

L2TP与多链路PPP的负载均衡和故障切换

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简介

本文描述使用负载均衡和故障切换的功能以多链路点对点协议(PPP)第2层隧道协议。

先决条件

要求

本文档的读者应掌握以下这些主题的相关知识：

- 虚拟专用拨号网络(VPDN)
- L2TP
- PPP
- PPP 多链路

使用的组件

本文档不限于特定的软件和硬件版本。

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

规则

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

背景

当运行在多同时PPP链路间时，多链路PPP允许拆分，再结合和定序数据包。在传输末端，多链路PPP提供单个数据包的分段到在多PPP链路间将传送的多个信息包。在接收末端，多链路PPP提供数据包从多PPP链路重新召集回到其原始信息包。要协商多链路，两对等体必须同意他们多链路支持，即，能组合多条物理链路到单个逻辑链接(经常被称为‘套件’)。用于的链路控制协议(LCP)选项表明对等体是启用的多链路是Max-Receive-Reconstructed-Unit (MRRU)。

下面的表在LCP协商最后阶段显示从两个已启用多链路设备的Cisco IOS软件debug输出。正如你看到的两个发送包含MRRU选项的CONFACKS表明在此PPP会话期间，多链路将使用。端点分辨器也包括，虽然如此执行是不必要的。

注意： 端点分辨器可以用于命名多链路捆绑，虽然默认Cisco IOS软件行为是使用仅认证的用户名。

```
Se0:0 LCP: O CONFACK [Listen] id 8 len 23
Se0:0 LCP: MagicNumber 0x30F8D4AB (0x050630F8D4AB)
Se0:0 LCP: MRRU 1524 (0x110405F4)
Se0:0 LCP: EndpointDisc 1 Local (0x130901323530302D31)

Se0:0 LCP: I CONFACK [ACKsent] id 20 len 28
Se0:0 LCP: AuthProto CHAP (0x0305C22305)
Se0:0 LCP: MagicNumber 0x14FBD62E (0x050614FBD62E)
Se0:0 LCP: MRRU 1524 (0x110405F4)
Se0:0 LCP: EndpointDisc 1 Local (0x130901353330302D31)
```

如果遇到L2TP接入集中器的情况(LAC)使用了负载均衡并且建立隧道多链路对等体的B信道对多个隧道终端，您看到多链路捆绑主控接口的每个LNS实例。对等体开始到分段的信息包并且在成员链接同时发送这些。每个LNS接收片段和尝试再结合，定序出故障，并且丢失的片段报告。结果，数据不可以通过。在这些情形中，有需求通知在关于连接多链路用户的状态的负载均衡涉及的其他LNSs。要执行此，LNS需要被放置到多机箱多链路PPP (MMP) ‘堆栈组’。MMP功能根据堆栈组竞标协议(SGBP)和第2层转发(L2F)多链路呼叫所有权的协议提供和投标在接受的呼叫之前。vpdn multihop命令要求允许从远程主机生成的数据包横断超过一个通道。

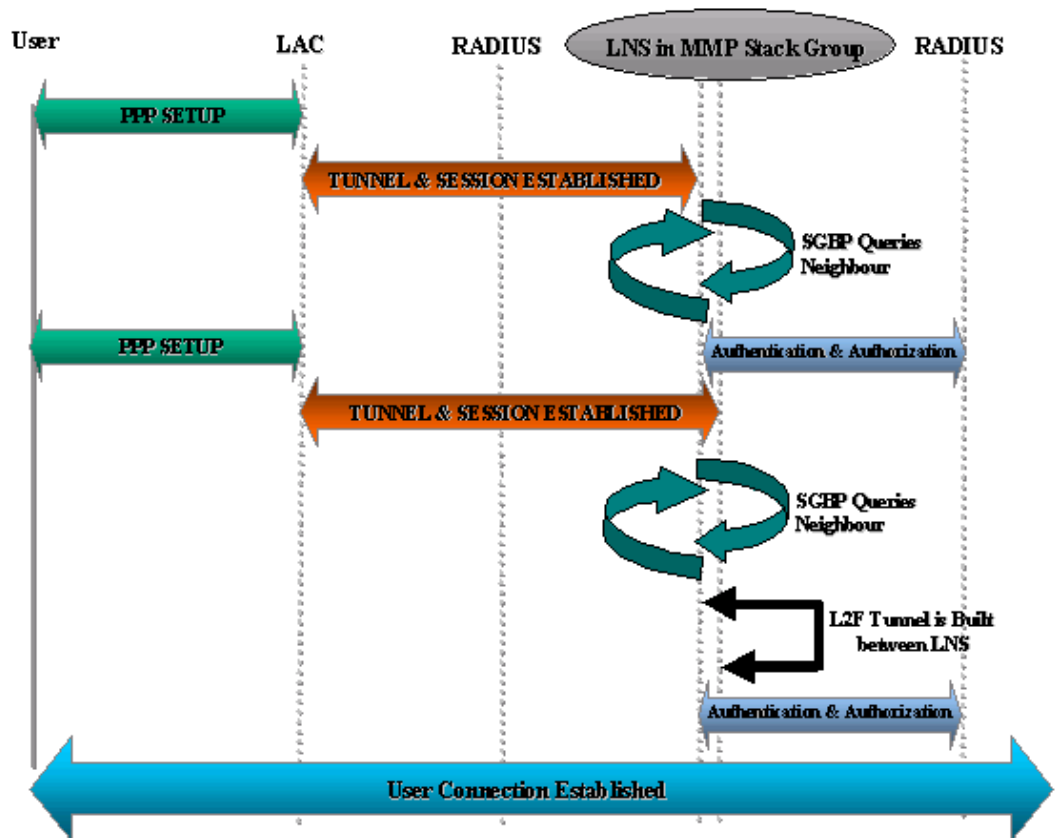
当LNS在完成验证之前时收到多链路呼叫，是命名对于多链路捆绑名称的Cisco IOS软件默认的用户名远程(通过对SGBP。SGBP为查询在堆栈组内提供一机制一呼叫的现有所有权。如果接受呼叫的堆栈组成员不是现有所有者，SGBP使用一个命令过程解决所有权以堆叠的其他成员。投标是为特定用户，不是单个连接。默认情况下，收到第一个呼叫的堆栈组成员总是赢取命令过程并且控制所有后续呼叫所有权从该用户的。这是不管终止的LNS (由配置，更改SGBP出价进程的行为，影响是可能的谁将赢取命令过程并且拥有呼叫)。当从用户的所有呼叫被断开时，重要的所有权被放弃。一新的呼叫从同一个用户再开始命令过程与一新的主控的解决方法。

与多链路PPP连接顺序的负载均衡

1. 一个远程苏活区用户'2500-1'发出一次多链路呼叫，单个信道，到LAC。建立PPP链路。
2. LCP协商(MRRUs在CONFACKS包括)，并且隧道信息从与用于负载均衡的隧道终点的RADIUS下载。当第一个非活动地址和连接转发，隧道终点'10.51.6.59'选择。通道和会话建立

3. LNS创建虚拟访问接口2终止L2TP通道。·开始以ppp、Keepalive、mtu、和仅命令从虚拟模板复制。Virtual-template 1有配置的PPP。在ICCN传送的LCP配置信息是牵强的在虚拟访问接口PPP堆叠上(这包括LAC协商的MRRU)。
4. LNS在ICCN使用代理验证答复AVP - 33，传送，开始所有现有多链路捆绑的SGBP出价进程与名称'2500-1'。精通查询开放投标为与默认种子投标的套件'2500-1'发送50。·与精通投标的Sgbp member '10.51.6.61'回复0 (精通拒绝)，尽管没有'2500-1'的一个现有套件。·'10.51.6.59' (本地)为'2500-1'当前是重要。一旦所有权的解决方法完成，精通查询close用精通投标声明值为10000传送。
5. AAA/PPP认证和授权然后发生。RADIUS访问请求发送。
6. 虚拟访问接口1为多链路捆绑主控创建和从virtual-template 1被克隆。
7. PPP IPCP协商完成并且宣称的开始，路由安装的主机。远程用户此时已连接，可以开始传输流量。
8. 由于带宽需求，远程苏活区用户'2500-1'发出第二次多链路呼叫对LAC。
9. RADIUS再被查询隧道信息。根据负载均衡逻辑，下个非活动隧道终点'10.51.6.61'选择。通道和会话建立。
10. LNS创建虚拟访问接口1终止L2TP通道。·Virtual-template 1用于克隆(安排'PPP多链路'配置)，在ICCN传送的LCP配置信息是牵强的在虚拟访问接口PPP堆叠上(这包括LAC协商的MRRU)。
11. SGBP出价为与名称'2500-1'的所有现有多链路捆绑开始通过发送套件的'2500-1'精通查询投标与默认种子投标50。
12. As'10.51.6.59'为会员投标有声明值为10000的'2500-1'已经是重要。·'10.51.6.61'当前寄PPP连接给'10.51.6.59'。L2F通道从'10.51.6.61'打开到'10.51.6.59' (多机箱多链路PPP的默认隧道协议是L2F)。通道验证使用Sgbp group用户名'多跳'。开始L2F通道和会话。
13. PPP会话是L2F转发对'10.51.6.59'。虚拟访问接口3创建终止L2F通道和从virtual-template 1被克隆。
14. LAC协商的LCP状态被重赛在虚拟访问PPP堆叠上，并且包括同意的MRRU选项。
15. AAA/PPP认证和授权然后发生。RADIUS访问请求发送。
16. 验证完成，并且虚拟访问接口3被添加到多链路捆绑主控。

Figure 3 - Load Balancing with Multilink Call Flow



实验室测试-与多链路PPP的LNS负载均衡

RADIUS配置文件

本文使用在Merit RADIUS服务器3.6B的此RADIUS用户和通道配置文件：

```
2500-1 Password = "cisco"
Service-Type = Framed,
Framed-Protocol = PPP,
Framed-IP-Address = 255.255.255.255
dnis:614629 Password = "cisco"
Service-Type = Outbound,
Cisco:Avpair = "vpdn:tunnel-type=l2tp",
Cisco:Avpair = "vpdn:tunnel-id=hgw",
Cisco:Avpair = "vpdn:ip-addresses=10.51.6.61,10.51.6.59",
Cisco:Avpair = "vpdn:l2tp-tunnel-password=hello"
```

LAC 配置

LAC配置同先前配置一样。

LNS -堆栈组多跳的配置(10.51.6.59和10.51.6.61)

```
hostname nsa-7200-2 (10.51.6.61)
username MULTIHOP password 0 cisco
!--- The stack name/password is used to authenticate the SGBP connections between !--- all
member routers. As RADIUS has no concept of SendAuth , the stack name !--- password needs to be
defined locally. sgbp group MULTIHOP !--- The stack group is given a unique username, the name
'MULTIHOP' must be !--- unique within a domain and only one stack group is allowed per router.
```

```
sgbp member nsa-7200-3 10.51.6.59 !--- The stack member '10.51.6.59' is defined. vpdn multihop
!--- Enables the LNS to forward Multilink PPP links to Stack Group members that !--- already own
existing bundle Masters for that session. multilink virtual-template 1 !--- The Multilink Bundle
Interface will clone from the Virtual Template 1. interface Virtual-Template1 ip unnumbered
Ethernet3/0 peer default ip address pool default ppp authentication chap vpdn ppp authorization
vpdn ppp chap hostname nsa-7200-2 ppp multilink hostname nsa-7200-3 (10.51.6.59) ! username
MULTIHOP password 0 cisco ! sgbp group MULTIHOP sgbp member nsa-7200-2 10.51.6.61 vpdn multihop
! multilink virtual-template 1 ! interface Virtual-Template1 ip unnumbered Ethernet3/0 peer
default ip address pool default ppp authentication chap vpdn ppp authorization vpdn ppp chap
hostname nsa-7200-3 ppp multilink
```

从LAC采取的调试

```
Jan 1 00:01:01.039: %LINK-3-UPDOWN: Interface Serial0:0,
changed state to up
Jan 1 00:01:01.235: Se0:0 PPP: Treating connection as a callin
Jan 1 00:01:01.235: Se0:0 PPP: Phase is ESTABLISHING, Passive Open
Jan 1 00:01:01.239: Se0:0 CHAP: Using alternate hostname 5300-1
Jan 1 00:01:01.239: Se0:0 LCP: State is Listen Jan 1 00:01:01.239: Se0:0 LCP: I CONFREQ [Listen]
id 22 len 23 Jan 1 00:01:01.239: Se0:0 LCP: MagicNumber 0x31BFC605 (0x050631BFC605) Jan 1
00:01:01.239: Se0:0 LCP: MRRU 1524 (0x110405F4) Jan 1 00:01:01.239: Se0:0 LCP: EndpointDisc 1
Local (0x130901323530302D31) Jan 1 00:01:01.239: Se0:0 LCP: O CONFREQ [Listen] id 27 len 28 Jan
1 00:01:01.239: Se0:0 LCP: AuthProto CHAP (0x0305C22305) Jan 1 00:01:01.239: Se0:0 LCP:
MagicNumber 0x15C13318 (0x050615C13318) Jan 1 00:01:01.239: Se0:0 LCP: MRRU 1524 (0x110405F4)
Jan 1 00:01:01.239: Se0:0 LCP: EndpointDisc 1 Local (0x130901353330302D31) Jan 1 00:01:01.239:
Se0:0 LCP: O CONFACK [Listen] id 22 len 23 Jan 1 00:01:01.239: Se0:0 LCP: MagicNumber 0x31BFC605
(0x050631BFC605) Jan 1 00:01:01.239: Se0:0 LCP: MRRU 1524 (0x110405F4) Jan 1 00:01:01.239: Se0:0
LCP: EndpointDisc 1 Local (0x130901323530302D31) Jan 1 00:01:01.287: Se0:0 LCP: I CONFACK
[ACKsent] id 27 len 28 Jan 1 00:01:01.287: Se0:0 LCP: AuthProto CHAP (0x0305C22305) Jan 1
00:01:01.287: Se0:0 LCP: MagicNumber 0x15C13318 (0x050615C13318) Jan 1 00:01:01.287: Se0:0 LCP:
MRRU 1524 (0x110405F4) Jan 1 00:01:01.287: Se0:0 LCP: EndpointDisc 1 Local
(0x130901353330302D31) Jan 1 00:01:01.287: Se0:0 LCP: State is Open Jan 1 00:01:01.287: Se0:0
PPP: Phase is AUTHENTICATING, by this end Jan 1 00:01:01.287: Se0:0 CHAP: Using alternate
hostname 5300-1 Jan 1 00:01:01.287: Se0:0 CHAP: O CHALLENGE id 17 len 27 from "5300-1" Jan 1
00:01:01.315: Se0:0 CHAP: I RESPONSE id 17 len 27 from "2500-1" Jan 1 00:01:01.315: Se0:0 PPP:
Phase is FORWARDING Jan 1 00:01:01.315: Se0:0 VPDN: Got DNIS string 614629 Jan 1 00:01:01.315:
Se0:0 VPDN: Looking for tunnel -- dnis:614629 -- Jan 1 00:01:01.315: Serial0:0 AAA/AUTHOR/VPDN
(552916761): Port='Serial0:0' list='default' service=NET Jan 1 00:01:01.315: AAA/AUTHOR/VPDN:
Serial0:0 (552916761) user='dnis:614629' Jan 1 00:01:01.315: Serial0:0 AAA/AUTHOR/VPDN
(552916761): send AV service=ppp Jan 1 00:01:01.315: Serial0:0 AAA/AUTHOR/VPDN (552916761): send
AV protocol=vpdn Jan 1 00:01:01.315: Serial0:0 AAA/AUTHOR/VPDN (552916761): found list "default"
Jan 1 00:01:01.315: Serial0:0 AAA/AUTHOR/VPDN (552916761): Method=NSA_LAB (radius) Jan 1
00:01:01.319: RADIUS: Initial Transmit Serial0:0 id 34 10.51.6.3:1645, Access-Request, len 112
Jan 1 00:01:01.319: Attribute 4 6 0A330644 Jan 1 00:01:01.319: Attribute 5 6 00000000 Jan 1
00:01:01.319: Attribute 26 17 00000009020B5365 Jan 1 00:01:01.319: Attribute 61 6 00000002 Jan 1
00:01:01.319: Attribute 1 13 646E6973 Jan 1 00:01:01.319: Attribute 30 8 36313436 Jan 1
00:01:01.319: Attribute 31 12 32303835 Jan 1 00:01:01.319: Attribute 2 18 B8DE6FA3 Jan 1
00:01:01.319: Attribute 6 6 00000005 Jan 1 00:01:01.323: RADIUS: Received from id 34
10.51.6.3:1645, Access-Accept, len 167 Jan 1 00:01:01.323: Attribute 6 6 00000005 Jan 1
00:01:01.323: Attribute 26 29 0000000901177670 Jan 1 00:01:01.323: Attribute 26 26
0000000901147670 Jan 1 00:01:01.323: Attribute 26 47 0000000901297670 Jan 1 00:01:01.327:
Attribute 26 39 0000000901217670 Jan 1 00:01:01.327: RADIUS: saved authorization data for user
620DAD68 at 619E9BC0 Jan 1 00:01:01.327: RADIUS: cisco AVPair "vpdn:tunnel-type=l2tp" Jan 1
00:01:01.327: RADIUS: cisco AVPair "vpdn:tunnel-id=hgw" Jan 1 00:01:01.327: RADIUS: cisco AVPair
"vpdn:ip-addresses= 10.51.6.61,10.51.6.59" Jan 1 00:01:01.327: RADIUS: cisco AVPair "vpdn:l2tp-
tunnel-password=hello" Jan 1 00:01:01.327: AAA/AUTHOR (552916761): Post authorization status =
PASS_ADD Jan 1 00:01:01.327: AAA/AUTHOR/VPDN: Processing AV service=ppp Jan 1 00:01:01.327:
AAA/AUTHOR/VPDN: Processing AV protocol=vpdn Jan 1 00:01:01.327: AAA/AUTHOR/VPDN: Processing AV
tunnel-type=l2tp Jan 1 00:01:01.327: AAA/AUTHOR/VPDN: Processing AV tunnel-id=hgw Jan 1
00:01:01.327: AAA/AUTHOR/VPDN: Processing AV ip-addresses= 10.51.6.61,10.51.6.59 Jan 1
00:01:01.327: AAA/AUTHOR/VPDN: Processing AV l2tp-tunnel-password=hello Jan 1 00:01:01.327:
Se0:0 VPDN/RPMS/: Got tunnel info for dnis:614629 Jan 1 00:01:01.327: Se0:0 VPDN/RPMS/: LAC hgw
Jan 1 00:01:01.327: Se0:0 VPDN/RPMS/: l2tp-busy-disconnect yes Jan 1 00:01:01.327: Se0:0
VPDN/RPMS/: l2tp-tunnel-password xxxxxx Jan 1 00:01:01.327: Se0:0 VPDN/RPMS/: 2 IP addresses Jan
```

1 00:01:01.327: Se0:0 VPDN/RPMS/: IP 10.51.6.61 Priority 1 Jan 1 00:01:01.327: Se0:0 VPDN/RPMS/:
IP 10.51.6.59 Priority 1 Jan 1 00:01:01.331: Se0:0 VPDN/: curlvl 1 Address 1: 10.51.6.59,
priority 1 Jan 1 00:01:01.331: Se0:0 VPDN/: Select non-active address 10.51.6.59, priority 1 Jan
1 00:01:01.331: Se0:0 VPDN: Find LNS process created Jan 1 00:01:01.331: Tnl 5105 L2TP: SM State
idle Jan 1 00:01:01.331: Tnl 5105 L2TP: O SCCRQ Jan 1 00:01:01.331: Tnl 5105 L2TP: Tunnel state
change from idle to wait-ctl-reply Jan 1 00:01:01.331: Tnl 5105 L2TP: SM State wait-ctl-reply
Jan 1 00:01:01.331: Se0:0 VPDN: Forward to address 10.51.6.59 Jan 1 00:01:01.331: Se0:0 VPDN:
Pending Jan 1 00:01:01.331: Se0:0 VPDN: Process created Jan 1 00:01:01.335: Tnl 5105 L2TP: I
SCCRP from l2tp-gw Jan 1 00:01:01.335: Tnl 5105 L2TP: Got a challenge from remote peer, l2tp-gw
Jan 1 00:01:01.335: Tnl 5105 L2TP: Got a response from remote peer, l2tp-gw Jan 1 00:01:01.335:
Tnl 5105 L2TP: Tunnel Authentication success **Jan 1 00:01:01.339: Tnl 5105 L2TP: Tunnel state
change from wait-ctl-reply to established** Jan 1 00:01:01.339: Tnl 5105 L2TP: O SCCCN to l2tp-gw
tnlid 24230 Jan 1 00:01:01.339: Tnl 5105 L2TP: SM State established Jan 1 00:01:01.339: Se0:0
VPDN: Forwarding... Jan 1 00:01:01.339: Tnl/Cl 5105/18 L2TP: Session FS enabled Jan 1
00:01:01.339: Tnl/Cl 5105/18 L2TP: Session state change from idle to wait-for-tunnel Jan 1
00:01:01.339: Se0:0 Tnl/Cl 5105/18 L2TP: Create session Jan 1 00:01:01.339: Tnl 5105 L2TP: SM
State established Jan 1 00:01:01.339: Se0:0 Tnl/Cl 5105/18 L2TP: O ICRQ to l2tp-gw 24230/0 Jan 1
00:01:01.339: Se0:0 Tnl/Cl 5105/18 L2TP: Session state change from wait-for-tunnel to wait-reply
Jan 1 00:01:01.339: Se0:0 VPDN: 2500-1 is forwarded Jan 1 00:01:01.343: Se0:0 Tnl/Cl 5105/18
L2TP: O ICCN to l2tp-gw 24230/41 **Jan 1 00:01:01.347: Se0:0 Tnl/Cl 5105/18 L2TP: Session state
change from wait-reply to established** Jan 1 00:01:02.343: %LINEPROTO-5-UPDOWN: Line protocol on
Interface Serial0:0, changed state to up *!--- Second Multilink Call is placed by the remote
user.* Jan 1 00:01:03.123: %LINK-3-UPDOWN: Interface Serial0:1, changed state to up Jan 1
00:01:03.127: %ISDN-6-CONNECT: Interface Serial0:0 is now connected to 2085730592 2500-1 Jan 1
00:01:03.351: Se0:1 PPP: Treating connection as a callin Jan 1 00:01:03.351: Se0:1 PPP: Phase is
ESTABLISHING, Passive Open Jan 1 00:01:03.351: Se0:1 CHAP: Using alternate hostname 5300-1 **Jan 1
00:01:03.351: Se0:1 LCP: State is Listen** Jan 1 00:01:03.351: Se0:1 LCP: I CONFREQ [Listen] id 3
len 23 Jan 1 00:01:03.351: Se0:1 LCP: MagicNumber 0x31BFCE57 (0x050631BFCE57) Jan 1
00:01:03.351: Se0:1 LCP: MRRU 1524 (0x110405F4) Jan 1 00:01:03.351: Se0:1 LCP: EndpointDisc 1
Local (0x130901323530302D31) Jan 1 00:01:03.351: Se0:1 LCP: O CONFREQ [Listen] id 3 len 28 Jan 1
00:01:03.351: Se0:1 LCP: AuthProto CHAP (0x0305C22305) Jan 1 00:01:03.351: Se0:1 LCP:
MagicNumber 0x15C13B5D (0x050615C13B5D) **Jan 1 00:01:03.351: Se0:1 LCP: MRRU 1524 (0x110405F4)
Jan 1 00:01:03.351: Se0:1 LCP: EndpointDisc 1 Local (0x130901353330302D31)** Jan 1 00:01:03.355:
Se0:1 LCP: O CONFACK [Listen] id 3 len 23 Jan 1 00:01:03.355: Se0:1 LCP: MagicNumber 0x31BFCE57
(0x050631BFCE57) Jan 1 00:01:03.355: Se0:1 LCP: MRRU 1524 (0x110405F4) Jan 1 00:01:03.355: Se0:1
LCP: EndpointDisc 1 Local (0x130901323530302D31) Jan 1 00:01:03.403: Se0:1 LCP: I CONFACK
[ACKsent] id 3 len 28 Jan 1 00:01:03.403: Se0:1 LCP: AuthProto CHAP (0x0305C22305) Jan 1
00:01:03.403: Se0:1 LCP: MagicNumber 0x15C13B5D (0x050615C13B5D) **Jan 1 00:01:03.403: Se0:1 LCP:
MRRU 1524 (0x110405F4) Jan 1 00:01:03.403: Se0:1 LCP: EndpointDisc 1 Local
(0x130901353330302D31) Jan 1 00:01:03.403: Se0:1 LCP: State is Open** Jan 1 00:01:03.403: Se0:1
PPP: Phase is AUTHENTICATING, by this end Jan 1 00:01:03.403: Se0:1 CHAP: Using alternate
hostname 5300-1 Jan 1 00:01:03.407: Se0:1 CHAP: O CHALLENGE id 3 len 27 from "5300-1" Jan 1
00:01:03.435: Se0:1 CHAP: I RESPONSE id 3 len 27 from "2500-1" Jan 1 00:01:03.435: Se0:1 PPP:
Phase is FORWARDING **Jan 1 00:01:03.435: Se0:1 VPDN: Got DNIS string 614629 Jan 1 00:01:03.435:
Se0:1 VPDN: Looking for tunnel -- dnis:614629 --** Jan 1 00:01:03.435: Serial0:1 AAA/AUTHOR/VPDN
(4201608973): Port='Serial0:1' list='default' service=NET Jan 1 00:01:03.435: AAA/AUTHOR/VPDN:
Serial0:1 (4201608973) user='dnis:614629' Jan 1 00:01:03.435: Serial0:1 AAA/AUTHOR/VPDN
(4201608973): send AV service=ppp Jan 1 00:01:03.435: Serial0:1 AAA/AUTHOR/VPDN (4201608973):
send AV protocol=vpdn Jan 1 00:01:03.435: Serial0:1 AAA/AUTHOR/VPDN (4201608973): found list
"default" Jan 1 00:01:03.435: Serial0:1 AAA/AUTHOR/VPDN (4201608973): Method=NSA_LAB (radius)
Jan 1 00:01:03.439: RADIUS: Initial Transmit Serial0:1 id 35 10.51.6.3:1645, Access-Request, len
112 Jan 1 00:01:03.439: Attribute 4 6 0A330644 Jan 1 00:01:03.439: Attribute 5 6 00000001 Jan 1
00:01:03.439: Attribute 26 17 00000009020B5365 Jan 1 00:01:03.439: Attribute 61 6 00000002 Jan 1
00:01:03.439: Attribute 1 13 646E6973 Jan 1 00:01:03.439: Attribute 30 8 36313436 Jan 1
00:01:03.439: Attribute 31 12 32303835 Jan 1 00:01:03.439: Attribute 2 18 0FC856FB Jan 1
00:01:03.439: Attribute 6 6 00000005 Jan 1 00:01:03.443: RADIUS: Received from id 35
10.51.6.3:1645, Access-Accept, len 167 Jan 1 00:01:03.443: Attribute 6 6 00000005 Jan 1
00:01:03.443: Attribute 26 29 0000000901177670 Jan 1 00:01:03.443: Attribute 26 26
0000000901147670 Jan 1 00:01:03.443: Attribute 26 47 0000000901297670 Jan 1 00:01:03.443:
Attribute 26 39 0000000901217670 Jan 1 00:01:03.443: RADIUS: saved authorization data for user
62127900 at 61CD10A0 Jan 1 00:01:03.443: RADIUS: cisco AVPair "vpdn:tunnel-type=l2tp" Jan 1
00:01:03.443: RADIUS: cisco AVPair "vpdn:tunnel-id=hgw" **Jan 1 00:01:03.443: RADIUS: cisco AVPair
"vpdn:ip-addresses= 10.51.6.61,10.51.6.59"** Jan 1 00:01:03.443: RADIUS: cisco AVPair "vpdn:l2tp-
tunnel-password=hello" Jan 1 00:01:03.443: AAA/AUTHOR (4201608973): Post authorization status =


```

PASS_ADD Jan 1 00:01:03.443: AAA/AUTHOR/VPDN: Processing AV service=ppp Jan 1 00:01:03.443:
AAA/AUTHOR/VPDN: Processing AV protocol=vpdn Jan 1 00:01:03.443: AAA/AUTHOR/VPDN: Processing AV
tunnel-type=l2tp Jan 1 00:01:03.443: AAA/AUTHOR/VPDN: Processing AV tunnel-id=hgw Jan 1
00:01:03.443: AAA/AUTHOR/VPDN: Processing AV ip-addresses= 10.51.6.61,10.51.6.59 Jan 1
00:01:03.443: AAA/AUTHOR/VPDN: Processing AV l2tp-tunnel-password=hello Jan 1 00:01:03.443:
Se0:1 VPDN/RPMS/: Got tunnel info for dnis:614629 Jan 1 00:01:03.443: Se0:1 VPDN/RPMS/: LAC hgw
Jan 1 00:01:03.443: Se0:1 VPDN/RPMS/: l2tp-busy-disconnect yes Jan 1 00:01:03.443: Se0:1
VPDN/RPMS/: l2tp-tunnel-password xxxxxx Jan 1 00:01:03.443: Se0:1 VPDN/RPMS/: 2 IP addresses Jan
1 00:01:03.443: Se0:1 VPDN/RPMS/: IP 10.51.6.61 Priority 1 Jan 1 00:01:03.447: Se0:1 VPDN/RPMS/:
IP 10.51.6.59 Priority 1 Jan 1 00:01:03.447: Se0:1 VPDN/: curlvl 1 Address 1: 10.51.6.59,
priority 1 Jan 1 00:01:03.447: Se0:1 VPDN/: curlvl 1 Address 0: 10.51.6.61, priority 1 Jan 1
00:01:03.447: Se0:1 VPDN/: Select non-active address 10.51.6.61, priority 1 Jan 1 00:01:03.447:
Se0:1 VPDN: Find LNS process created Jan 1 00:01:03.447: Tnl 49388 L2TP: SM State idle Jan 1
00:01:03.447: Tnl 49388 L2TP: O SCCRQ Jan 1 00:01:03.447: Tnl 49388 L2TP: Tunnel state change
from idle to wait-ctl-reply Jan 1 00:01:03.447: Tnl 49388 L2TP: SM State wait-ctl-reply Jan 1
00:01:03.447: Se0:1 VPDN: Forward to address 10.51.6.61 Jan 1 00:01:03.447: Se0:1 VPDN: Pending
Jan 1 00:01:03.447: Se0:1 VPDN: Process created Jan 1 00:01:03.451: Tnl 49388 L2TP: I SCCRP from
l2tp-gw Jan 1 00:01:03.451: Tnl 49388 L2TP: Got a challenge from remote peer, l2tp-gw Jan 1
00:01:03.451: Tnl 49388 L2TP: Got a response from remote peer, l2tp-gw Jan 1 00:01:03.451: Tnl
49388 L2TP: Tunnel Authentication success Jan 1 00:01:03.451: Tnl 49388 L2TP: Tunnel state
change from wait-ctl-reply to established Jan 1 00:01:03.451: Tnl 49388 L2TP: O SCCCN to l2tp-gw
tnlid 43591 Jan 1 00:01:03.455: Tnl 49388 L2TP: SM State established Jan 1 00:01:03.455: Se0:1
VPDN: Forwarding... Jan 1 00:01:03.455: Tnl/Cl 49388/19 L2TP: Session FS enabled Jan 1
00:01:03.455: Tnl/Cl 49388/19 L2TP: Session state change from idle to wait-for-tunnel Jan 1
00:01:03.455: Se0:1 Tnl/Cl 49388/19 L2TP: Create session Jan 1 00:01:03.455: Tnl 49388 L2TP: SM
State established Jan 1 00:01:03.455: Se0:1 Tnl/Cl 49388/19 L2TP: O ICRQ to l2tp-gw 43591/0 Jan
1 00:01:03.455: Se0:1 Tnl/Cl 49388/19 L2TP: Session state change from wait-for-tunnel to wait-
reply Jan 1 00:01:03.455: Se0:1 VPDN: 2500-1 is forwarded Jan 1 00:01:03.459: Se0:1 Tnl/Cl
49388/19 L2TP: O ICCN to l2tp-gw 43591/19 Jan 1 00:01:03.463: Se0:1 Tnl/Cl 49388/19 L2TP:
Session state change from wait-reply to established Jan 1 00:01:04.455: %LINEPROTO-5-UPDOWN:
Line protocol on Interface Serial0:1, changed state to up Jan 1 00:01:09.127: %ISDN-6-CONNECT:
Interface Serial0:1 is now connected to 2085730592 2500-1

```

Shows from LAC

```

5300-I#show users

```

Interface	User	Mode	Idle	Peer Address
Se0:0	2500-1	Sync PPP	-	
Se0:1	2500-1	Sync PPP	-	

```

5300-I#show vpdn

```

L2TP Tunnel and Session Information **Total tunnels 2 sessions 2**

LocID	RemID	Remote Name	State	Remote Address	Port	Sessions
5105	24230	l2tp-gw	est	10.51.6.59	1701	1

LocID	RemID	TunID	Intf	Username	State	Last Chg
Fastswitch						
18	41	5105	Se0:0	2500-1	est	00:01:04 enabled

LocID	RemID	Remote Name	State	Remote Address	Port	Sessions
49388	43591	l2tp-gw	est	10.51.6.61	1701	1

LocID	RemID	TunID	Intf	Username	State	Last Chg
Fastswitch						
19	19	49388	Se0:1	2500-1	est	00:01:02 enabled

% No active L2F tunnels

调试采取从LNS - 10.51.6.59

```
Jan 1 00:01:01.783: L2TP: I SCCRQ from hgw tnl 5105
Jan 1 00:01:01.783: Tnl 24230 L2TP: Got a challenge in SCCRQ, hgw
Jan 1 00:01:01.783: Tnl 24230 L2TP: New tunnel created for remote hgw,
address10.51.6.68
Jan 1 00:01:01.783: Tnl 24230 L2TP: O SCCRP to hgw tnlid 5105
Jan 1 00:01:01.783: Tnl 24230 L2TP: Tunnel state change from idle
to wait-ctl-reply
Jan 1 00:01:01.787: Tnl 24230 L2TP: I SCCCN from hgw tnl 5105
Jan 1 00:01:01.787: Tnl 24230 L2TP: Got a Challenge Response in SCCCN from hgw
Jan 1 00:01:01.787: Tnl 24230 L2TP: Tunnel Authentication success
Jan 1 00:01:01.787: Tnl 24230 L2TP: Tunnel state change from wait-ctl-reply to established Jan 1
00:01:01.787: Tnl 24230 L2TP: SM State established Jan 1 00:01:01.791: Tnl 24230 L2TP: I ICRQ
from hgw tnl 5105 Jan 1 00:01:01.791: Tnl/Cl 24230/41 L2TP: Session FS enabled Jan 1
00:01:01.791: Tnl/Cl 24230/41 L2TP: Session state change from idle to wait-connect Jan 1
00:01:01.791: Tnl/Cl 24230/41 L2TP: New session created Jan 1 00:01:01.791: Tnl/Cl 24230/41
L2TP: O ICRP to hgw 5105/18 Jan 1 00:01:01.795: Tnl/Cl 24230/41 L2TP: I ICCN from hgw tnl 5105,
cl 18 Jan 1 00:01:01.795: Tnl/Cl 24230/41 L2TP: Session state change from wait-connect to
established Jan 1 00:01:01.795: Vi2 VPDN: Virtual interface created for 2500-1 Jan 1
00:01:01.795: Vi2 PPP: Phase is DOWN, Setup Jan 1 00:01:01.799: Vi2 VTEMPLATE: Has a new
cloneblk vtemplate, now it has vtemplate Jan 1 00:01:01.799: Vi2 VTEMPLATE: ***** CLONE
VACCESS2 ***** Jan 1 00:01:01.799: Vi2 VTEMPLATE: Clone from Virtual-Template1
interface Virtual-Access2 default ip address ppp authentication chap vpdn ppp authorization vpdn
ppp multilink pp chap hostname nsa-7200-3 end Jan 1 00:01:01.835: %LINK-3-UPDOWN: Interface
Virtual-Access2, changed state to up Jan 1 00:01:01.835: Vi2 PPP: Using set call direction Jan 1
00:01:01.835: Vi2 PPP: Treating connection as a callin Jan 1 00:01:01.835: Vi2 PPP: Phase is
ESTABLISHING, Passive Open Jan 1 00:01:01.835: Vi2 CHAP: Using alternate hostname nsa-7200-3 Jan
1 00:01:01.835: Vi2 LCP: State is Listen Jan 1 00:01:01.835: Vi2 LCP: I FORCED CONFREQ len 24
Jan 1 00:01:01.835: Vi2 LCP: AuthProto CHAP (0x0305C22305) Jan 1 00:01:01.835: Vi2 LCP:
MagicNumber 0x15C13318 (0x050615C13318) Jan 1 00:01:01.835: Vi2 LCP: MRRU 1524 (0x110405F4) Jan
1 00:01:01.835: Vi2 LCP: EndpointDisc 1 Local (0x130901353330302D31) Jan 1 00:01:01.835: Vi2
VPDN: PPP LCP accepted rcv CONFACK Jan 1 00:01:01.835: Vi2 LCP: I FORCED CONFACK len 19 Jan 1
00:01:01.835: Vi2 LCP: MagicNumber 0x31BFC605 (0x050631BFC605) Jan 1 00:01:01.835: Vi2 LCP: MRRU
1524 (0x110405F4) Jan 1 00:01:01.835: Vi2 LCP: EndpointDisc 1 Local (0x130901323530302D31) Jan 1
00:01:01.835: Vi2 VPDN: PPP LCP accepted sent CONFACK Jan 1 00:01:01.835: Vi2 PPP: Phase is
AUTHENTICATING, by this end Jan 1 00:01:01.835: Vi2 CHAP: Using alternate hostname nsa-7200-3
Jan 1 00:01:01.835: Vi2 CHAP: O CHALLENGE id 3 len 31 from "nsa-7200-3" Jan 1 00:01:01.835: Vi2
CHAP: I RESPONSE id 17 len 27 from "2500-1" Jan 1 00:01:01.835: Vi2 PPP: Phase is FORWARDING Jan
1 00:01:01.835: Vi2 VPDN: Looking for tunnel -- -- Jan 1 00:01:01.839: Vi2 VPDN: Looking for
tunnel -- -- Jan 1 00:01:01.839: %SGBP-7-NEWL: Local query #53 for 2500-1, count 1, ourbid 50
Jan 1 00:01:01.839: Vi2 VPDN: Continue using SGBP for 2500-1 Jan 1 00:01:01.839: Vi2 VPDN:
Pending Jan 1 00:01:01.839: Vi2 VPDN: Process created Jan 1 00:01:02.091: %SGBP-7-DONE: Query
#53 for bundle 2500-1, count 1, master is local Jan 1 00:01:02.091: %SGBP-7-MQB: Bundle: 2500-1
State: Done OurBid: 10000 Jan 1 00:01:02.091: %SGBP-7-PB: 10.51.6.61 State: Rcvd Bid: 000 Retry:
0 Jan 1 00:01:02.091: Vi2 VPDN: Not forwarded Jan 1 00:01:02.091: Vi2 PPP: Phase is
AUTHENTICATING Jan 1 00:01:02.091: Vi2 CHAP: I RESPONSE id 17 len 27 from "2500-1" Jan 1
00:01:02.091: AAA/AUTHEN/START (3376880111): port='Virtual-Access2' list='vpdn' action=LOGI
service=PPP Jan 1 00:01:02.091: AAA/AUTHEN/START (3376880111): found list vpdn Jan 1
00:01:02.091: AAA/AUTHEN/START (3376880111): Method=radius (radius) Jan 1 00:01:02.091: RADIUS:
Initial Transmit Virtual-Access2 id 15 10.51.6.3:1645, Access-Request, len 97 Jan 1
00:01:02.091: Attribute 4 6 0A33063B Jan 1 00:01:02.091: Attribute 5 6 00000002 Jan 1
00:01:02.091: Attribute 61 6 00000005 Jan 1 00:01:02.091: Attribute 1 8 32353030 Jan 1
00:01:02.091: Attribute 30 8 36313436 Jan 1 00:01:02.091: Attribute 31 12 32303835 Jan 1
00:01:02.091: Attribute 3 19 110F710D Jan 1 00:01:02.091: Attribute 6 6 00000002 Jan 1
00:01:02.091: Attribute 7 6 00000001 Jan 1 00:01:02.095: RADIUS: Received from id 15
10.51.6.3:1645, Access-Accept, len 38 Jan 1 00:01:02.095: Attribute 6 6 00000002 Jan 1
00:01:02.095: Attribute 7 6 00000001 Jan 1 00:01:02.095: Attribute 8 6 FFFFFFFF Jan 1
00:01:02.095: AAA/AUTHEN (3376880111): status = PASS Jan 1 00:01:02.095: Vi2 AAA/AUTHOR/LCP:
Authorize LCP Jan 1 00:01:02.095: Vi2 AAA/AUTHOR/LCP (2242497288): Port='Virtual-Access2'
list='vpdn' service=NET Jan 1 00:01:02.099: AAA/AUTHOR/LCP: Vi2 (2242497288) user='2500-1' Jan 1
00:01:02.099: Vi2 AAA/AUTHOR/LCP (2242497288): send AV service=ppp Jan 1 00:01:02.099: Vi2
AAA/AUTHOR/LCP (2242497288): send AV protocol=lcp Jan 1 00:01:02.099: Vi2 AAA/AUTHOR/LCP
```


(2242497288): found list "vpdn" Jan 1 00:01:02.099: Vi2 AAA/AUTHOR/LCP (2242497288): Method=radius (radius) Jan 1 00:01:02.099: Vi2 AAA/AUTHOR (2242497288): Post authorization status = PASS_REPL Jan 1 00:01:02.099: Vi2 AAA/AUTHOR/LCP: Processing AV service=ppp Jan 1 00:01:02.099: Vi2 CHAP: O SUCCESS id 17 len 4 Jan 1 00:01:02.099: Vi2 PPP: Phase is VIRTUALIZED Jan 1 00:01:02.099: Vi2 AAA/AUTHOR/MLP (2616761311): Port='Virtual-Access2' list='vpdn' service=NET Jan 1 00:01:02.099: AAA/AUTHOR/MLP: Vi2 (2616761311) user='2500-1' Jan 1 00:01:02.099: Vi2 AAA/AUTHOR/MLP (2616761311): send AV service=ppp Jan 1 00:01:02.099: Vi2 AAA/AUTHOR/MLP (2616761311): send AV protocol=multilink Jan 1 00:01:02.099: Vi2 AAA/AUTHOR/MLP (2616761311): found list "vpdn" Jan 1 00:01:02.099: Vi2 AAA/AUTHOR/MLP (2616761311): Method=radius (radius) Jan 1 00:01:02.099: Vi2 AAA/AUTHOR (2616761311): Post authorization status = PASS_REPL Jan 1 00:01:02.099: Vi1 VTEMPLATE: Set default settings with ip unnumbered Jan 1 00:01:02.115: Vi1 VTEMPLATE: Hardware address 0010.0ba5.f800 Jan 1 00:01:02.115: Vi1 PPP: Phase is DOWN, Setup Jan 1 00:01:02.119: Vi1 VTEMPLATE: Has a new cloneblk vtemplate, now it has vtemplate Jan 1 00:01:02.119: Vi1 VTEMPLATE: ***** CLONE VACCESS1 ***** Jan 1 00:01:02.119: Vi1 VTEMPLATE: Clone from Virtual-Templatel interface Virtual-Access1 default ip address no ip address encaps ppp ip unnumbered Ethernet5/0 peer default ip address pool default ppp authentication chap vpdn ppp authorization vpdn **ppp multilink** pp chap hostname nsa-7200-3 end Jan 1 00:01:02.179: Vi2 IPCP: Packet buffered while building MLP bundle interface Jan 1 00:01:02.179: %LINK-3-UPDOWN: Interface Virtual-Access1, changed state to up Jan 1 00:01:02.179: Vi1 PPP: Treating connection as a dedicated line Jan 1 00:01:02.179: Vi1 PPP: Phase is ESTABLISHING, Active Open Jan 1 00:01:02.179: Vi1 CHAP: Using alternate hostname nsa-7200-3 Jan 1 00:01:02.179: Vi1 AAA/AUTHOR/FSM: (0): LCP succeeds trivially Jan 1 00:01:02.179: Vi1 LCP: O CONFREQ [Closed] id 1 len 32 Jan 1 00:01:02.179: Vi1 LCP: AuthProto CHAP (0x0305C22305) Jan 1 00:01:02.179: Vi1 LCP: MagicNumber 0x1F5A340B (0x05061F5A340B) Jan 1 00:01:02.179: Vi1 LCP: MRRU 1524 (0x110405F4) Jan 1 00:01:02.179: Vi1 LCP: EndpointDisc 1 Local (0x130D016E73612D373230302D33) Jan 1 00:01:02.179: AAA/AUTHOR/MLP Vi1: Processing AV service=ppp Jan 1 00:01:02.179: Vi1 VPDN: Virtual interface iteration Jan 1 00:01:02.179: Vi1 PPP: Phase is UP Jan 1 00:01:02.179: Vi1 AAA/AUTHOR/FSM: (0): Can we start IPCP? Jan 1 00:01:02.179: Vi1 AAA/AUTHOR/FSM (2530889481): Port='Virtual-Access2' list='vpdn' service=NET Jan 1 00:01:02.179: AAA/AUTHOR/FSM: Vi1 (2530889481) user='2500-1' Jan 1 00:01:02.179: Vi1 AAA/AUTHOR/FSM (2530889481): send AV service=ppp Jan 1 00:01:02.179: Vi1 AAA/AUTHOR/FSM (2530889481): send AV protocol=ip Jan 1 00:01:02.179: Vi1 AAA/AUTHOR/FSM (2530889481): found list "vpdn" Jan 1 00:01:02.179: Vi1 AAA/AUTHOR/FSM (2530889481): Method=radius (radius) Jan 1 00:01:02.179: RADIUS: allowing negotiated framed address Jan 1 00:01:02.179: Vi1 AAA/AUTHOR (2530889481): Post authorization status = PASS_REPL Jan 1 00:01:02.179: Vi1 AAA/AUTHOR/FSM: We can start IPCP Jan 1 00:01:02.183: Vi1 IPCP: O CONFREQ [Closed] id 1 len 10 Jan 1 00:01:02.183: Vi1 IPCP: Address 10.51.6.59 (0x03060A33063B) Jan 1 00:01:02.183: Vi1 MLP: Added first link Vi2 to bundle 2500-1 Jan 1 00:01:02.183: Vi2 IPCP: Redirect packet to Vi1 Jan 1 00:01:02.183: Vi1 IPCP: I CONFREQ [REQsent] id 1 len 10 Jan 1 00:01:02.183: Vi1 IPCP: Address 10.10.53.2 (0x03060A0A3502) Jan 1 00:01:02.183: Vi1 AAA/AUTHOR/IPCP: Start. Her address 10.10.53.2, we want 0.0.0.0 Jan 1 00:01:02.183: Vi1 AAA/AUTHOR/IPCP (2777739044): Port='Virtual-Access2' list='vpdn' service=NET Jan 1 00:01:02.183: AAA/AUTHOR/IPCP: Vi1 (2777739044) user='2500-1' Jan 1 00:01:02.183: Vi1 AAA/AUTHOR/IPCP (2777739044): send AV service=ppp Jan 1 00:01:02.183: Vi1 AAA/AUTHOR/IPCP (2777739044): send AV protocol=ip Jan 1 00:01:02.183: Vi1 AAA/AUTHOR/IPCP (2777739044): send AV addr*10.10.53.2 Jan 1 00:01:02.183: Vi1 AAA/AUTHOR/IPCP (2777739044): found list "vpdn" Jan 1 00:01:02.183: Vi1 AAA/AUTHOR/IPCP (2777739044): Method=radius (radius) Jan 1 00:01:02.183: RADIUS: allowing negotiated framed address 10.10.53.2 Jan 1 00:01:02.183: Vi1 AAA/AUTHOR (2777739044): Post authorization status = PASS_REPL Jan 1 00:01:02.183: Vi1 AAA/AUTHOR/IPCP: Processing AV service=ppp Jan 1 00:01:02.183: Vi1 AAA/AUTHOR/IPCP: Processing AV addr=10.10.53.2 Jan 1 00:01:02.183: Vi1 AAA/AUTHOR/IPCP: Authorization succeeded Jan 1 00:01:02.183: Vi1 AAA/AUTHOR/IPCP: Done. Her address 10.10.53.2, we want 10.10.53.2 Jan 1 00:01:02.183: Vi1 IPCP: O CONFACK [REQsent] id 1 len 10 Jan 1 00:01:02.183: Vi1 IPCP: Address 10.10.53.2 (0x03060A0A3502) Jan 1 00:01:02.211: Vi1 IPCP: I CONFACK [ACKsent] id 1 len 10 Jan 1 00:01:02.211: Vi1 IPCP: Address 10.51.6.59 (0x03060A33063B) Jan 1 00:01:02.211: Vi1 IPCP: State is Open Jan 1 00:01:02.211: Vi1 AAA/AUTHOR/PER-USER: Event IP_UP Jan 1 00:01:02.211: Vi1 AAA/AUTHOR: IP_UP Jan 1 00:01:02.211: Vi1 AAA/PER-USER: processing author params. Jan 1 00:01:02.215: Vi1 IPCP: Install route to 10.10.53.2 Jan 1 00:01:03.099: %LINEPROTO-5-UPDOWN: Line protocol on Interface Virtual-Access2, changed state to up Jan 1 00:01:03.179: %LINEPROTO-5-UPDOWN: Line protocol on Interface Virtual-Access1, changed state to up **Jan 1 00:01:04.163: %SGBP-7-NEWP: Peer query #54 for 2500-1, count 1, peerbid 50, ourbid 10000 Jan 1 00:01:04.363: %SGBP-7-DONE: Query #54 for bundle 2500-1, count 0, master is local Jan 1 00:01:04.367: L2X: L2F_CONF received Jan 1 00:01:04.367: Tnl 46 L2F: Received L2F-CONF from MULTI HOP Jan 1 00:01:04.367: AAA/AUTHEN/START (1546583827): port='' list='default' action=SENDAUTH service=PPP Jan 1 00:01:04.367: AAA/AUTHEN/START (1546583827): found list default Jan 1 00:01:04.367:**

AAA/AUTHEN/START (1546583827): Method=LOCAL Jan 1 00:01:04.367: AAA/AUTHEN (1546583827): status = PASS Jan 1 00:01:04.367: AAA/AUTHEN/START (3291965384): port='' list='default' action=SENDAUTH service=PPP Jan 1 00:01:04.367: AAA/AUTHEN/START (3291965384): found list default Jan 1 00:01:04.367: AAA/AUTHEN/START (3291965384): Method=LOCAL Jan 1 00:01:04.367: AAA/AUTHEN (3291965384): status = PASS Jan 1 00:01:04.367: Tnl 46 L2F: Opened UDP socket to 10.51.6.61 using source 10.51.6.59 Jan 1 00:01:04.367: Tnl 46 L2F: Tunnel MULTIHOPE state change from closed state opening Jan 1 00:01:04.367: Tnl 46 L2F: Sending L2F-CONF to peer Jan 1 00:01:04.375: Tnl 46 L2F: L2F_OPEN received Jan 1 00:01:04.375: Tnl 46 L2F: OPEN from MULTIHOPE received for tunnel in state opening Jan 1 00:01:04.375: AAA/AUTHEN/START (3210024667): port='' list='default' action=LOGIN service=PPP Jan 1 00:01:04.375: AAA/AUTHEN/START (3210024667): found list default Jan 1 00:01:04.375: AAA/AUTHEN/START (3210024667): Method=LOCAL Jan 1 00:01:04.375: AAA/AUTHEN (3210024667): status = PASS Jan 1 00:01:04.375: VPDN: Chap authentication succeeded for MULTIHOPE Jan 1 00:01:04.375: Tnl 46 L2F: Tunnel MULTIHOPE state change from opening state open Jan 1 00:01:04.375: Tnl 46 L2F: Replying to MULTIHOPE with L2F-OPEN Jan 1 00:01:04.379: Tnl 46 L2F: L2F_OPEN received Jan 1 00:01:04.379: Tnl 46 L2F: New OPEN received for Session 12 Jan 1 00:01:04.379: 2500-1Tnl/Cl 46/12 L2F: Session state change from closed to opening Jan 1 00:01:04.379: Vi3 VTEMPLATE: Hardware address 0010.0ba5.f800 Jan 1 00:01:04.379: Vi3 VPDN: Virtual interface created for 2500-1 bandwidth 64 Kbps Jan 1 00:01:04.379: Vi3 PPP: Phase is DOWN, Setup Jan 1 00:01:04.379: Vi3 VTEMPLATE: Has a new cloneblk vtemplate, now it has vtemplate Jan 1 00:01:04.379: Vi3 VTEMPLATE: ***** CLONE VACCESS3 ***** Jan 1 00:01:04.379: Vi3 VTEMPLATE: Clone from Virtual-Templatel interface Virtual-Access3 default ip address ppp authentication chap vpdn ppp authorization vpdn ppp multilink pp chap hostname nsa-7200-3 end Jan 1 00:01:04.419: %LINK-3-UPDOWN: Interface Virtual-Access3, changed state to up Jan 1 00:01:04.419: Vi3 PPP: Using set call direction Jan 1 00:01:04.419: Vi3 PPP: Treating connection as a callin Jan 1 00:01:04.419: Vi3 PPP: Phase is ESTABLISHING, Passive Open Jan 1 00:01:04.419: Vi3 CHAP: Using alternate hostname nsa-7200-3 Jan 1 00:01:04.419: Vi3 LCP: State is Listen Jan 1 00:01:04.419: Vi3 LCP: I FORCED CONFREQ len 24 Jan 1 00:01:04.419: Vi3 LCP: AuthProto CHAP (0x0305C22305) Jan 1 00:01:04.419: Vi3 LCP: MagicNumber 0x15C13B5D (0x050615C13B5D) Jan 1 00:01:04.419: Vi3 LCP: MRRU 1524 (0x110405F4) Jan 1 00:01:04.419: Vi3 LCP: EndpointDisc 1 Local (0x130901353330302D31) Jan 1 00:01:04.419: Vi3 VPDN: PPP LCP accepted rcv CONFACK Jan 1 00:01:04.419: Vi3 LCP: I FORCED CONFACK len 19 Jan 1 00:01:04.419: Vi3 LCP: MagicNumber 0x31BFCE57 (0x050631BFCE57) Jan 1 00:01:04.419: Vi3 LCP: MRRU 1524 (0x110405F4) Jan 1 00:01:04.419: Vi3 LCP: EndpointDisc 1 Local (0x130901323530302D31) Jan 1 00:01:04.419: Vi3 VPDN: PPP LCP accepted sent CONFACK Jan 1 00:01:04.419: Vi3 PPP: Phase is AUTHENTICATING, by this end Jan 1 00:01:04.419: Vi3 CHAP: Using alternate hostname nsa-7200-3 Jan 1 00:01:04.419: Vi3 CHAP: O CHALLENGE id 3 len 31 from "nsa-7200-3" Jan 1 00:01:04.419: Vi3 Tnl/Cl 46/12 L2F: Transfer NAS-Rate L2F/64000/64000 to LCP Jan 1 00:01:04.419: Vi3 CHAP: I RESPONSE id 3 len 27 from "2500-1" Jan 1 00:01:04.419: Vi3 PPP: Phase is FORWARDING Jan 1 00:01:04.423: Vi3 VPDN: Looking for tunnel -- -- Jan 1 00:01:04.423: Vi3 VPDN: Looking for tunnel -- -- Jan 1 00:01:04.423: Vi3 VPDN: Multihop illegal for Multichassis Multilink !--- This debug message is generated as the Cisco IOS software checks to see !--- if the second and first hops are already an existing Multichassis tunnel. !--- If so, the tunnel is disallowed. Jan 1 00:01:04.423: Vi3 VPDN: Continue PPP authentication for 2500-1 Jan 1 00:01:04.423: Vi3 PPP: Phase is AUTHENTICATING Jan 1 00:01:04.423: Vi3 Tnl/Cl 46/12 L2F: Created VA for Mid, Replying with OPEN Jan 1 00:01:04.423: Vi3 Tnl/Cl 46/12 L2F: Session state change from opening to open Jan 1 00:01:04.423: AAA/AUTHEN/START (578160697): port='Virtual-Access3' list='vpdn' action=LOGIN service=PPP Jan 1 00:01:04.423: AAA/AUTHEN/START (578160697): found list vpdn Jan 1 00:01:04.423: AAA/AUTHEN/START (578160697): Method=radius (radius) Jan 1 00:01:04.423: RADIUS: Initial Transmit Virtual-Access3 id 16 10.51.6.3:1645, Access-Request, len 97 Jan 1 00:01:04.423: Attribute 4 6 0A33063B Jan 1 00:01:04.423: Attribute 5 6 00000003 Jan 1 00:01:04.423: Attribute 61 6 00000005 Jan 1 00:01:04.423: Attribute 1 8 32353030 Jan 1 00:01:04.423: Attribute 30 8 36313436 Jan 1 00:01:04.423: Attribute 31 12 32303835 Jan 1 00:01:04.423: Attribute 3 19 03A99FFB Jan 1 00:01:04.423: Attribute 6 6 00000002 Jan 1 00:01:04.423: Attribute 7 6 00000001 Jan 1 00:01:04.427: RADIUS: Received from id 16 10.51.6.3:1645, Access-Accept, len 38 Jan 1 00:01:04.427: Attribute 6 6 00000002 Jan 1 00:01:04.427: Attribute 7 6 00000001 Jan 1 00:01:04.427: Attribute 8 6 FFFFFFFF Jan 1 00:01:04.427: AAA/AUTHEN (578160697): status = PASS Jan 1 00:01:04.427: Vi3 AAA/AUTHOR/LCP: Authorize LCP Jan 1 00:01:04.427: Vi3 AAA/AUTHOR/LCP (2032781798): Port='Virtual-Access3' list='vpdn' service=NET Jan 1 00:01:04.427: AAA/AUTHOR/LCP: Vi3 (2032781798) user='2500-1' Jan 1 00:01:04.427: Vi3 AAA/AUTHOR/LCP (2032781798): send AV service=ppp Jan 1 00:01:04.427: Vi3 AAA/AUTHOR/LCP (2032781798): send AV protocol=lcp Jan 1 00:01:04.427: Vi3 AAA/AUTHOR/LCP (2032781798): found list "vpdn" Jan 1 00:01:04.427: Vi3 AAA/AUTHOR/LCP (2032781798): Method=radius (radius) Jan 1 00:01:04.427: Vi3 AAA/AUTHOR (2032781798): Post authorization status = PASS_REPL Jan 1 00:01:04.427: Vi3 AAA/AUTHOR/LCP: Processing AV service=ppp Jan 1

```
00:01:04.427: Vi3 CHAP: O SUCCESS id 3 len 4 Jan 1 00:01:04.427: Vi3 PPP: Phase is VIRTUALIZED
Jan 1 00:01:04.427: Vi1 MLP: Added link Vi3 to bundle 2500-1 Jan 1 00:01:04.491: %SGBP-7-MQB:
Bundle: 2500-1 State: Done OurBid:10000 Jan 1 00:01:04.491: %SGBP-7-PB: 10.51.6.61 State: Closed
Bid: 050 Retry: 1 Jan 1 00:01:05.427: %LINEPROTO-5-UPDOWN: Line protocol on Interface Virtual-
Access3, changed state to up
```

Shows from LNS - 10.51.6.59

```
Nsa-7200-3#show users
```

Interface	User	Mode	Idle	Peer Address
Vi1	2500-1	Virtual PPP (Bundle)	00:02:34	10.10.53.2
Vi2	2500-1	Virtual PPP (L2TP)	-	-
Vi3	2500-1	Virtual PPP (L2F)	-	-

```
Nsa-7200-3#show sgrp
Group Name: MULTIHOP Ref: 0xBA5F800
Seed bid: default, 50, default seed bid setting

Member Name: nsa-7200-2 State: active Id: 1
Ref: 0xB1210C00
Address: 10.51.6.61
```

```
nsa-7200-3#show vpdn
```

L2TP Tunnel and Session Information Total tunnels 1 sessions 1

LocID	RemID	Remote Name	State	Remote Address	Port	Sessions
24230	5105	hgw	est	10.51.6.68	1701	1

LocID	RemID	TunID	Intf	Username	State	Last Chg	Fastswitc
41	18	24230	Vi2	2500-1	est	00:02:40	enabled

L2F Tunnel and Session Information Total tunnels 1 sessions 1

NAS CLID	HGW CLID	NAS Name	HGW Name	State
46	46	MULTIHOP 10.51.6.61	MULTIHOP 10.51.6.59	open

CLID	MID	Username	Intf	State
46	12	2500-1	Vi3	open

```
Nsa-7200-3#show ppp multilink

Virtual-Access1, bundle name is 2500-1
Bundle up for 00:02:53
1 lost fragments, 3 reordered, 0 unassigned
1 discarded, 0 lost received, 81/255 load
0x1986 received sequence, 0x1986 sent sequence
Member links: 2 (max not set, min not set)
:Virtual-Access2 (10.51.6.68), since 00:02:53
nsa-7200-2:Virtual-Access3 (10.51.6.61), since 00:02:50
```

调试采取从LNS - 10.51.6.61

```
Jan 1 00:01:02.399: %SGBP-7-NEWP: Peer query #53 for 2500-1,
count 1, peerbid 5 0, ourbid 0
Jan 1 00:01:04.411: L2TP: I SCCRQ from hgw tnl 49388
Jan 1 00:01:04.411: Tnl 43591 L2TP: Got a challenge in SCCRQ, hgw
Jan 1 00:01:04.411: Tnl 43591 L2TP: New tunnel created for remote hgw,
address 10.51.6.68
Jan 1 00:01:04.411: Tnl 43591 L2TP: O SCCRP to hgw tnlid 49388
```

```
Jan 1 00:01:04.411: Tnl 43591 L2TP: Tunnel state change from idle to
wait-ctl-reply
Jan 1 00:01:04.415: Tnl 43591 L2TP: I SCCCN from hgw tnl 49388
Jan 1 00:01:04.415: Tnl 43591 L2TP: Got a Challenge Response in SCCCN from hgw
Jan 1 00:01:04.415: Tnl 43591 L2TP: Tunnel Authentication success
Jan 1 00:01:04.415: Tnl 43591 L2TP: Tunnel state change from wait-ctl-reply
to established
Jan 1 00:01:04.415: Tnl 43591 L2TP: SM State established
Jan 1 00:01:04.419: Tnl 43591 L2TP: I ICRQ from hgw tnl 49388
Jan 1 00:01:04.419: Tnl/Cl 43591/19 L2TP: Session FS enabled
Jan 1 00:01:04.419: Tnl/Cl 43591/19 L2TP: Session state change from idle
to wait-connect
Jan 1 00:01:04.419: Tnl/Cl 43591/19 L2TP: New session created
Jan 1 00:01:04.419: Tnl/Cl 43591/19 L2TP: O ICRP to hgw 49388/19
Jan 1 00:01:04.423: Tnl/Cl 43591/19 L2TP: I ICCN from hgw tnl 49388, cl 19
Jan 1 00:01:04.423: Tnl/Cl 43591/19 L2TP: Session state change from
wait-connect to established
Jan 1 00:01:04.423: Vi1 VTEMPLATE: Hardware address 0090.b121.0c00
Jan 1 00:01:04.423: Vi1 VPDN: Virtual interface created for 2500-1
Jan 1 00:01:04.423: Vi1 PPP: Phase is DOWN, Setup
Jan 1 00:01:04.423: Vi1 VTEMPLATE: Has a new cloneblk vtemplate,
now it has vtemplate
Jan 1 00:01:04.423: Vi1 VTEMPLATE:
***** CLONE VACCESS1 *****
Jan 1 00:01:04.423: Vi1 VTEMPLATE: Clone from Virtual-Templatel
interface Virtual-Access1
default ip address
ppp authentication chap vpdn
ppp authorization vpdn
ppp multilink
pp chap hostname nsa-7200-2
end

Jan 1 00:01:04.479: %LINK-3-UPDOWN: Interface Virtual-Access1,
changed state to up
Jan 1 00:01:04.479: Vi1 PPP: Using set call direction
Jan 1 00:01:04.479: Vi1 PPP: Treating connection as a callin
Jan 1 00:01:04.479: Vi1 PPP: Phase is ESTABLISHING, Passive Open
Jan 1 00:01:04.479: Vi1 CHAP: Using alternate hostname nsa-7200-2
Jan 1 00:01:04.479: Vi1 LCP: State is Listen
Jan 1 00:01:04.479: Vi1 VPDN: Bind interface direction=2
Jan 1 00:01:04.479: Vi1 LCP: I FORCED CONFREQ len 24
Jan 1 00:01:04.479: Vi1 LCP: AuthProto CHAP (0x0305C22305)
Jan 1 00:01:04.479: Vi1 LCP: MagicNumber 0x15C13B5D (0x050615C13B5D)
Jan 1 00:01:04.479: Vi1 LCP: MRRU 1524 (0x110405F4)
Jan 1 00:01:04.479: Vi1 LCP: EndpointDisc 1 Local (0x130901353330302D31)
Jan 1 00:01:04.479: Vi1 VPDN: PPP LCP accepted rcv CONFACK
Jan 1 00:01:04.479: Vi1 LCP: I FORCED CONFACK len 19
Jan 1 00:01:04.479: Vi1 LCP: MagicNumber 0x31BFCE57 (0x050631BFCE57)
Jan 1 00:01:04.479: Vi1 LCP: MRRU 1524 (0x110405F4)
Jan 1 00:01:04.479: Vi1 LCP: EndpointDisc 1 Local (0x130901323530302D31)
Jan 1 00:01:04.479: Vi1 VPDN: PPP LCP accepted sent CONFACK
Jan 1 00:01:04.479: Vi1 PPP: Phase is AUTHENTICATING, by this end
Jan 1 00:01:04.483: Vi1 CHAP: O CHALLENGE id 3 len 31 from "nsa-7200-2"
Jan 1 00:01:04.483: Vi1 CHAP: I RESPONSE id 3 len 27 from "2500-1"
Jan 1 00:01:04.483: Vi1 PPP: Phase is FORWARDING
Jan 1 00:01:04.483: Vi1 VPDN: Looking for tunnel -- --
Jan 1 00:01:04.483: Vi1 VPDN: Looking for tunnel -- --
Jan 1 00:01:04.483: %SGBP-7-NEWL: Local query #54 for 2500-1, count 1,
ourbid 50
Jan 1 00:01:04.483: Vi1 VPDN: Continue using SGBP for 2500-1
Jan 1 00:01:04.483: Vi1 VPDN: Pending
Jan 1 00:01:04.483: Vi1 VPDN: Process created
Jan 1 00:01:04.875: %SGBP-7-DONE: Query #54 for bundle 2500-1, count 1,
```

master is 10.51.6.59
Jan 1 00:01:04.875: %SGBP-7-MQB: Bundle: 2500-1 State: Done OurBid: 050
Jan 1 00:01:04.875: %SGBP-7-PB: 10.51.6.59 State: Closed Bid: 10000 Retry: 0
Jan 1 00:01:04.875: Vi1 VPDN: Forwarding...
Jan 1 00:01:04.875: Vi1 Tnl/Cl 46/12 L2F:
Session_create: Tunnel in closed state
Jan 1 00:01:04.875: Tnl 46 L2F:
UDP socket opened to 10.51.6.59 using source 10.51.6.61
Jan 1 00:01:04.875: Tnl 46 L2F:
Tunnel MULTIHOPE state change from closed state opening
Jan 1 00:01:04.875: Vi1 Tnl/Cl 46/12 L2F:
Session state change from closed to waiting_for_tunnel
Jan 1 00:01:04.875: Vi1 Tnl/Cl 46/12 L2F:
Session_create: Closed Tunnel being Re-Opened
Jan 1 00:01:04.875: Vi1 VPDN: 2500-1 is forwarded
Jan 1 00:01:04.879: Tnl 46 L2F: L2F_CONF received
Jan 1 00:01:04.879: Tnl 46 L2F: Received L2F-CONF from MULTIHOPE
Jan 1 00:01:04.879: AAA/AUTHEN/START (3039224583):
port='' list='default' action=SENDAUTH service=PPP
Jan 1 00:01:04.883: AAA/AUTHEN/START (3039224583): found list default
Jan 1 00:01:04.883: AAA/AUTHEN/START (3039224583): Method=LOCAL
Jan 1 00:01:04.883: AAA/AUTHEN (3039224583): status = PASS
Jan 1 00:01:04.883: AAA/AUTHEN/START (3797117540):
port='' list='default' action=SENDAUTH service=PPP
Jan 1 00:01:04.883: AAA/AUTHEN/START (3797117540): found list default
Jan 1 00:01:04.883: AAA/AUTHEN/START (3797117540): Method=LOCAL
Jan 1 00:01:04.883: AAA/AUTHEN (3797117540): status = PASS
Jan 1 00:01:04.883: Tnl 46 L2F:
Tunnel MULTIHOPE state change from opening state open
Jan 1 00:01:04.883: Tnl 46 L2F:
Replying with L2F-OPEN, Tunnel in Open-Wait
Jan 1 00:01:04.887: Tnl 46 L2F: L2F_OPEN received
Jan 1 00:01:04.887: Tnl 46 L2F: OPEN from MULTIHOPE
received for tunnel in state open
Jan 1 00:01:04.887: AAA/AUTHEN/START (228147723):
port='' list='default' action=LOGIN service=PPP
Jan 1 00:01:04.887: AAA/AUTHEN/START (228147723): found list default
Jan 1 00:01:04.887: AAA/AUTHEN/START (228147723): Method=LOCAL
Jan 1 00:01:04.887: AAA/AUTHEN (228147723): status = PASS
Jan 1 00:01:04.887: VPDN: Chap authentication succeeded for MULTIHOPE
Jan 1 00:01:04.887: Tnl 46 L2F:
Tunnel MULTIHOPE state change from open state open
Jan 1 00:01:04.887: Vi1 Tnl/Cl 46/12 L2F:
Session state change from waiting_for_tunnel to opening
Jan 1 00:01:04.887: Vi1 Tnl/Cl 46/12 L2F:
Sending OPEN for Open-Waiting Session
Jan 1 00:01:04.935: Vi1 Tnl/Cl 46/12 L2F: L2F_OPEN received
Jan 1 00:01:04.935: Vi1 Tnl/Cl 46/12 L2F:
OPEN received for existing session in state opening
Jan 1 00:01:04.935: Vi1 Tnl/Cl 46/12 L2F:
Session state change from opening to open
Jan 1 00:01:04.935: Vi1 Tnl/Cl 46/12 L2F:
MID synced NAS/HG Clid=46/46 Mid=12
Jan 1 00:01:04.935: Vi1 PPP: Phase is FORWARDED
Jan 1 00:01:05.875: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Virtual-Access1, changed state to up

Shows from LNS - 10.51.6.61

```
nsa-7200-2#show users
Interface User Mode Idle Peer Address
V1 2500-1 Virtual PPP (L2TP) 00:01:14
nsa-7200-2#show sgrp
Group Name: MULTI_HOP Ref: 0xB1210C00
Seed bid: default, 50, default seed bid setting

Member Name: nsa-7200-3 State: active Id: 1
Ref: 0xBA5F800
Address: 10.51.6.59
```

```
nsa-7200-2#show v2vpn
L2TP Tunnel and Session Information Total tunnels 1 sessions 1

LocID RemID Remote Name State Remote Address Port Sessions
43591 49888 hgw est 10.51.6.68 1701 1

LocID RemID TunID Intf Username State Last Chg Fastswitch
19 19 43591 V1 2500-1 est 00:01:22 enabled

L2F Tunnel and Session Information Total tunnels 1 sessions 1

NAS CLID HGW CLID NAS Name HGW Name State
46 46 MULTI_HOP MULTI_HOP open
10.51.6.61 10.51.6.59

CLID MID Username Intf State
46 12 2500-1 V1 open
```

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