

# Esempio di configurazione del metodo statico e del metodo di hairpinning del protocollo di tunneling di layer 2 (versione 3)

## Sommario

[Introduzione](#)

[Prerequisiti](#)

[Requisiti](#)

[Componenti usati](#)

[Convenzioni](#)

[Configurazione](#)

[Esempio di rete](#)

[Configurazioni](#)

[Verifica](#)

[Risoluzione dei problemi](#)

[Informazioni correlate](#)

## Introduzione

In questo documento viene fornita una configurazione di esempio per i metodi statici e di hairpinning del protocollo di tunneling di layer 2 versione 3 (L2TPv3).

Nella tabella seguente viene descritto il supporto per la modifica della versione del software Cisco IOS<sup>®</sup> per L2TPv3:

Per preparare questo documento, è stato utilizzato Cisco IOS Software Release	Descrizione supporto L2TPv3
12.0(21)S	Il supporto del data plane iniziale per L2TPv3 è stato introdotto sulle piattaforme Cisco serie 7200, Cisco serie 7500, Cisco serie 10720 e Cisco serie 12000.
12.0(23)S	Il supporto del control plane L2TPv3 è stato introdotto sulle piattaforme Cisco serie 7200, Cisco serie 7500, Cisco serie 10720 e Cisco

	serie 12000.
12.3(2)T	Questa funzionalità è stata integrata nel software Cisco IOS versione 12.3(2)T.

Per utilizzare la funzionalità L2TPv3, è necessario abilitare Cisco Express Forwarding (CEF). La modalità secondaria di configurazione Xconnect è bloccata finché il CEF non viene abilitato. Sulle piattaforme distribuite, ad esempio Cisco serie 7500, se il CEF viene disabilitato mentre viene stabilita una sessione, la sessione viene chiusa e rimane inattiva finché il CEF non viene riabilitato. Usare il comando **ip cef** o **ip cef distribuito** per abilitare il CEF.

Si consiglia di specificare un indirizzo IP di origine per configurare un'interfaccia di loopback. Se non si configura un'interfaccia di loopback, il router seleziona il miglior indirizzo locale disponibile, che potrebbe essere qualsiasi indirizzo IP configurato su un'interfaccia con interfaccia core. Questa configurazione potrebbe impedire la creazione di un canale di controllo. L'indirizzo di loopback deve essere raggiungibile dalle reti principali.

## Prerequisiti

### Requisiti

Prima di provare la configurazione, accertarsi di conoscere le seguenti caratteristiche:

- [L2TPv3: Layer 2 Tunnel Protocol versione 3](#)

### Componenti usati

Il documento può essere consultato per tutte le versioni software o hardware.

### Convenzioni

Per ulteriori informazioni sulle convenzioni usate, consultare il documento [Cisco sulle convenzioni nei suggerimenti tecnici](#).

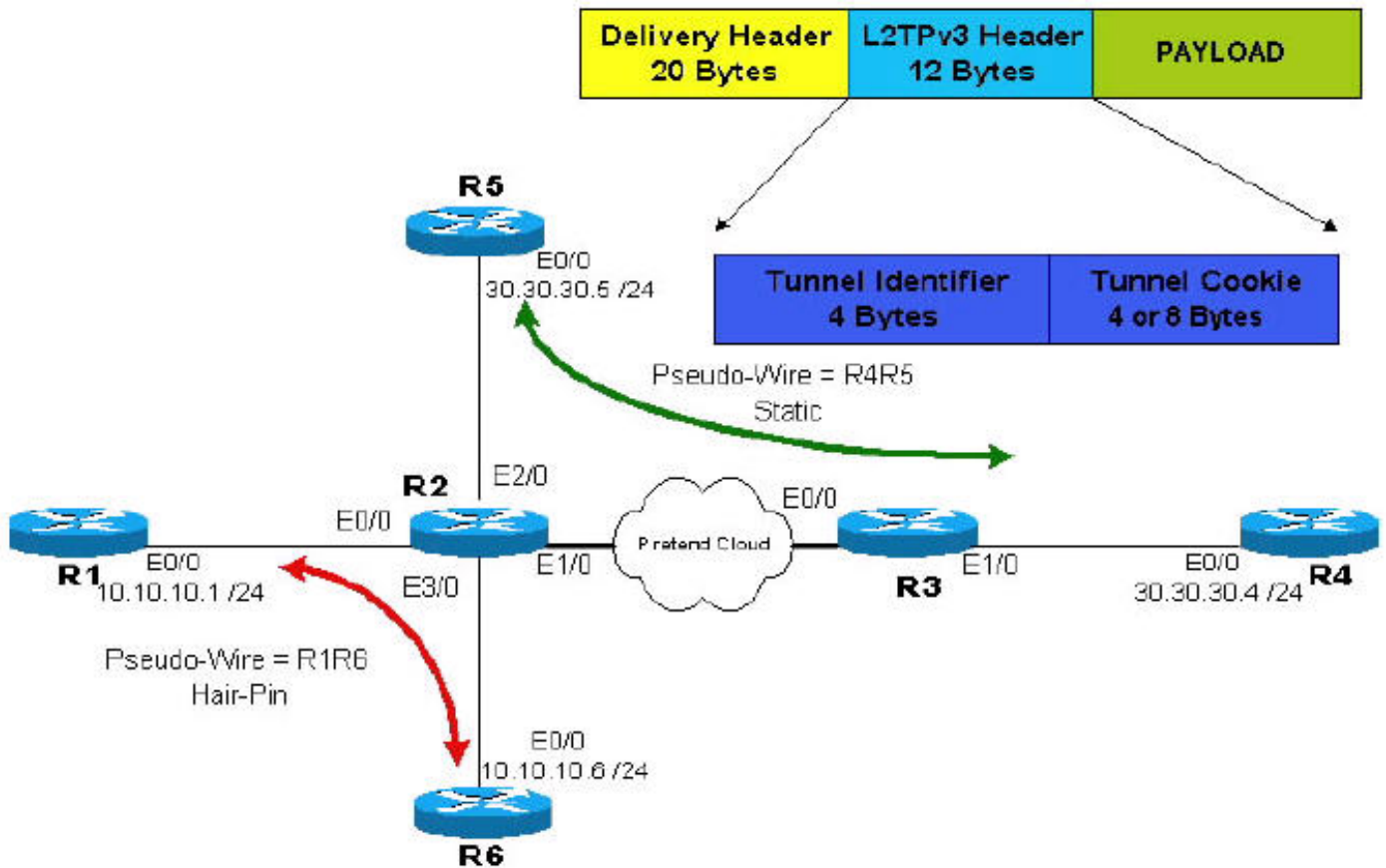
## Configurazione

In questa sezione vengono presentate le informazioni necessarie per configurare le funzionalità descritte più avanti nel documento.

**Nota:** per ulteriori informazioni sui comandi menzionati in questo documento, usare lo [strumento di ricerca dei comandi](#) (solo utenti [registrati](#)).

### Esempio di rete

Nel documento viene usata questa impostazione di rete:



**Nota:** i router R2 e R3 vengono utilizzati dal provider. I router R1, R4, R5 e R6 sono clienti finali. Utilizzando L2TPv3, il router R4 sembra avere una connessione diretta a R5; ciò vale anche per la connessione tra il router R1 e il router R6.

## Configurazioni

Nel documento vengono usate queste configurazioni:

- pseudo-filo statico attraverso un cloud IP. La parte pertinente della configurazione si trova in R2 e R3 dove sono configurati due tunnel unidirezionali.
- Commutazione pseudo-wireframe o locale (da una porta a un'altra porta dello stesso router). La configurazione viene eseguita solo su R2 e consiste nella configurazione di due tunnel unidirezionali che puntano a due loopback, entrambi sul router R2.

### 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
```

Configurazione del router finale del tunnel R1R6 (pseudo-cavo) del cliente:

## 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
```

Configurazione del router finale del tunnel R4R5 (pseudo-cavo) del cliente:

## 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
```

## Verifica

Le informazioni contenute in questa sezione permettono di verificare che la configurazione funzioni correttamente.

```
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

Alcuni comandi **show** sono supportati dallo [strumento Output Interpreter \(solo utenti registrati\)](#); lo [strumento permette di visualizzare un'analisi dell'output del comando show](#).

- **show l2tun tunnel all**: per visualizzare lo stato corrente di una sessione L2TPv3 e le informazioni sulle sessioni configurate, inclusi i nomi host L2TP locali e remoti, i conteggi aggregati dei pacchetti e i canali di controllo L2TP, utilizzare il comando **show l2tun tunnel all** in modalità di esecuzione.

```
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**: per visualizzare lo stato corrente di una sessione di layer 2 e le informazioni di protocollo su un canale di controllo L2TPv3, utilizzare il comando **show l2tun session all** in modalità di esecuzione.

```
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:
  encaps 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:
  encaps 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
```

Le informazioni contenute in questa sezione permettono di risolvere i problemi relativi alla configurazione.

È possibile usare [Bug Tool Kit](#) (solo utenti [registrati](#)) per ulteriori informazioni sui bug relativi alle funzionalità L2TPv3 seguenti:

- [CSCdz01467](#) (solo utenti [registrati](#)) — Risolto (R) L2TPv3: Tunnel packet counter, visualizza il conteggio non accurato.
- [CSCeb56061](#) (solo utenti [registrati](#)) — Risolto (R) L2TPv3: L2TPv3oETH genera tunnel zombie.
- [CSCeb35497](#) (solo utenti [registrati](#)) — Sequenziamento L2TPv3 risolto (R): Tx Seqnum non va a capo a 1 dopo 16777215.
- [CSCdz48481](#) (solo utenti [registrati](#)) — La configurazione hairpinning L2TPv3 risolta (R) non è più supportata.
- [CSCec00463](#) (solo utenti [registrati](#)) — Risolto (R) L2TPv3: Errore decap modalità porta Gigabit Ethernet
- [CSCec44356](#) (solo utenti [registrati](#)) — Risolto (R) C10720: La corrispondenza 802.1P nel hairpinning L2TPv3 è interrotta.

## [Informazioni correlate](#)

- [Pagina di supporto per i protocolli di routing IP](#)
- [Pagina di supporto per il routing IP](#)
- [Supporto tecnico – Cisco Systems](#)