

第2层隧道协议(版本3)静态方法和发夹方法配置示例

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简介

本文档提供第2层隧道协议第3版(L2TPv3)静态和迂回方法的示例配置。

下表介绍L2TPv3的Cisco IOS®软件版本修改支持：

Cisco IOS 软件版本	L2TPv3支持说明
12.0(21)S	Cisco 7200系列、Cisco 7500系列、Cisco 10720和Cisco 12000系列平台引入了对L2TPv3的初始数据平面支持。
12.0(23)S	Cisco 7200系列、Cisco 7500系列、Cisco 10720和Cisco 12000系列平台引入了L2TPv3控制平面支持。
12.3(2)T	此功能已集成到Cisco IOS软件版本12.3(2)T中。

您必须启用思科快速转发(CEF)才能使用L2TPv3功能。在启用CEF之前，Xconnect配置子模式将被阻止。在分布式平台（如Cisco 7500系列）上，如果在会话建立时禁用了CEF，则会话会被关闭并保持关闭，直到CEF重新启用。使用`ip cef`或`ip cef distributed`命令启用CEF。

强烈建议指定源IP地址以配置环回接口。如果不配置环回接口，路由器将选择最佳可用本地地址，该地址可以是在面向核心的接口上配置的任何IP地址。此配置可能会阻止建立控制信道。环回地址必须可从核心网络访问。

先决条件

要求

在尝试此配置之前，请确保您了解：

- [L2TPv3:第2层隧道协议第3版](#)

使用的组件

本文档不限于特定的软件和硬件版本。

规则

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

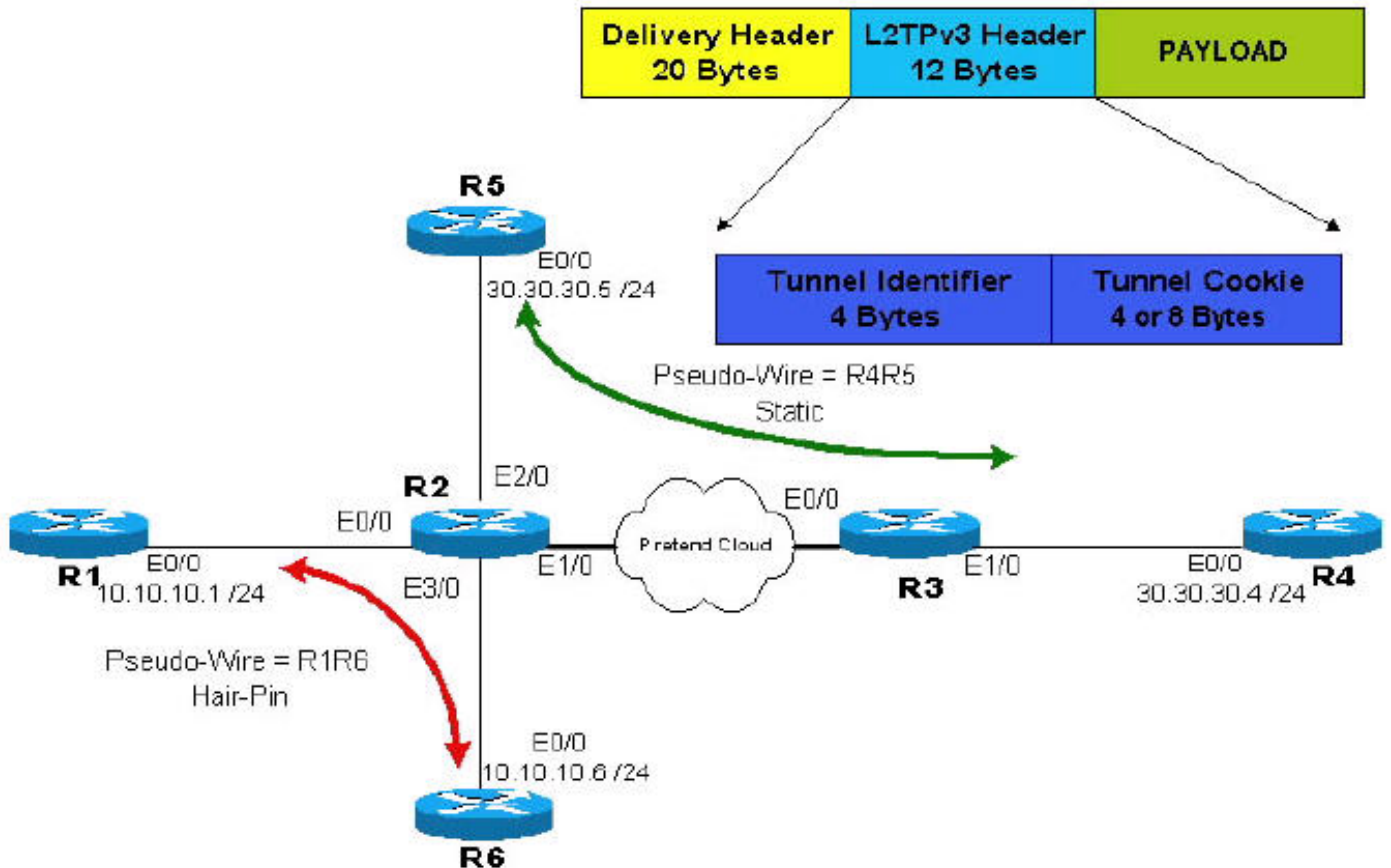
配置

本部分提供有关如何配置本文档所述功能的信息。

注：要查找有关本文档中使用的命令的其他信息，请使用 [命令查找工具](#) (仅注册客户)。

网络图

本文档使用以下网络设置：



注意：提供商使用路由器R2和R3。路由器R1、R4、R5和R6是最终客户。通过使用L2TPv3，路由器R4似乎与R5有直接连接；路由器R1与路由器R6之间的连接也是如此。

配置

本文档使用以下配置：

- 通过IP云的静态伪线。在配置了两个单向隧道的R2和R3中，可以找到配置的相关部分。
- 发夹伪线或本地交换（从同一路由器的一个端口到另一个端口）。该配置仅在R2上完成，包括配置两个指向两个环回的单向隧道，这两个环回都在路由器R2上。

R2

```
R2# show running-config
Building configuration...
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname R2
!
!
clock timezone EST 10
ip subnet-zero
ip cef
no ip domain-lookup
l2tp-class R2signal
  hello 10
  password 0 cisco
  cookie size 8
!
pseudowire-class wireR5R4
  encapsulation l2tpv3
  protocol l2tpv3 R2signal
  ip local interface Loopback0
  ip dfbit set
!
pseudowire-class wireR6R1
  encapsulation l2tpv3
  protocol l2tpv3 R2signal
  ip local interface Loopback1
  ip dfbit set
!
pseudowire-class wireR1R6
  encapsulation l2tpv3
  protocol l2tpv3 R2signal
  ip local interface Loopback2
  ip dfbit set
!
interface Loopback0
description Used by wireR5R4 for Static Connection
 ip address 2.2.2.2 255.255.255.255
 no ip directed-broadcast
!
interface Loopback1
description Used by wireR6R1 for Hair Pinning Connection
 ip address 2.2.2.6 255.255.255.255
 no ip directed-broadcast
!
interface Loopback2
description Used by wireR1R6 for Hair Pinning Connection
```

```
ip address 2.2.2.1 255.255.255.255
no ip directed-broadcast
!
interface Ethernet0/0
description Connection to R1
no ip address
no ip directed-broadcast
xconnect 2.2.2.6 16 encapsulation l2tpv3 pw-class
wireR1R6
!
interface Ethernet1/0
description Connection to Pretend Cloud.
ip address 20.20.20.2 255.255.255.0
no ip directed-broadcast
no cdp enable
!
interface Ethernet2/0
description Connection to R5
no ip address
no ip directed-broadcast
no cdp enable
xconnect 3.3.3.3 12 encapsulation l2tpv3 pw-class
wireR5R4
!
interface Ethernet3/0
description Connection to R6
no ip address
no ip directed-broadcast
xconnect 2.2.2.1 16 encapsulation l2tpv3 pw-class
wireR6R1
!
ip classless
ip route 3.3.3.3 255.255.255.255 20.20.20.3
!--- The other end of wireR5R4 loopback (3.3.3.3) must
be !--- reachable from this router. Hair Pinning
loopbacks !--- are reachable—there is no need for
additional routes. !! line con 0 exec-timeout 0 0
privilege level 15 line aux 0 line vty 0 4 login ! end
```

R3

```
R3# show running-config
Building configuration...
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname R3
!
!
clock timezone EST 10
ip subnet-zero
ip cef
!
l2tp-class R3signal
hello 10
password 0 cisco
cookie size 8
!
pseudowire-class wireR4R5
encapsulation l2tpv3
protocol l2tpv3 R3signal
```

```

ip local interface Loopback0
ip dfbit set
!
interface Loopback0
description Use by wireR4R5 for static connection
ip address 3.3.3.3 255.255.255.255
no ip directed-broadcast
!
interface Ethernet0/0
ip address 20.20.20.3 255.255.255.0
no ip directed-broadcast
!
interface Ethernet1/0
no ip address
no ip directed-broadcast
no cdp enable
xconnect 2.2.2.2 12 encapsulation l2tpv3 pw-class
wireR4R5
!
ip classless
ip route 2.2.2.2 255.255.255.255 Ethernet0/0
!--- The other end of wireR4R5 loopback (3.3.3.3) must
be !--- reachable from this router. ! line con 0 exec-
timeout 0 0 privilege level 15 line aux 0 line vty 0 4
login ! end

```

客户R1R6隧道（伪线）终端路由器配置：

R1

```

R1# show running-config
Building configuration...
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname R1
!
!
clock timezone EST 10
ip subnet-zero
no ip domain-lookup
!
interface Ethernet0/0
ip address 10.10.10.1 255.255.255.0
no ip directed-broadcast
!
ip classless
!
line con 0
exec-timeout 0 0
privilege level 15
line aux 0
line vty 0 4
login
!
end

```

R6

```

R6# show running-config

```

```
Building configuration...
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname R6
!
!
clock timezone EST 10
ip subnet-zero
no ip domain-lookup
!
interface Ethernet0/0
 ip address 10.10.10.6 255.255.255.0
 no ip directed-broadcast
!
ip classless
!
line con 0
 exec-timeout 0 0
 privilege level 15
line aux 0
line vty 0 4
 login
!
end
```

客户R4R5隧道（伪线）终端路由器配置：

R4

```
R4# show running-config
Building configuration...
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname R4
!
!
ip subnet-zero
!
interface Ethernet0/0
 ip address 30.30.30.4 255.255.255.0
 no ip directed-broadcast
!
router ospf 1
 log-adjacency-changes
 network 30.30.30.0 0.0.0.255 area 0
!
ip classless
!
line con 0
 exec-timeout 0 0
 privilege level 15
line aux 0
line vty 0 4
 login
!
end
```

R5

```
R5# show running-config
Building configuration...
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname R5
!
!
ip subnet-zero
!
interface Ethernet0/0
 ip address 30.30.30.5 255.255.255.0
 no ip directed-broadcast
!
router ospf 1
 log-adjacency-changes
 network 30.30.30.0 0.0.0.255 area 0
!
ip classless
!
line con 0
 exec-timeout 0 0
 privilege level 15
line aux 0
line vty 0 4
 login
!
end
```

验证

本部分所提供的信息可用于确认您的配置是否正常工作。

```
R4# show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
30.30.30.5	1	FULL/DR	00:00:39	30.30.30.5	Ethernet0/0

```
R5# show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
30.30.30.4	1	FULL/BDR	00:00:38	30.30.30.4	Ethernet0/0

```
R1# show cdp neighbors
```

```
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater
Device ID        Local Intrfce  Holdtme  Capability Platform  Port ID
R6                Eth 0/0        158      R           7206VXR   Eth 0/0
```

[命令输出解释程序工具 \(仅限注册用户\)](#) 支持某些 **show** 命令，使用此工具可以查看对 **show** 命令输出的分析。

- **show l2tun tunnel all** — 要显示L2TPv3会话的当前状态并显示有关当前配置的会话的信息，包括本地和远程L2TP主机名、聚合数据包计数和L2TP控制通道，请在EXEC模式下使用**show l2tun tunnel all**命令。

```
R2# show l2tun tunnel all
```

Tunnel Information Total tunnels 3 sessions 3

Tunnel id 54217 is up, remote id is 44186, 1 active sessions
Tunnel state is established, time since change 00:12:07
Tunnel transport is IP (115)
Remote tunnel name is R2
Internet Address 2.2.2.6, port 0
Local tunnel name is R2
Internet Address 2.2.2.1, port 0
Tunnel domain is
VPDN group for tunnel is -
L2TP class for tunnel is R2signal
88 packets sent, 87 received
10086 bytes sent, 11092 received
Control Ns 76, Nr 74
Local RWS 1024 (default), Remote RWS 1024 (max)
Tunnel PMTU checking disabled
Retransmission time 1, max 1 seconds
Unsent queuesize 0, max 0
Resend queuesize 0, max 2
Total resends 0, ZLB ACKs sent 72
Current nosession queue check 0 of 5
Retransmit time distribution: 0 0 0 0 0 0 0 0 0
Sessions disconnected due to lack of resources 0

Tunnel id 44186 is up, remote id is 54217, 1 active sessions
Tunnel state is established, time since change 00:12:08
Tunnel transport is IP (115)
Remote tunnel name is R2
Internet Address 2.2.2.1, port 0
Local tunnel name is R2
Internet Address 2.2.2.6, port 0
Tunnel domain is
VPDN group for tunnel is -
L2TP class for tunnel is R2signal
87 packets sent, 88 received
11092 bytes sent, 10086 received
Control Ns 74, Nr 76
Local RWS 1024 (default), Remote RWS 1024 (max)
Tunnel PMTU checking disabled
Retransmission time 1, max 1 seconds
Unsent queuesize 0, max 0
Resend queuesize 0, max 1
Total resends 0, ZLB ACKs sent 74
Current nosession queue check 0 of 5
Retransmit time distribution: 0 0 0 0 0 0 0 0 0
Sessions disconnected due to lack of resources 0

Tunnel id 24124 is up, remote id is 48735, 1 active sessions
Tunnel state is established, time since change 00:11:00
Tunnel transport is IP (115)
Remote tunnel name is R3
Internet Address 3.3.3.3, port 0
Local tunnel name is R2
Internet Address 2.2.2.2, port 0
Tunnel domain is
VPDN group for tunnel is -
L2TP class for tunnel is R2signal
155 packets sent, 158 received
15230 bytes sent, 17586 received
Control Ns 69, Nr 67
Local RWS 1024 (default), Remote RWS 1024 (max)
Tunnel PMTU checking disabled
Retransmission time 1, max 1 seconds


```
Unsent queuesize 0, max 0
Resend queuesize 0, max 2
Total resends 1, ZLB ACKs sent 65
Current nosession queue check 0 of 5
Retransmit time distribution: 0 0 1 0 0 0 0 0 0
Sessions disconnected due to lack of resources 0
```

R3# **show l2tun tunnel all**

Tunnel Information Total tunnels 1 sessions 1

```
Tunnel id 48735 is up, remote id is 24124, 1 active sessions
Tunnel state is established, time since change 00:12:36
Tunnel transport is IP (115)
Remote tunnel name is R2
Internet Address 2.2.2.2, port 0
Local tunnel name is R3
Internet Address 3.3.3.3, port 0
Tunnel domain is
VPDN group for tunnel is -
L2TP class for tunnel is R3signal
180 packets sent, 176 received
19766 bytes sent, 17316 received
Control Ns 77, Nr 79
Local RWS 1024 (default), Remote RWS 1024 (max)
Tunnel PMTU checking disabled
Retransmission time 1, max 1 seconds
Unsent queuesize 0, max 0
Resend queuesize 0, max 1
Total resends 1, ZLB ACKs sent 78
Current nosession queue check 0 of 5
Retransmit time distribution: 0 0 1 0 0 0 0 0 0
Sessions disconnected due to lack of resources 0
```

- **show l2tun session all** — 要显示第2层会话的当前状态并显示有关L2TPv3控制通道的协议信息，请在EXEC模式下使用**show l2tun session all**命令。

R2# **show l2tun session all**

Session Information Total tunnels 3 sessions 3

```
Session id 19996 is up, tunnel id 54217
Call serial number is 1492400000
Remote tunnel name is R2
Internet address is 2.2.2.6
Session is L2TP signalled
Session state is established, time since change 00:15:37
112 Packets sent, 111 received
12309 Bytes sent, 13312 received
Receive packets dropped:
  out-of-order: 0
  total: 0
Send packets dropped:
  exceeded session MTU: 0
  total: 0
Session vcid is 16
Session Layer 2 circuit, type is Ethernet, name is Ethernet0/0
Circuit state is UP
Remote session id is 19999, remote tunnel id 44186
DF bit on, ToS reflect disabled, ToS value 0, TTL value 255
Session cookie information:
local cookie, size 8 bytes, value 6E 47 8C 4A BA BF 7E A4
remote cookie, size 8 bytes, value 7F 9F 65 C4 C7 5B 57 FF
FS cached header information:
encap size = 32 bytes
00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000
```

```
Sequencing is off
Session id 19999 is up, tunnel id 44186
Call serial number is 1492400000
Remote tunnel name is R2
Internet address is 2.2.2.1
Session is L2TP signalled
Session state is established, time since change 00:15:38
111 Packets sent, 112 received
13312 Bytes sent, 12309 received
Receive packets dropped:
  out-of-order: 0
  total: 0
Send packets dropped:
  exceeded session MTU: 0
  total: 0
Session vcid is 16
Session Layer 2 circuit, type is Ethernet, name is Ethernet3/0
Circuit state is UP
Remote session id is 19996, remote tunnel id 54217
DF bit on, ToS reflect disabled, ToS value 0, TTL value 255
Session cookie information:
local cookie, size 8 bytes, value 7F 9F 65 C4 C7 5B 57 FF
remote cookie, size 8 bytes, value 6E 47 8C 4A BA BF 7E A4
FS cached header information:
encap size = 32 bytes
00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000
```

```
Sequencing is off
Session id 20005 is up, tunnel id 24124
Call serial number is 1492400002
Remote tunnel name is R3
Internet address is 3.3.3.3
Session is L2TP signalled
Session state is established, time since change 00:14:29
200 Packets sent, 204 received
19650 Bytes sent, 22100 received
Receive packets dropped:
  out-of-order: 0
  total: 0
Send packets dropped:
  exceeded session MTU: 0
  total: 0
Session vcid is 12
Session Layer 2 circuit, type is Ethernet, name is Ethernet2/0
Circuit state is UP
Remote session id is 17834, remote tunnel id 48735
DF bit on, ToS reflect disabled, ToS value 0, TTL value 255
Session cookie information:
local cookie, size 8 bytes, value 22 09 F1 E9 BC 8C 00 94
remote cookie, size 8 bytes, value 39 DD CB 00 9C 4B 1C 8C
FS cached header information:
encap size = 32 bytes
00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000
```

Sequencing is off

```
R3# show l2tun session all
Session Information Total tunnels 1 sessions 1
Session id 17834 is up, tunnel id 48735
Call serial number is 1492400002
Remote tunnel name is R2
Internet address is 2.2.2.2
```

```
Session is L2TP signalled
Session state is established, time since change 00:23:53
327 Packets sent, 322 received
33758 Bytes sent, 31248 received
Receive packets dropped:
  out-of-order: 0
  total: 0
Send packets dropped:
  exceeded session MTU: 0
  total: 0
Session vcid is 12
Session Layer 2 circuit, type is Ethernet, name is Ethernet1/0
Circuit state is UP
Remote session id is 20005, remote tunnel id 24124
DF bit on, ToS reflect disabled, ToS value 0, TTL value 255
Session cookie information:
local cookie, size 8 bytes, value 39 DD CB 00 9C 4B 1C 8C
remote cookie, size 8 bytes, value 22 09 F1 E9 BC 8C 00 94
FS cached header information:
encap size = 32 bytes
00000000 00000000 00000000 00000000
00000000 00000000 00000000 00000000

Sequencing is off
```

故障排除

本部分提供的信息可用于对配置进行故障排除。

您可以使用[Bug工具包](#)(仅[注册](#)客户)获取有关以下L2TPv3功能相关Bug的详细信息：

- [CSCdz01467](#)(仅[限注](#)册客户) — 已解析(R)L2TPv3:隧道数据包计数器，显示不准确的计数。
- [CSCeb56061](#)(仅[限注](#)册客户) — 已解析(R)L2TPv3:L2TPv3oETH生成僵尸隧道。
- [CSCeb35497](#)(仅[限注](#)册客户) — 已解决(R)L2TPv3排序：Tx Seqnum在16777215后不换行为1。
- [CSCdz48481](#)(仅[限注](#)册客户) — 不再支持已解析(R)L2TPv3迂回配置。
- [CSCec00463](#)(仅[限注](#)册客户) — 已解析(R)L2TPv3:千兆以太网端口模式decap故障
- [CSCec44356](#)(仅[限注](#)册客户) — 已解决(R)C10720:L2TPv3发夹中的匹配802.1P已断开。

相关信息

- [IP 路由协议支持页](#)
- [IP 路由 支持页](#)
- [技术支持 - Cisco Systems](#)