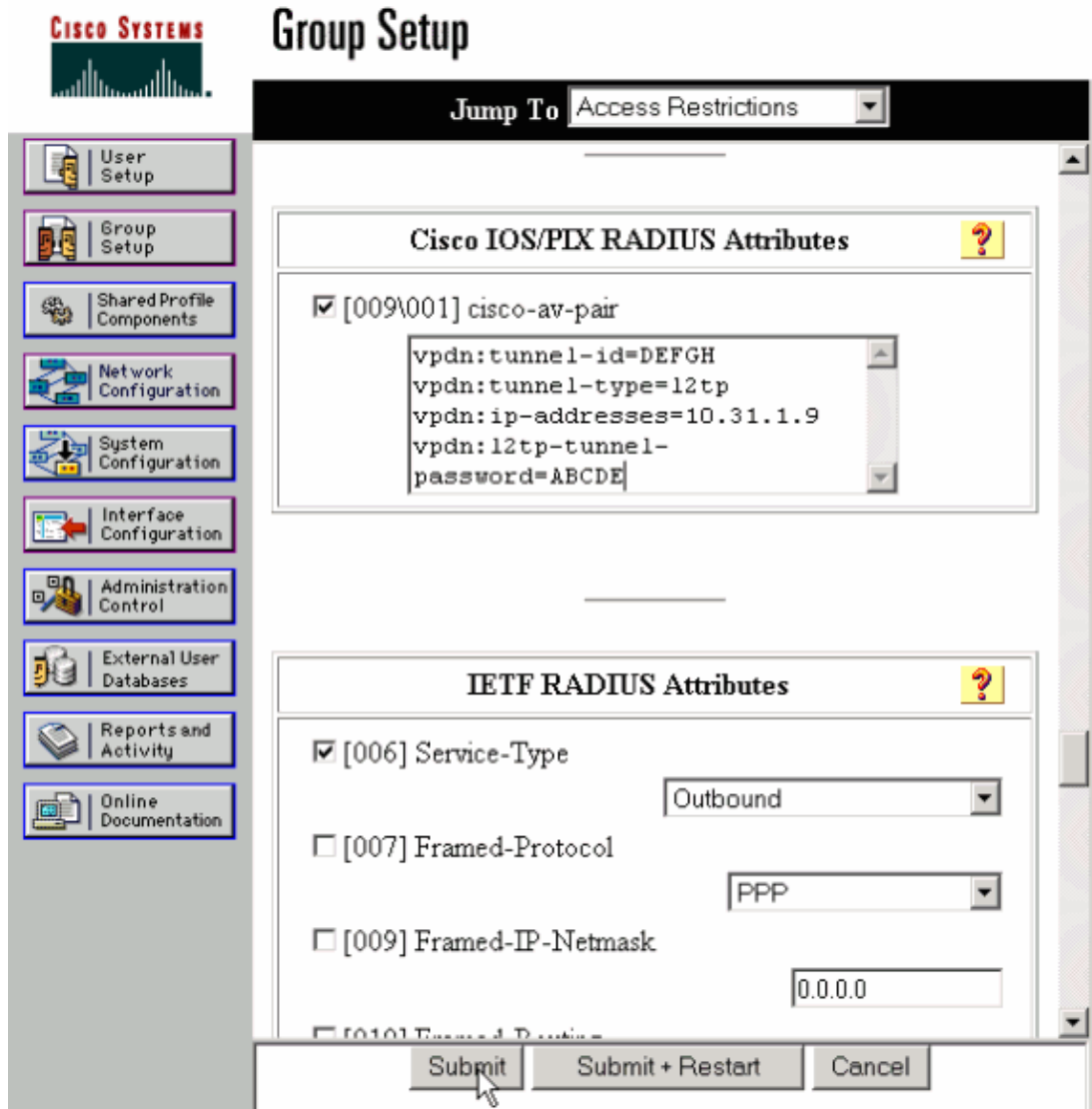
4. In the Cisco IOS/PIX RADIUS attributes section at the bottom, check the box for **009\001 cisco-av-pair**, and type this in the box:

```

vpdn:tunnel-id=DEFGH
vpdn:tunnel-type=l2tp
vpdn:ip-addresses=10.31.1.9
vpdn:l2tp-tunnel-password=ABCDE

```

For more information on RADIUS configuration on the LAC, refer to the RADIUS Profile for Use by the LAC section within Layer 2 Tunnel Protocol.



## LNS RADIUS Configuration – Cisco Secure ACS for Windows

Complete these steps:

1. Configure the user id **janedoe@rtp.cisco.com** and input any password for plain and CHAP.
2. Click on the **Group Setup** button in the left bar. Select the Group the user belongs to and click **Edit Settings**.
3. In the section for Internet Engineering Task Force (IETF) RADIUS Attributes, select **Service-type (attribute 6) = Framed** and **Framed-Protocol (attribute 7)=PPP** from the drop-down menu.

**Note:** You must also click the checkbox located next to the selected attributes **Service-Type** and **Framed-Protocol**.

## LAC RADIUS Configuration – Merit RADIUS

**Note:** Livingston and Merit servers must frequently be modified to support vendor-specific av-pairs.

```
rtp.cisco.com Password = "cisco"
Service-Type = Outbound-User,
cisco-avpair = "vpdn:tunnel-id=DEFGH",
cisco-avpair = "vpdn:tunnel-type=l2tp",
cisco-avpair = "vpdn:ip-addresses=10.31.1.9",
```

```
cisco-avpair = "vpdn:l2tp-tunnel-password=ABCDE"
```

For more information on RADIUS configuration on the LAC, refer to the RADIUS Profile for Use by the LAC section within Layer 2 Tunnel Protocol.

## LNS RADIUS Configuration – Merit RADIUS

```
janedoe@rtp.cisco.com Password = "rtp",  
Service-Type = Framed,  
Framed-Protocol = PPP
```

## Router Configurations

This document uses these configurations.

- LAC Router Configuration
- LNS Router Configuration

### LAC Router Configuration

```
LAC#show run  
Building configuration...  
  
Current configuration:  
!  
version 12.0  
service timestamps debug datetime  
service timestamps log uptime  
no service password-encryption  
!  
hostname LAC  
!  
  
!--- AAA commands needed to authenticate the user and obtain  
!--- VPDN tunnel information.  
  
aaa new-model  
aaa authentication login default local  
aaa authentication ppp default if-needed radius  
aaa authorization network default radius  
aaa accounting exec default start-stop radius  
aaa accounting network default start-stop radius  
enable secret level 7 5 $1$Dj3K$9jkyuJR6fJV2JO./Qt0lC1  
enable password ww  
!  
username cse password 0 csecse  
username john password 0 doe  
ip subnet-zero  
no ip domain-lookup  
!  
jn00=tfdf  
vpdn enable  
!  
  
!--- VPDN tunnel authorization is based on the domain name  
!--- (the default is DNIS).  
  
vpdn search-order domain  
!  
!  
!  
interface Loopback0
```

```
no ip address
no ip directed-broadcast
!
interface Ethernet0
ip address 10.31.1.6 255.255.255.0
no ip directed-broadcast
!
interface Serial0
no ip address
no ip directed-broadcast
no ip mroute-cache
shutdown
!
interface Serial1
no ip address
no ip directed-broadcast
shutdown
!
interface Async1
ip unnumbered Ethernet0
no ip directed-broadcast
ip tcp header-compression passive
encapsulation ppp
async mode dedicated
peer default ip address pool async
no cdp enable
ppp authentication chap
!
interface Group-Async1
physical-layer async
no ip address
no ip directed-broadcast
!
ip local pool default 10.5.5.5 10.5.5.50
ip local pool async 10.7.1.1 10.7.1.5
ip classless
ip route 0.0.0.0 0.0.0.0 10.31.1.1
!

!--- RADIUS server host and key.

radius-server host 171.68.118.101 auth-port 1645 acct-port 1646
radius-server key cisco
!
line con 0
transport input none
line 1
session-timeout 20
exec-timeout 0 0
password ww
autoselect during-login
autoselect ppp
modem InOut
transport preferred none
transport output none
stopbits 1
speed 38400
flowcontrol hardware
line 2 16
modem InOut
transport input all
speed 38400
flowcontrol hardware
line aux 0
line vty 0 4
password ww
```

```
!  
end
```

## LNS Router Configuration

```
LNS#show run  
Building configuration...  
  
Current configuration:  
!  
! Last configuration change at 12:17:54 UTC Sun Feb 7 1999  
!==m6knr5yui6yt6egv2wr25nfdlrsion 12.0=4rservice exec-callback  
service timestamps debug datetime  
service timestamps log uptime  
no service password-encryption  
!  
hostname LNS  
!  
aaa new-model  
aaa authentication login default local  
aaa authentication ppp default radius local  
aaa authorization network default radius local  
aaa accounting exec default start-stop radius  
aaa accounting network default start-stop radius  
enable secret 5 $1$pnYM$B.FveZjZpgA3C9ZPq/cma/  
enable password ww  
!  
username john password 0 doe  
  
!--- User the_LNS is used to authenticate the tunnel.  
!--- The password used here must match the vpdn:l2tp-tunnel-password  
!--- configured in the LAC RADIUS server.  
  
username the_LNS password 0 ABCDE  
ip subnet-zero  
!  
  
!--- Enable VPDN on the LNS.  
  
vpdn enable  
!  
  
!--- VPDN group for connection from the LAC.  
  
vpdn-group 1  
  
!--- This command specifies that the router uses  
!--- virtual-template 1 for tunnel-id DEFGH (which matches the tunnel-id  
!--- configured in the LAC RADIUS server).  
  
accept dialin l2tp virtual-template 1 remote DEFGH  
  
!--- The username used to authenticate this tunnel  
!--- is the_LNS (configured above).  
  
local name the_LNS  
!  
interface Ethernet0  
ip address 10.31.1.9 255.255.255.0  
no ip directed-broadcast  
!  
  
!--- Virtual-template that is used for the incoming connection.  
  
interface Virtual-Templat1
```

```

ip unnumbered Ethernet0
no ip directed-broadcast
peer default ip address pool default
ppp authentication chap
!
interface Serial0
no ip address
no ip directed-broadcast
no ip mroute-cache
shutdown
no fair-queue
!
interface Serial1
no ip address
no ip directed-broadcast
shutdown
!
interface Async1
ip unnumbered Ethernet0
no ip directed-broadcast
encapsulation ppp
async mode interactive
peer default ip address pool async
ppp authentication chap
!
ip local pool default 10.6.1.1 10.6.1.5
ip local pool async 10.8.100.100 10.8.100.110
ip classless
ip route 0.0.0.0 0.0.0.0 10.31.1.1
!

!--- RADIUS server host and key information.

radius-server host 171.68.120.194 auth-port 1645 acct-port 1646
radius-server key cisco
!
line con 0
transport input none
line 1
session-timeout 20
exec-timeout 5 0
password ww
autoselect during-login
autoselect ppp
modem InOut
transport input all
escape-character BREAK
stopbits 1
speed 38400
flowcontrol hardware
line 2 8
line aux 0
line vty 0 4
password ww
!
end

```

## Verify

This section provides information you can use to confirm your configuration is working properly.

Certain **show** commands are supported by the Output Interpreter Tool (registered customers only) , which allows you to view an analysis of **show** command output.



- **show vpdn tunnel** Displays information about all active Layer 2 Forwarding and L2TP tunnels in summary-style format.
- **show caller ip** Displays a summary of caller information for the IP address you provide.

## Troubleshoot

This section provides information you can use to troubleshoot your configuration.

## Troubleshooting Commands

**Note:** Before issuing **debug** commands, please see Important Information on Debug Commands.

- **debug aaa authentication** Displays information on AAA/TACACS+ authentication.
- **debug aaa authorization** Displays information on AAA/TACACS+ authorization.
- **debug aaa accounting** Displays information on accountable events as they occur. The information displayed by this command is independent of the accounting protocol used to transfer the accounting information to a server.
- **debug radius** Displays detailed debugging information associated with the RADIUS.
- **debug vtemplate** Displays cloning information for a virtual access interface from the time it is cloned from a virtual template to the time the virtual access interface comes down when the call ends.
- **debug vpdn error** Displays errors that prevent a PPP tunnel from being established or errors that cause an established tunnel to be closed.
- **debug vpdn events** Displays messages about events that are part of normal PPP tunnel establishment or shutdown.
- **debug vpdn l2x-errors** Displays Layer 2 protocol errors that prevent Layer 2 establishment or prevent its normal operation.
- **debug vpdn l2x-events** Displays messages about events that are part of normal PPP tunnel establishment or shutdown for Layer 2.
- **debug vpdn l2tp-sequencing** Displays messages about L2TP.

## Debug Output

For detailed description of the L2TP debugs, refer to L2TP Tunnel Setup and Teardown.

## Good Debug from LAC Router

```
LAC#show debug
General OS:
  AAA Authentication debugging is on
  AAA Authorization debugging is on
  AAA Accounting debugging is on
VPN:
  L2X protocol events debugging is on
  L2X protocol errors debugging is on
  VPDN events debugging is on
  VPDN errors debugging is on
  L2TP data sequencing debugging is on
VTEMPLATE:
  Virtual Template debugging is on
Radius protocol debugging is on
LAC#
Feb  7 12:22:16: As1 AAA/AUTHOR/FSM: (0):
  LCP succeeds trivially
2d18h: %LINK-3-UPDOWN: Interface Async1,
  changed state to up
Feb  7 12:22:17: As1 VPDN: Looking for tunnel
```

```
-- rtp.cisco.com --
Feb  7 12:22:17: AAA: parse name=Async1 idb
type=10 tty=1
Feb  7 12:22:17: AAA: name=Async1 flags=0x11
type=4 shelf=0 slot=0
adapter=0 port=1 channel=0
Feb  7 12:22:17: AAA/AUTHEN: create_user (0x25BA84)
user='rtp.cisco.com' ruser='' port='Async1' rem_addr=''
authen_type=NONE service=LOGIN priv=0
Feb  7 12:22:17: AAA/AUTHOR/VPDN (6239469):
Port='Async1' list='default' service=NET
Feb  7 12:22:17: AAA/AUTHOR/VPDN: (6239469)
user='rtp.cisco.com'
Feb  7 12:22:17: AAA/AUTHOR/VPDN: (6239469)
send AV service=ppp
Feb  7 12:22:17: AAA/AUTHOR/VPDN: (6239469)
send AV protocol=vpdn
Feb  7 12:22:17: AAA/AUTHOR/VPDN (6239469)
found list "default"
Feb  7 12:22:17: AAA/AUTHOR/VPDN: (6239469) Method=RADIUS
Feb  7 12:22:17: RADIUS: authenticating to get author data
Feb  7 12:22:17: RADIUS: ustruct sharecount=2
Feb  7 12:22:17: RADIUS: Initial Transmit Async1 id 66
171.68.118.101:1645, Access-Request, len 77
Feb  7 12:22:17: Attribute 4 6 0A1F0106
Feb  7 12:22:17: Attribute 5 6 00000001
Feb  7 12:22:17: Attribute 61 6 00000000
Feb  7 12:22:17: Attribute 1 15 7274702E
Feb  7 12:22:17: Attribute 2 18 6AB5A2B0
Feb  7 12:22:17: Attribute 6 6 00000005
Feb  7 12:22:17: RADIUS: Received from id 66
171.68.118.101:1645, Access-Accept, len 158
Feb  7 12:22:17: Attribute 6 6 00000005
Feb  7 12:22:17: Attribute 26 28 0000000901167670
Feb  7 12:22:17: Attribute 26 29 0000000901177670
Feb  7 12:22:17: Attribute 26 36 00000009011E7670
Feb  7 12:22:17: Attribute 26 39 0000000901217670
Feb  7 12:22:17: RADIUS: saved authorization data for user
25BA84 at 24C488
```

*!--- RADIUS server supplies the VPDN tunnel attributes.*

```
Feb  7 12:22:17: RADIUS: cisco AVPair
"vpdn:tunnel-id=DEFGH"
Feb  7 12:22:17: RADIUS: cisco AVPair
"vpdn:tunnel-type=l2tp"
Feb  7 12:22:17: RADIUS: cisco AVPair
"vpdn:ip-addresses=10.31.1.9,"
Feb  7 12:22:17: RADIUS: cisco AVPair
"vpdn:l2tp-tunnel-password=ABCDE"
Feb  7 12:22:17: AAA/AUTHOR (6239469): Post
authorization status = PASS_ADD
Feb  7 12:22:17: AAA/AUTHOR/VPDN: Processing
AV service=ppp
Feb  7 12:22:17: AAA/AUTHOR/VPDN: Processing
AV protocol=vpdn
Feb  7 12:22:17: AAA/AUTHOR/VPDN: Processing
AV tunnel-id=DEFGH
Feb  7 12:22:17: AAA/AUTHOR/VPDN: Processing
AV tunnel-type=l2tp
Feb  7 12:22:17: AAA/AUTHOR/VPDN: Processing AV
ip-addresses=10.31.1.9,
Feb  7 12:22:17: AAA/AUTHOR/VPDN: Processing AV
l2tp-tunnel-password=ABCDE
Feb  7 12:22:17: As1 VPDN: Get tunnel info for
rtp.cisco.com with LAC DEFGH, IP 10.31.1.9
```

```

Feb  7 12:22:17: AAA/AUTHEN: free_user (0x25BA84)
user='rtp.cisco.com' ruser='' port='Async1' rem_addr=''
authen_type=NONE service=LOGIN priv=0
Feb  7 12:22:17: As1 VPDN: Forward to address 10.31.1.9
Feb  7 12:22:17: As1 VPDN: Forwarding...
Feb  7 12:22:17: AAA: parse name=Async1 idb
type=10 tty=1
Feb  7 12:22:17: AAA: name=Async1 flags=0x11 type=4
shelf=0 slot=0 adapter=0 port=1 channel=0
Feb  7 12:22:17: AAA/AUTHEN: create_user (0xB7918)
user='janedoe@rtp.cisco.com' ruser='' port='Async1'
rem_addr='async' authen_type=CHAP service=PPP priv=1
Feb  7 12:22:17: As1 VPDN: Bind interface direction=1
Feb  7 12:22:17: Tnl/C1 51/1 L2TP: Session FS enabled
Feb  7 12:22:17: Tnl/C1 51/1 L2TP: Session state change
from idle to wait-for-tunnel
Feb  7 12:22:17: As1 51/1 L2TP: Create session
Feb  7 12:22:17: Tnl 51 L2TP: SM State idle
Feb  7 12:22:17: Tnl 51 L2TP: O SCCRQ
Feb  7 12:22:17: Tnl 51 L2TP: Tunnel state change
from idle to wait-ctl-reply
Feb  7 12:22:17: Tnl 51 L2TP: SM State wait-ctl-reply
Feb  7 12:22:17: As1 VPDN: janedoe@rtp.cisco.com
is forwarded
Feb  7 12:22:17: Tnl 51 L2TP: I SCCRP from the_LNS

!--- Tunnel authentication is successful.

Feb  7 12:22:17: Tnl 51 L2TP: Got a challenge from remote
peer, the_LNS
Feb  7 12:22:17: Tnl 51 L2TP: Got a response from remote
peer, the_LNS
Feb  7 12:22:17: Tnl 51 L2TP: Tunnel Authentication
success
Feb  7 12:22:17: Tnl 51 L2TP: Tunnel state change from
wait-ctl-reply to established
Feb  7 12:22:17: Tnl 51 L2TP: O SCCCN to the_LNS tn1id 38
Feb  7 12:22:17: Tnl 51 L2TP: SM State established
Feb  7 12:22:17: As1 51/1 L2TP: O ICRQ to the_LNS 38/0
Feb  7 12:22:17: As1 51/1 L2TP: Session state change from
wait-for-tunnel to wait-reply
Feb  7 12:22:17: As1 51/1 L2TP: O ICCN to the_LNS 38/1
Feb  7 12:22:17: As1 51/1 L2TP: Session state change from
wait-reply to established
2d18h: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Async1, changed state to up
LAC#

```

## Good Debug from LNS Router

```

LNS#show debug
General OS:
  AAA Authentication debugging is on
  AAA Authorization debugging is on
  AAA Accounting debugging is on
VPN:
  L2X protocol events debugging is on
  L2X protocol errors debugging is on
  VPDN events debugging is on
  VPDN errors debugging is on
  L2TP data sequencing debugging is on
VTEMPLATE:
  Virtual Template debugging is on
Radius protocol debugging is on
LNS#

```

Feb 7 12:22:16: L2TP: I SCCRQ from DEFGH tnl 51

**Feb 7 12:22:16: Tnl 38 L2TP: New tunnel created for remote DEFGH, address 10.31.1.6**

Feb 7 12:22:16: Tnl 38 L2TP: Got a challenge in SCCRQ, DEFGH

Feb 7 12:22:16: Tnl 38 L2TP: O SCCRP to DEFGH tnlid 51

Feb 7 12:22:16: Tnl 38 L2TP: Tunnel state change from idle to wait-ctl-reply

Feb 7 12:22:16: Tnl 38 L2TP: I SCCCN from DEFGH tnl 51

Feb 7 12:22:16: Tnl 38 L2TP: Got a Challenge Response in SCCCN from DEFGH

Feb 7 12:22:16: Tnl 38 L2TP: Tunnel Authentication success

Feb 7 12:22:16: Tnl 38 L2TP: Tunnel state change from wait-ctl-reply to established

Feb 7 12:22:16: Tnl 38 L2TP: SM State established

Feb 7 12:22:17: Tnl 38 L2TP: I ICRQ from DEFGH tnl 51

Feb 7 12:22:17: Tnl/C1 38/1 L2TP: Session FS enabled

Feb 7 12:22:17: Tnl/C1 38/1 L2TP: Session state change from idle to wait-for-tunnel

Feb 7 12:22:17: Tnl/C1 38/1 L2TP: New session created

Feb 7 12:22:17: Tnl/C1 38/1 L2TP: O ICRP to DEFGH 51/1

Feb 7 12:22:17: Tnl/C1 38/1 L2TP: Session state change from wait-for-tunnel to wait-connect

Feb 7 12:22:17: Tnl/C1 38/1 L2TP: I ICCN from DEFGH tnl 51, cl 1

Feb 7 12:22:17: Tnl/C1 38/1 L2TP: Session state change from wait-connect to established

Feb 7 12:22:17: Vil VTEMPLATE: Reuse Vil, recycle queue size 0

Feb 7 12:22:17: Vil VTEMPLATE: Hardware address 00e0.1e68.942c

*!--- Use Virtual-template 1 for this user.*

**Feb 7 12:22:17: Vil VPDN: Virtual interface created for janedoe@rtp.cisco.com**

**Feb 7 12:22:17: Vil VPDN: Set to Async interface**

**Feb 7 12:22:17: Vil VPDN: Clone from Vtemplate 1 filterPPP=0 blocking**

Feb 7 12:22:17: Vil VTEMPLATE: Has a new cloneblk vtemplate, now it has vtemplate

Feb 7 12:22:17: Vil VTEMPLATE: \*\*\*\*\* CLONE VACCESS1 \*\*\*\*\*

Feb 7 12:22:17: Vil VTEMPLATE: Clone from Virtual-Templatel

interface Virtual-Access1

default ip address

no ip address

encap ppp

ip unnum eth 0

no ip directed-broadcast

peer default ip address pool default

ppp authen chap

end

Feb 7 12:22:18: janedoe@rtp.cisco.com 38/1 L2TP: Session with no hwidb

02:23:59: %LINK-3-UPDOWN: Interface Virtual-Access1, changed state to up

Feb 7 12:22:19: Vil AAA/AUTHOR/FSM: (0): LCP succeeds trivially

Feb 7 12:22:19: Vil VPDN: Bind interface direction=2

Feb 7 12:22:19: Vil VPDN: PPP LCP accepted rcv CONFACK

Feb 7 12:22:19: Vil VPDN: PPP LCP accepted sent CONFACK

```
Feb  7 12:22:19: Vi1 L2X: Discarding packet because of
no mid/session
Feb  7 12:22:19: AAA: parse name=Virtual-Access1 idb
type=21 tty=-1
Feb  7 12:22:19: AAA: name=Virtual-Access1 flags=0x11
type=5 shelf=0 slot=0 adapter=0 port=1 channel=0
Feb  7 12:22:19: AAA/AUTHEN: create_user (0x2462A0)
user='janedoe@rtp.cisco.com' ruser='' port='Virtual-Access1'
rem_addr='' authen_type=CHAP service=PPP priv=1
Feb  7 12:22:19: AAA/AUTHEN/START (2229277178):
port='Virtual-Access1' list='' action=LOGIN
service=PPP
Feb  7 12:22:19: AAA/AUTHEN/START (2229277178):
using "default" list
Feb  7 12:22:19: AAA/AUTHEN/START (2229277178):
Method=RADIUS
Feb  7 12:22:19: RADIUS: ustruct sharecount=1
Feb  7 12:22:19: RADIUS: Initial Transmit Virtual-Access1
id 78 171.68.120.194:1645, Access-Request, len 92
Feb  7 12:22:19:         Attribute 4 6 0A1F0109
Feb  7 12:22:19:         Attribute 5 6 00000001
Feb  7 12:22:19:         Attribute 61 6 00000005
Feb  7 12:22:19:         Attribute 1 23 6464756E
Feb  7 12:22:19:         Attribute 3 19 34A66389
Feb  7 12:22:19:         Attribute 6 6 00000002
Feb  7 12:22:19:         Attribute 7 6 00000001
Feb  7 12:22:19: RADIUS: Received from id 78
171.68.120.194:1645, Access-Accept, len 32
Feb  7 12:22:19:         Attribute 6 6 00000002
Feb  7 12:22:19:         Attribute 7 6 00000001
Feb  7 12:22:19: AAA/AUTHEN (2229277178): status = PASS
Feb  7 12:22:19: Vi1 AAA/AUTHOR/LCP: Authorize LCP
Feb  7 12:22:19: AAA/AUTHOR/LCP Vi1 (1756915964):
Port='Virtual-Access1' list='' service=NET
Feb  7 12:22:19: AAA/AUTHOR/LCP: Vi1 (1756915964)
user='janedoe@rtp.cisco.com'
Feb  7 12:22:19: AAA/AUTHOR/LCP: Vi1 (1756915964)
send AV service=ppp
Feb  7 12:22:19: AAA/AUTHOR/LCP: Vi1 (1756915964)
send AV protocol=lcp
Feb  7 12:22:19: AAA/AUTHOR/LCP (1756915964) found
list "default"
Feb  7 12:22:19: AAA/AUTHOR/LCP: Vi1 (1756915964)
Method=RADIUS
Feb  7 12:22:19: AAA/AUTHOR (1756915964): Post
authorization status = PASS_REPL
Feb  7 12:22:19: Vi1 AAA/AUTHOR/LCP: Processing
AV service=ppp
Feb  7 12:22:19: AAA/ACCT/NET/START User
janedoe@rtp.cisco.com, Port Virtual-Access1, List ""
Feb  7 12:22:19: AAA/ACCT/NET: Found list "default"
Feb  7 12:22:19: Vi1 AAA/AUTHOR/FSM: (0): Can we
start IPCP?
Feb  7 12:22:19: AAA/AUTHOR/FSM Vi1 (1311872588):
Port='Virtual-Access1' list='' service=NET
Feb  7 12:22:19: AAA/AUTHOR/FSM: Vi1 (1311872588)
user='janedoe@rtp.cisco.com'
Feb  7 12:22:19: AAA/AUTHOR/FSM: Vi1 (1311872588)
send AV service=ppp
Feb  7 12:22:19: AAA/AUTHOR/FSM: Vi1 (1311872588)
send AV protocol=ip
Feb  7 12:22:19: AAA/AUTHOR/FSM (1311872588)
found list "default"
Feb  7 12:22:19: AAA/AUTHOR/FSM: Vi1 (1311872588)
Method=RADIUS
Feb  7 12:22:19: AAA/AUTHOR (1311872588): Post
```

```
authorization status = PASS_REPL
Feb  7 12:22:19: Vi1 AAA/AUTHOR/FSM: We can start
IPCP
Feb  7 12:22:19: RADIUS: ustruct sharecount=2
Feb  7 12:22:19: RADIUS: Initial Transmit Virtual-Access1
id 79 171.68.120.194:1646, Accounting-Request, len 101
Feb  7 12:22:19:      Attribute 4 6 0A1F0109
Feb  7 12:22:19:      Attribute 5 6 00000001
Feb  7 12:22:19:      Attribute 61 6 00000005
Feb  7 12:22:19:      Attribute 1 23 6464756E
Feb  7 12:22:19:      Attribute 40 6 00000001
Feb  7 12:22:19:      Attribute 45 6 00000001
Feb  7 12:22:19:      Attribute 6 6 00000002
Feb  7 12:22:19:      Attribute 44 10 30303030
Feb  7 12:22:19:      Attribute 7 6 00000001
Feb  7 12:22:19:      Attribute 41 6 00000000
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Start. Her
address 0.0.0.0, we want 0.0.0.0
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Processing
AV service=ppp
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Authorization
succeeded
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Done. Her
address 0.0.0.0, we want 0.0.0.0
Feb  7 12:22:19: RADIUS: Received from id 79
171.68.120.194:1646, Accounting-response,
len 20
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Start.
Her address 0.0.0.0, we want 10.6.1.1
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Processing
AV service=ppp
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Authorization
succeeded
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Done.
Her address 0.0.0.0, we want 10.6.1.1
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Start.
Her address 10.6.1.1, we want 10.6.1.1
Feb  7 12:22:19: AAA/AUTHOR/IPCP Vi1 (2909132255):
Port='Virtual-Access1' list='' service=NET
Feb  7 12:22:19: AAA/AUTHOR/IPCP: Vi1 (2909132255)
user='janedoe@rtp.cisco.com'
Feb  7 12:22:19: AAA/AUTHOR/IPCP: Vi1 (2909132255)
send AV service=ppp
Feb  7 12:22:19: AAA/AUTHOR/IPCP: Vi1 (2909132255)
send AV protocol=ip
Feb  7 12:22:19: AAA/AUTHOR/IPCP: Vi1 (2909132255)
send AV addr*10.6.1.1
Feb  7 12:22:19: AAA/AUTHOR/IPCP (2909132255)
found list "default"
Feb  7 12:22:19: AAA/AUTHOR/IPCP: Vi1 (2909132255)
Method=RADIUS
Feb  7 12:22:19: AAA/AUTHOR (2909132255): Post
authorization status = PASS_REPL
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Reject
10.6.1.1, using 10.6.1.1
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Processing
AV service=ppp
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Processing
AV addr*10.6.1.1
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Authorization
succeeded
Feb  7 12:22:19: Vi1 AAA/AUTHOR/IPCP: Done.
Her address 10.6.1.1, we want 10.6.1.1
02:24:00: %LINEPROTO-5-UPDOWN: Line protocol on
Interface Virtual-Access1, changed state to up
LNS#
```

## What Can Go Wrong – Bad Debug from LAC

```
LAC#show debug
General OS:
  AAA Authentication debugging is on
  AAA Authorization debugging is on
  AAA Accounting debugging is on
VPN:
  L2X protocol events debugging is on
  L2X protocol errors debugging is on
  VPDN events debugging is on
  VPDN errors debugging is on
  L2TP data sequencing debugging is on
VTEMPLATE:
  Virtual Template debugging is on
  Radius protocol debugging is on
```

The user comes in as janedoe@sj.cisco.com (instead of janedoe@rtp.cisco.com), but the LAC RADIUS server does not recognize this domain.

```
Feb  7 13:26:48: RADIUS: Received from id 86
171.68.118.101:1645, Access-Reject, len 46
Feb  7 13:26:48:      Attribute 18 26 41757468
Feb  7 13:26:48: RADIUS: failed to get
authorization data: authen status = 2
%VPDN-6-AUTHORFAIL: L2F NAS LAC, AAA authorization
failure for As1 user janedoe@sj.cisco.com
```

These debugs show a situation where the tunnel information is received, but with an invalid IP address for the other end of the tunnel. The user attempts to establish a session, but cannot connect.

```
Feb  7 13:32:45: As1 VPDN: Forward to
address 1.1.1.1
Feb  7 13:32:45: As1 VPDN: Forwarding...
Feb  7 13:32:45: Tnl 56 L2TP: Tunnel state
change from idle to wait-ctl-reply
Feb  7 13:32:46: As1 56/1 L2TP: Discarding data
packet because tunnel is not open
```

These debugs show a situation when there is a tunnel password mismatch. On the LNS, "username the\_LNS password ABCDE" is changed to "username the\_LNS password garbage" so that tunnel authentication fails when attempted.

```
Feb  7 13:39:35: Tnl 59 L2TP: Tunnel Authentication
fails for the_LNS
Feb  7 13:39:35: Tnl 59 L2TP: Expected
E530DA13B826685C678589250C0BF525
Feb  7 13:39:35: Tnl 59 L2TP: Got
E09D90E8A91CF1014C91D56F65BDD052
Feb  7 13:39:35: Tnl 59 L2TP: O StopCCN
to the_LNS tn lid 44
Feb  7 13:39:35: Tnl 59 L2TP: Tunnel state
change from wait-ctl-reply to shutting-down
Feb  7 13:39:35: Tnl 59 L2TP: Shutdown tunnel
```

## What Can Go Wrong – Bad Debug from LNS

```
LNS#show debug
General OS:
  AAA Authentication debugging is on
  AAA Authorization debugging is on
  AAA Accounting debugging is on
```

```
VPN:
  L2X protocol events debugging is on
  L2X protocol errors debugging is on
  VPDN events debugging is on
  VPDN errors debugging is on
  L2TP data sequencing debugging is on
VTEMPLATE:
  Virtual Template debugging is on
  Radius protocol debugging is on
LNS#
```

In this example, "accept dialing l2tp virtual-template 1 remote DEFGH" is changed to "accept dialin l2tp virtual-template 1 remote junk". The LNS can no longer find the tunnel DEFGH (it is "junk" instead).

```
Feb  7 13:45:32: L2TP: I SCCRQ from
      DEFGH tnl 62
Feb  7 13:45:32: L2X: Never heard of
      DEFGH
Feb  7 13:45:32: L2TP: Could not find info
      block for DEFGH
```


## LNS Accounting Records

```
10.31.1.9 janedoe@rtp.cisco.com 1 - start
  server=rtp-cherry time=09:23:53
  date=02/ 6/1999 task_id=0000001C
Sat Feb  6 12:23:53 1999
  Client-Id = 10.31.1.9
  Client-Port-Id = 1
  NAS-Port-Type = Virtual
  User-Name = "janedoe@rtp.cisco.com"
  Acct-Status-Type = Start
  Acct-Authentic = RADIUS
  User-Service-Type = Framed-User
  Acct-Session-Id = "0000001C"
  Framed-Protocol = PPP
  Acct-Delay-Time = 0

10.31.1.9 janedoe@rtp.cisco.com 1 - stop
  server=rtp-cherry time=09:24:46
  date=02/ 6/1999 task_id=0000001C
Sat Feb  6 12:24:46 1999
  Client-Id = 10.31.1.9
  Client-Port-Id = 1
  NAS-Port-Type = Virtual
  User-Name = "janedoe@rtp.cisco.com"
  Acct-Status-Type = Stop
  Acct-Authentic = RADIUS
  User-Service-Type = Framed-User
  Acct-Session-Id = "0000001C"
  Framed-Protocol = PPP
  Framed-Address = 10.6.1.1
  Acct-Terminate-Cause = Lost-Carrier
  Acct-Input-Octets = 678
  Acct-Output-Octets = 176
  Acct-Input-Packets = 17
  Acct-Output-Packets = 10
  Acct-Session-Time = 53
  Acct-Delay-Time = 0
```



## Related Information

- [Access VPDN Dial-in Using L2TP](#)
  - [Layer 2 Tunnel Protocol](#)
  - [RADIUS Support Page](#)
  - [RADIUS in IOS Documentation](#)
  - [Cisco Secure ACS for Windows Support Page](#)
  - [Documentation for Cisco Secure ACS for Windows](#)
  - [Cisco Secure ACS for UNIX Support Page](#)
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