

Async Multilink PPP da router a router

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[Introduzione](#)

Questa configurazione descrive un Cisco 3640 remoto con una scheda modem analogica a 8 porte (NM-8AM) interna che si connette a un Cisco AS5300 con una Primary Rate Interface (PRI). La configurazione descrive una connessione multipla composta da due linee telefoniche analogiche sul sito remoto. È possibile configurare più linee telefoniche per MP, se disponibili.

[Prerequisiti](#)

[Requisiti](#)

Non sono previsti prerequisiti specifici per questo documento.

[Componenti usati](#)

Le informazioni fornite in questo documento si basano sulle versioni software e hardware riportate di seguito.

- Cisco 3640 con software Cisco IOS versione 12.1(3)
- Cisco AS5300 con software Cisco IOS versione 12.07(T)

Nota: MP è stato introdotto per la prima volta nel software Cisco IOS versione 11.0(3).

Le informazioni discusse in questo documento fanno riferimento a dispositivi usati in uno specifico ambiente di emulazione. Su tutti i dispositivi menzionati nel documento la configurazione è stata ripristinata ai valori predefiniti. Se la rete è operativa, valutare attentamente eventuali conseguenze derivanti dall'uso dei comandi.

Convenzioni

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

Nozioni di base

Multilink PPP (MP) consente ai dispositivi di inviare dati su più collegamenti dati point-to-point alla stessa destinazione implementando un collegamento virtuale. La larghezza di banda massima della connessione MP è uguale alla somma delle larghezze di banda dei collegamenti dei componenti. MP può essere configurato sia per i collegamenti multiplex, come ISDN e Frame Relay, sia per più linee asincrone. Per ulteriori informazioni su MP, consultare la [RFC 1990](#).

Nota: la RFC 1990 fa riferimento al protocollo Multilink PPP come protocollo MP. Altri nomi noti per MP sono MPPP, MLP e Multilink.

Async MP può essere utilizzato per collegare i client remoti a una velocità superiore a quella disponibile attraverso una singola connessione analogica. In Async MP, il client remoto utilizza più modem, e quindi più linee telefoniche, per connettersi al router centrale e accedere alla rete. Poiché più linee telefoniche sono spesso più economiche rispetto al servizio BRI (Basic Rate Interface) ISDN, Async MP offre un modo efficace per aumentare la velocità di connessione per gli utenti remoti e controllare i costi. Async MP è anche un modo efficace per ottenere velocità di accesso più elevate per le aree remote che non possono essere servite da ISDN.

Async MP raggruppa le connessioni modem separate a un Access Server. Il software PPP su ciascun peer frammenta i pacchetti e quindi trasmette i pacchetti all'altro lato tramite le diverse connessioni analogiche. L'estremità ricevente raccoglie questi pezzi dalle connessioni separate e, sulla base delle informazioni MP in essi incorporate, li ricomponi in pacchetti di dati validi, fornendo così un collegamento virtuale end-to-end con una larghezza di banda maggiore. Il protocollo MP asincrono può essere configurato tra due router o tra un router e un PC client.

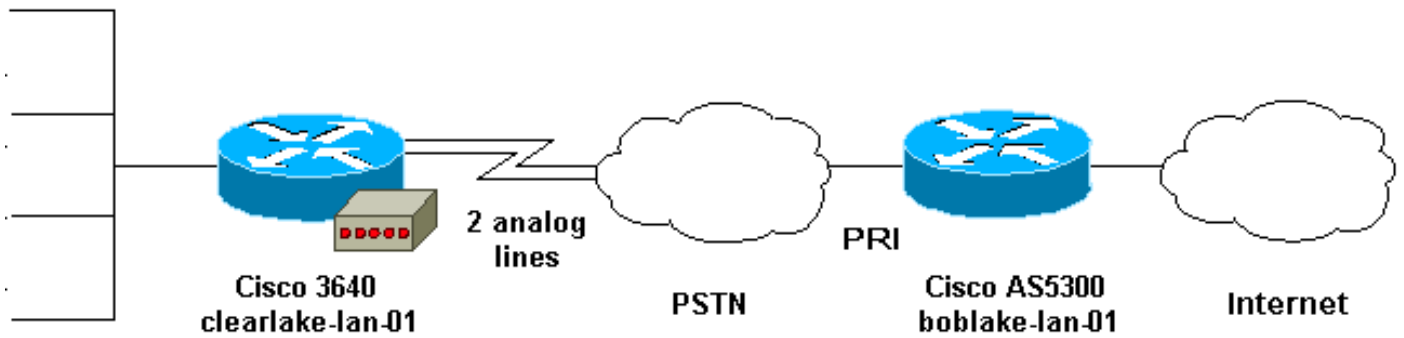
Configurazione

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

Esempio di rete

Questo documento utilizza le impostazioni di rete mostrate nel diagramma sottostante.



Configurazioni

Questo documento utilizza le configurazioni mostrate di seguito.

- [Cisco 3640](#)
- [Cisco AS5300](#)

Cisco 3640

```
clearlake-lan-01#show running-config
Building configuration...

Current configuration:
!
version 12.1
service timestamps debug datetime msec localtime show-
timezone
service timestamps log datetime msec localtime show-
timezone
!
hostname clearlake-lan-01
!
aaa new-model
aaa authentication login default local
aaa authentication ppp default if-needed local
!
username bobslake-nas-01 password <deleted>
  !--- Remote router and password for CHAP
  authentication. !--- Dialer interface must also be
  configured to use !--- this username and password.
username admin privilege 15 password <deleted> ! no ip
domain-lookup ! chat-script async-mppp ABORT ERROR ABORT
BUSY "" "ATZ" OK "ATDT \T" TIMEOUT 30 CONNECT \c !---
Chat script used for dialing out. ! interface Loopback0
ip address 172.21.126.254 255.255.255.0 ! interface
Ethernet0/0 ip address 172.21.125.1 255.255.255.0 !
interface Group-Async1 !--- Interface to configure
modems used for dialout. no ip address encapsulation ppp
!--- Use PPP encapsulation for members of this !---
group-async interface. dialer in-band !--- Permit DDR on
this interface. dialer pool-member 10 !--- All members
of this group-async interface belong !--- to dialer pool
10. ppp multilink !--- Enable PPP multilink on physical
interface. group-range 33 34 !--- Assign async 33 and 34
to this group-async interface. !--- This can be adjusted
depending on the number of POTS lines available. !
interface Dialer1 !--- Dialer interface to dialout to
bobslake-nas-01. ip address negotiated !--- Obtain an IP
address from central site. encapsulation ppp dialer
```

```

remote-name bobslake-nas-01 !--- Identify central site
router for CHAP authentication. !--- Shared secret
password is defined above. dialer pool 10 !--- Defines
the pool of physical resources that the Dialer !---
interface may use. dialer idle-timeout 600 !---
Specifies number of seconds without interesting traffic
that !--- the connection is kept up. dialer string
5551212 !--- Number to be dialed; this number belongs to
the PRI !--- of the central router. dialer load-
threshold 15 either !--- Load level for either inbound
or outbound traffic !--- at which additional lines will
be added to the MP bundle. !--- Load level values range
from 1 (unloaded) to 255 (fully loaded). dialer-group 8
!--- Uses dialer-list 8 to determine interesting
traffic. ppp authentication chap callin !--- Use CHAP
authentication for incoming calls only !--- This router
will not challenge remote routers for outgoing calls.
ppp multilink !--- Activates the interface for MP
operation. ppp timeout multilink link remove 300 !---
Keeps the multilink connections up for 300 seconds !---
after the load drops below the threshold. !--- This
command should be used to control flapping. ! ip
classless ip route 0.0.0.0 0.0.0.0 Dialer1 !--- Use
Interface Dialer1 for all networks. no ip http server !
access-list 188 remark define interesting traffic
access-list 188 deny udp any any eq ntp access-list 188
permit ip any any dialer-list 8 protocol ip list 188 !--
- Assign access-list 188 to dialer-list 8. ! line con 0
transport input none line 33 34 !--- Async lines to be
used for dialout. !--- This number should match the
group-range in the !--- Group-Async interface. script
dialer async-mppp !--- Use chat script called async-mppp
for dialout. modem InOut modem autoconfigure discovery
transport preferred none transport input all line 35 40
transport preferred none transport input all line aux 0
line vty 0 4 ! ntp clock-period 17179871 ntp server
172.22.255.1 prefer end

```

Cisco AS5300

```
bobslake-nas-01#show running-config
```

```
Building configuration...
```

```
Current configuration:
```

```

version 12.0
service timestamps debug datetime msec localtime show-
timezone
service timestamps log datetime msec localtime show-
timezone
service password-encryption
service tcp-small-servers
!
hostname bobslake-nas-01
!
logging buffered 10000 debugging
aaa new-model
aaa authentication login default local
aaa authentication ppp default if-needed local
!--- Authenticate for PPP if not authenticated during
login. !--- Allows users with Terminal Window after Dial
to initiate PPP. ! username clearlake-lan-01 password

```

```

<deleted> !--- Remote router and password for Challenge
Handshake !--- Authentication Protocol (CHAP)
authentication. !--- The password must be identical on
both sides. spe 1/0 1/7 firmware location
system:/ucode/mica_port_firmware ! resource-pool disable
! ip subnet-zero ! multilink virtual-template 1 !--- Use
virtual-template 1 for multilink connections. isdn
switch-type primary-5ess isdn voice-call-failure 0 !
controller T1 0 framing esf clock source line primary
linecode b8zs pri-group timeslots 1-24 ! interface
Loopback0 ip address 172.21.10.10 255.255.255.255 no ip
directed-broadcast ! interface Loopback1 ip address
172.21.104.254 255.255.255.0 !--- Summarizes addresses
in address pool. !--- Loopback 1 is in the same subnet
as the address pool. no ip directed-broadcast !
interface Virtual-Templatel description Template for
Multilink Users ip unnumbered Loopback0 no ip directed-
broadcast peer default ip address pool addr-pool !---
Use IP pool called addr-pool for incoming calls. ppp
authentication chap !--- Authenticate using CHAP. ppp
multilink !--- Allow multilink sessions. ! !---
Configure D channel on PRI. interface Serial0:23
description Headquarters 555-1212 active PRI line no ip
address no ip directed-broadcast isdn switch-type
primary-5ess isdn incoming-voice mode fair-queue 64 256
0 no cdp enable ! interface FastEthernet0 ip address
172.21.101.23 255.255.255.0 no ip directed-broadcast
duplex auto speed auto ! interface Group-Async1 ip
unnumbered Loopback0 no ip directed-broadcast
encapsulation ppp dialer in-band dialer idle-timeout 600
either !--- Specifies number of seconds without
interesting !--- traffic that the connection is kept up.
!--- Configure the same idle-timeout on both routers.
dialer map ip 172.21.125.1 name clearlake-nas-01 dialer-
group 5 !--- Uses dialer-list 5 to determine interesting
traffic. async mode interactive peer default ip address
pool addr-pool !--- Use IP pool called addr-pool for
incoming calls. ppp authentication chap callin !---
Issue CHAP challenges for dialin users only. ppp
multilink group-range 1 48 !--- Assign modems 1-48 to
the Group-Async 1 configuration template. ! router eigrp
1 passive-interface Group-Async1 !--- To prevent routing
traffic on async lines. network 172.21.0.0 ! ip local
pool addr-pool 172.21.104.1 172.21.104.48 !--- Define IP
address pool range for dialin clients. ip classless no
ip http server ! access-list 105 permit ip any any !---
Define interesting traffic. dialer-list 5 protocol ip
list 105 !--- Assign access list 105 to dialer list 5. !
line con 0 transport input none line 1 48 autoselect
during-login !--- Permits user login prompts after
dialin. autoselect ppp !--- Automatically launches PPP
on the line. modem InOut !--- Modems can be used to
dialin and dialout. transport preferred none transport
output telnet line aux 0 line vty 0 4 ! ntp clock-period
17180374 ntp update-calendar ntp server 172.22.255.1
prefer end

```

Comandi di ottimizzazione e opzionali

I comandi seguenti possono essere utilizzati per regolare il comportamento della connessione MP. Un'attenta regolazione di tali parametri può aiutare a controllare i costi evitando un uso inutile e dispendioso dei collegamenti dati.

- **dialer load-threshold load [in uscita] | in entrata | oppure]** È possibile configurare MP in modo che i canali aggiuntivi vengano visualizzati immediatamente dopo aver stabilito il canale principale. Per impostare questo scenario, impostare il valore della soglia di carico nel comando **load-threshold load della** connessione telefonica su 1. In questo caso, i canali aggiuntivi vengono attivati e continuano a rimanere attivi (ovvero non flap). Se la soglia di carico è impostata su un qualsiasi altro valore, i canali multipli possono lampeggiare a seconda del carico sul collegamento. Se si desidera aggiungere ulteriori canali, in base al traffico, impostare la soglia di carico sul valore appropriato tra 1 e 255. Ad esempio, per visualizzare ulteriori canali al 50%, la soglia deve essere impostata su 128 ($0,50 \cdot 255$). Quando si determina la soglia, è necessario considerare il tempo di impostazione per le chiamate asincrone perché tempi di impostazione più lunghi potrebbero richiedere soglie inferiori. Il carico può essere calcolato in base al valore **in uscita**, in **entrata** o al **valore** più alto tra il traffico in entrata e in uscita sull'interfaccia. Se il carico viene basato sul traffico in **entrata** o su **uno dei due**, verificare che nel sito centrale sia configurata l'interfaccia **passiva Group-Async1**, in modo che gli aggiornamenti del routing dal core non vengano inviati tramite la linea asincrona. Impedire al traffico di routing di passare sul collegamento fornisce maggiore larghezza di banda per altri dati sulla linea.
- **timeout ppp collegamento multiplo rimozione secondi** Questo comando può essere utilizzato per impedire che le connessioni a connessione multipla lampeggino quando il carico varia. Ad esempio, quando la soglia di carico è impostata su 15 (ovvero $15/255=6\%$) e il traffico supera la soglia, vengono visualizzate altre linee. Quando il traffico scende sotto la soglia, le linee aggiuntive vengono scartate. In situazioni in cui le velocità di trasmissione dei dati sono molto variabili, è vantaggioso che i canali multipli rimangano attivi per un determinato periodo di tempo anche se la soglia di carico scende al di sotto del valore specificato. Assegnare questo timeout di connessione multipla a un valore inferiore a quello specificato per il **timeout di inattività della connessione telefonica** che controlla il timeout per tutti i collegamenti.
- **aggiunta di secondi per il collegamento multiplo timeout ppp** Questo comando può essere utilizzato per impedire l'aggiunta di più collegamenti al bundle MP fino a quando non si riceve un traffico elevato per un intervallo specificato. In questo modo è possibile evitare che alcuni picchi di traffico causino inutilmente l'aumento delle linee.

Verifica

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

Alcuni comandi **show** sono supportati dallo strumento Output Interpreter, che consente di visualizzare un'analisi dell'output del comando **show**.

- **show ppp multilink**: consente di visualizzare informazioni sui bundle di connessione multipla attivi. Utilizzare questo comando per verificare la connessione multipla.
- **show caller**: consente di visualizzare informazioni sui singoli utenti e sulle risorse utilizzate sul NAS. Questo comando visualizza le statistiche delle chiamate attive per ampi pool di connessioni e mostra i tempi di inattività e assoluti per ciascun utente. Se la versione del software Cisco IOS in uso non supporta questo comando, utilizzare il comando **show user**.
- **show caller user**: consente di visualizzare i parametri per l'utente specifico, ad esempio la linea TTY utilizzata, l'interfaccia asincrona (scaffale/slot/porta), il numero del canale DS0, il numero del modem, l'indirizzo IP assegnato, i parametri del bundle PPP e PPP e così via. Se

la versione in uso del software Cisco IOS non supporta questo comando, usare il comando **show user**.

Output di esempio

Gli output del comando show riportati di seguito sono tratti dallo switch Cisco 3640 che sta chiamando l'AS5300. Ciò indica che la connessione multilink è attiva

```
clearlake-lan-01#show ppp multilink
Virtual-Access1, bundle name is bobslake-nas-01
!--- Virtualized MP bundle. Bundle name is derived from the !--- username used during
authentication. Dialer interface is Dialer1 !--- This Virtual Access Interface used Interface
Dialer1. 0 lost fragments, 0 reordered, 0 unassigned 0 discarded, 0 lost received, 1/255 load
0x4 received sequence, 0x0 sent sequence Member links: 2 (max not set, min not set) Async34
Async33
!--- Members of the MP bundle. clearlake-lan-01#show dialer

As33 - dialer type = IN-BAND ASYNC NO-PARITY
Dialer pool 10, priority 0
!--- Member of dialer pool 10. Idle timer (120 secs), Fast idle timer (20 secs) Wait for carrier
(30 secs), Re-enable (15 secs) Dialer state is multilink member Dial reason: Multilink bundle
overloaded
!--- Interface was not the first link in the MP bundle. Interface bound to profile Dil Current
call connected 00:00:54 !--- Current call duration Connected to <deleted>5551212 (bobslake-nas-
01) !--- Phone number that was dialed. As34 - dialer type = IN-BAND ASYNC NO-PARITY
Dialer pool 10, priority 0
!--- Member of dialer pool 10. Idle timer (600 secs), Fast idle timer (20 secs) Wait for carrier
(30 secs), Re-enable (15 secs) Dialer state is multilink member Dial reason: ip (s=172.21.125.1,
d=172.21.104.254) !--- Interface was the first link in the bundle, triggered by !--- interesting
traffic. Interface bound to profile Dil Current call connected 00:00:54 !--- Current Call
duration. Connected to 5551212 <deleted> (bobslake-nas-01) !--- Phone number that was dialed.
Gr1 - dialer type = IN-BAND ASYNC NO-PARITY Idle timer (120 secs), Fast idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs) Dialer state is idle Dial String Successes
Failures Last DNIS Last status Dil - dialer type = DIALER PROFILE Load threshold for dialing
additional calls is 15 !--- Load threshold. Idle timer (600 secs), Fast idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs) Dialer state is data link layer up Number of
active calls = 2 Dial String Successes Failures Last DNIS Last status 15 0 00:00:56 successful
Default clearlake-lan-01#show caller

      Active      Idle
Line      User          Service      Time      Time
con 0     tarpon          TTY          00:09:11  00:00:00
tty 33   -              Async        -          00:00:01
TTY 34   -              Async        -          00:00:06
As33     bobslake-nas-01 PPP          00:00:24  00:00:00
!--- Second connection. As34          bobslake-nas-01 PPP          00:01:05  00:00:00
!--- First connection. Vi1           bobslake-nas-01 PPP Bundle 00:01:05  00:01:04
!--- MP bundle !--- bobslake-nas-01 has two async lines, two TTY, and one virtual !--- interface
bundle. clearlake-lan-01#show caller user bobslake-nas-01

User: bobslake-nas-01, line As33, service PPP
!--- PPP setting for bobslake-nas-01. Active time 00:00:34, Idle time 00:00:00 Timeouts:
Absolute Idle Limits: - - Disconnect in: - - PPP: LCP Open, multilink Open, CHAP (-> AAA)
!--- Multilink is up. Dialer: Connected 00:01:09 to <deleted>, outbound !--- Dialer interface
was used to dialout. Type is IN-BAND ASYNC, group Dialer1 Cause: Multilink bundle overloaded
!--- This interface was not the first member of the MP bundle. IP: Local 172.21.104.48/32
Bundle: Member of bobslake-nas-01, last input 00:00:00 Counts: 59 packets input, 3529 bytes, 0
no buffer 0 input errors, 22 CRC, 0 frame, 0 overrun 31 packets output, 1515 bytes, 0 underruns
0 output errors, 0 collisions, 4 interface resets !---Packets are passing through the
connection. User: bobslake-nas-01, line As34, service PPP
```

```

!--- PPP setting for user bobslake-nas-01. Active time 00:01:15, Idle time 00:00:00 Timeouts:
Absolute Idle Limits: - - Disconnect in: - - PPP: LCP Open, multilink Open, CHAP (-> AAA)
!--- MP state is open. Dialer: Connected 00:01:10 to <deleted>, outbound Type is IN-BAND ASYNC,
group Dialer1 Cause: ip (s=172.21.125.1, d=172.21.104.254)
!--- Dialing cause was interesting traffic; this was the !--- first link in the bundle. IP:
Local 172.21.104.48/32 Bundle: Member of bobslake-nas-01, last input 00:00:00 Counts: 172
packets input, 20699 bytes, 0 no buffer 0 input errors, 81 CRC, 0 frame, 0 overrun 80 packets
output, 14347 bytes, 0 underruns 0 output errors, 0 collisions, 6 interface resets !--- Packets
are passing through the connection. User: bobslake-nas-01, line Vi1, service PPP Bundle
!--- Bundle information for user bobslake-nas-01. Active time 00:01:16, Idle time 00:01:15
Timeouts: Absolute Idle Limits: - 00:10:00 Disconnect in: - 00:08:44 !--- Idle-timeout is 600
seconds(10 minutes). PPP: LCP Open, multilink Open, IPCP
Dialer: Connected 00:01:10 to <deleted>, outbound
Idle timer 600 secs, idle 75 secs
Type is IN-BAND SYNC, group Dialer1
IP: Local 172.21.104.48/32, remote 172.21.104.254
!--- IP address assigned to the bundle and loopback address !--- of the remote router. Bundle:
First link of bobslake-nas-01, 2 links, last input 00:01:16 Counts: 23 packets input, 4758
bytes, 0 no buffer 0 input errors, 0 CRC, 0 frame, 0 overrun 7 packets output, 3734 bytes, 0
underruns 0 output errors, 0 collisions, 0 interface resets

```

Di seguito sono riportati alcuni output del comando **show** dell'AS5300. Per ulteriori informazioni sugli output, consultare il documento [Async Multilink PPP Dialup from Microsoft Windows Clients](#). L'output **show** e **debug** del sistema AS5300 (sito centrale) sarà simile a quello dei protocolli Async MP di PC-Router e Async MP di Router-Router.

```
bobslake-nas-01#show ppp multilink
```

```

Virtual-Access1, bundle name is clearlake-lan-01
0 lost fragments, 0 reordered, 0 unassigned, sequence 0x1/0x10 rcvd/sent
0 discarded, 0 lost received, 1/255 load
Member links: 2 (max not set, min not set)
Async47
Async45

```

```
bobslake-nas-01#show caller
```

Line	User	Service	Active Time	Idle Time
TTY 45	clearlake-lan-01	Async	00:01:12	00:01:03
TTY 47	clearlake-lan-01	Async	00:01:51	00:00:06
vty 0	admin	VTY	00:11:02	00:00:00
As45	clearlake-lan-01	PPP	00:01:02	00:00:00
As47	clearlake-lan-01	PPP	00:01:49	00:00:00
Vi1	clearlake-lan-01	PPP Bundle	00:01:43	00:01:10

[Risoluzione dei problemi](#)

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

[Procedura di risoluzione dei problemi](#)

Per la risoluzione dei problemi di una connessione MP, procedere come segue:

Di seguito è riportato un [esempio di output del comando debug](#), contrassegnato con le spiegazioni su cosa cercare.

Quando si esegue il test della configurazione MP, assicurarsi di generare una quantità di traffico sufficiente sul collegamento per attivare la soglia di carico. Se necessario, potete regolare il valore

della soglia di carico durante il test.

1. Utilizzare i comandi **debug dialer** e **debug chat** per verificare che la composizione della connessione sia corretta.
2. Verificare che la negoziazione e l'autenticazione PPP abbiano esito positivo. Prestare attenzione alla negoziazione LCP in cui vengono negoziati i parametri della riga MRRU (Maximum Receive Reconstruction Unit) e Discriminatore endpoint (EndpointDisc).
3. Verificare che il collegamento sia virtualizzato correttamente. Il software Cisco IOS crea un'interfaccia di accesso virtuale che rappresenta il bundle MP.
4. Verificare che la negoziazione IPCP (Internet Protocol Control Protocol) sia stata completata. Si noti se sono stati assegnati indirizzi IP corretti e se sono state installate le route corrette.

Comandi per la risoluzione dei problemi

Alcuni comandi **show** sono supportati dallo strumento Output Interpreter, che consente di visualizzare un'analisi dell'output del comando **show**.

Nota: prima di usare i comandi di **debug**, consultare le [informazioni importanti sui comandi di debug](#).

- **debug vtemplate:** per visualizzare le informazioni di copia di un'interfaccia di accesso virtuale dal momento della copia da un modello virtuale al momento della disattivazione.
- **debug ppp multilink events:** consente di visualizzare informazioni sugli eventi che influiscono sui bundle multilink.
- **debug ppp negotiation:** per visualizzare le informazioni sul traffico e gli scambi PPP durante la negoziazione del protocollo LCP (Link Control Protocol), dell'autenticazione e del protocollo NCP (Network Control Protocol). Una negoziazione PPP riuscita aprirà innanzitutto lo stato LCP, quindi autenterà e infine negozierà NCP. Durante la negoziazione LCP vengono stabiliti parametri di connessione multipla, ad esempio Unità massima di ricezione ricostruita (MRRU).
- **debug ppp authentication:** consente di visualizzare i messaggi del protocollo di autenticazione PPP, inclusi gli scambi di pacchetti Challenge Handshake Authentication Protocol (CHAP) e gli scambi PAP (Password Authentication Protocol).
- **debug ppp error:** consente di visualizzare gli errori di protocollo e le statistiche sugli errori associate alla negoziazione e al funzionamento della connessione PPP.
- **debug modem** - Per visualizzare l'attività della linea del modem su un server di accesso.

Output di esempio del comando debug

Il Cisco 3640 ha restituito le seguenti uscite. Mostrano il Cisco 3640 che chiama il sistema PRI dell'AS5300 e che stabilisce una connessione MP. Per un esempio dell'output del comando debug di AS5300, fare riferimento al documento [Async Multilink PPP Dialup from Microsoft Windows Clients](#).

```
clearlake-lan-01#debug dialer
Dial on demand events debugging is on
clearlake-lan-01#debug ppp negotiation
PPP protocol negotiation debugging is on
clearlake-lan-01#debug ppp authentication
```

PPP authentication debugging is on
clearlake-lan-01#**debug vtemplate**
Virtual Template debugging is on
clearlake-lan-01#**debug ppp multilink events**
clearlake-lan-01#**show debug**

Dial on demand:

Dial on demand events debugging is on

PPP:

PPP authentication debugging is on

PPP protocol negotiation debugging is on

Multilink events debugging is on

VTEMPLATE:

Virtual Template debugging is on

clearlake-lan-01#**ping ip**

Target IP address: 172.21.104.254

Repeat count [5]: 20

Datagram size [100]: 1200

Timeout in seconds [2]:

Extended commands [n]:

Sweep range of sizes [n]:

Type escape sequence to abort.

Sending 20, 1200-byte ICMP Echos to 172.21.104.254, timeout is 2 seconds:

Jul 25 13:20:29.047 UTC: As34 DDR: rotor dialout [priority]

Jul 25 13:20:29.047 UTC: As34 DDR: Dialing cause ip (s=172.21.125.1,
d=172.21.104.254)

!--- Dialing Reason Jul 25 13:20:29.047 UTC: As34 DDR: **Attempting to dial**

!--- Number being dialed Jul 25 13:20:29.047 UTC: CHAT34: Attempting async line dialer script
Jul 25 13:20:29.047 UTC: CHAT34: Dialing using Modem script: async-mppp & System script: none *!---
-- Using chat script async-mppp for dialout* Jul 25 13:20:29.051 UTC: CHAT34: process started Jul
25 13:20:29.051 UTC: CHAT34: Asserting DTR Jul 25 13:20:29.051 UTC: CHAT34: Chat script async-
mppp started *!--- Call is being established; !--- note the time elapsed for call setup* Jul 25
13:20:54.831 UTC: CHAT34: Chat script async-mppp finished, status = Success. Jul 25 13:20:56.831
UTC: **%LINK-3-UPDOWN: Interface Async34, changed state to up**
Jul 25 13:20:56.831 UTC:
Async34 DDR: Dialer statechange to up
Jul 25 13:20:56.831 UTC:
%DIALER-6-BIND: Interface As34 bound to profile D11
Jul 25 13:20:56.831 UTC:
Async34 DDR: Dialer call has been placed
!--- PPP negotiation begins Jul 25 13:20:56.831 UTC: As34 PPP: Treating connection as a callout
Jul 25 13:20:56.831 UTC: As34 PPP: Phase is ESTABLISHING, Active Open Jul 25 13:20:56.831 UTC:
As34 PPP: No remote authentication for call-out *!--- CHAP challenge is configured for callin
only !--- LCP negotiation begins; Multilink parameters are also negotiated* Jul 25 13:20:56.835
UTC: As34 LCP: O CONFREQ [Closed] id 43 len 43 Jul 25 13:20:56.835 UTC: As34 LCP: ACCM
0x000A0000 (0x0206000A0000) Jul 25 13:20:56.835 UTC: As34 LCP: MagicNumber 0x4395638E
(0x05064395638E) Jul 25 13:20:56.835 UTC: As34 LCP: PFC (0x0702) Jul 25 13:20:56.835 UTC: As34
LCP: ACFC (0x0802) Jul 25 13:20:56.835 UTC: As34 LCP: MRRU 1524 (0x110405F4) *!--- Negotiate
Maximum Receive Reconstructed Unit (MRRU) !--- MRRU is the maximum packet size this end will
reconstruct* Jul 25 13:20:56.835 UTC: As34 LCP: EndpointDisc 1 Local Jul 25 13:20:56.835 UTC:
As34 LCP: (0x131301636C6561726C616B652D6C616E) Jul 25 13:20:56.835 UTC: As34 LCP: (0x2D3031).
Jul 25 13:20:58.831 UTC: As34 LCP: TIMEout: State REQsent Jul 25 13:20:58.831 UTC: As34 LCP: O
CONFREQ [REQsent] id 44 Len 43 Jul 25 13:20:58.831 UTC: As34 LCP: ACCM 0x000A0000
(0x0206000A0000) Jul 25 13:20:58.831 UTC: As34 LCP: MagicNumber 0x4395638E (0x05064395638E) Jul
25 13:20:58.831 UTC: As34 LCP: PFC (0x0702) Jul 25 13:20:58.831 UTC: As34 LCP: ACFC (0x0802) Jul
25 13:20:58.831 UTC: As34 LCP: MRRU 1524 (0x110405F4) Jul 25 13:20:58.831 UTC: As34 LCP:
EndpointDisc 1 Local Jul 25 13:20:58.831 UTC: As34 LCP: (0x131301636C6561726C616B652D6C616E) Jul
25 13:20:58.831 UTC: As34 LCP: (0x2D3031). Jul 25 13:21:00.831 UTC: As34 LCP: TIMEout: State
REQsent Jul 25 13:21:00.831 UTC: As34 LCP: O CONFREQ [REQsent] id 45 Len 43 Jul 25 13:21:00.831

UTC: As34 LCP: ACCM 0x000A0000 (0x0206000A0000) Jul 25 13:21:00.831 UTC: As34 LCP: MagicNumber 0x4395638E (0x05064395638E) Jul 25 13:21:00.831 UTC: As34 LCP: PFC (0x0702) Jul 25 13:21:00.831
UTC: As34 LCP: ACFC (0x0802) Jul 25 13:21:00.831 UTC: As34 LCP: MRRU 1524 (0x110405F4) Jul 25
13:21:00.831 UTC: As34 LCP: EndpointDisc 1 Local Jul 25 13:21:00.831 UTC: As34 LCP:
(0x131301636C6561726C616B652D6C616E) Jul 25 13:21:00.831 UTC: As34 LCP: (0x2D3031) Jul 25
13:21:01.135 UTC: **As34 LCP: I CONFACK [REQsent] id 45 Len 43**
Jul 25 13:21:01.135 UTC: As34 LCP: ACCM 0x000A0000 (0x0206000A0000)
Jul 25 13:21:01.135 UTC: As34 LCP: MagicNumber 0x4395638E (0x05064395638E)
Jul 25 13:21:01.135 UTC: As34 LCP: PFC (0x0702)
Jul 25 13:21:01.135 UTC: As34 LCP: ACFC (0x0802)
Jul 25 13:21:01.135 UTC: **As34 LCP: MRRU 1524 (0x110405F4)**
Jul 25 13:21:01.135 UTC: As34 LCP: EndpointDisc 1 Local
Jul 25 13:21:01.135 UTC: As34 LCP: (0x131301636C6561726C616B652D6C616E)
Jul 25 13:21:01.135 UTC: As34 LCP: (0x2D3031)
Jul 25 13:21:01.139 UTC: As34 LCP: I CONFREQ [ACKrcvd] id 6 Len 47
Jul 25 13:21:01.139 UTC: As34 LCP: ACCM 0x000A0000 (0x0206000A0000)
Jul 25 13:21:01.143 UTC: As34 LCP: AuthProto CHAP (0x0305C22305)
Jul 25 13:21:01.143 UTC: As34 LCP: MagicNumber 0xE16DFC8D (0x0506E16DFC8D)
Jul 25 13:21:01.143 UTC: As34 LCP: PFC (0x0702)
Jul 25 13:21:01.143 UTC: As34 LCP: ACFC (0x0802)
Jul 25 13:21:01.143 UTC: As34 LCP: MRRU 1524 (0x110405F4)
Jul 25 13:21:01.143 UTC: As34 LCP: EndpointDisc 1 Local
Jul 25 13:21:01.143 UTC: As34 LCP: (0x131201626F62736C616B652D6E61732D)
Jul 25 13:21:01.143 UTC: As34 LCP: (0x3031)
Jul 25 13:21:01.143 UTC: **As34 LCP: O CONFACK [ACKrcvd] id 6 Len 47**
Jul 25 13:21:01.143 UTC: As34 LCP: ACCM 0x000A0000 (0x0206000A0000)
Jul 25 13:21:01.143 UTC: As34 LCP: AuthProto CHAP (0x0305C22305)
Jul 25 13:21:01.143 UTC: As34 LCP: MagicNumber 0xE16DFC8D (0x0506E16DFC8D)
Jul 25 13:21:01.143 UTC: As34 LCP: PFC (0x0702)
Jul 25 13:21:01.143 UTC: As34 LCP: ACFC (0x0802)
Jul 25 13:21:01.143 UTC: **As34 LCP: MRRU 1524 (0x110405F4)**
Jul 25 13:21:01.143 UTC: As34 LCP: EndpointDisc 1 Local
Jul 25 13:21:01.143 UTC: As34 LCP: (0x131201626F62736C616B652D6E61732D)
Jul 25 13:21:01.143 UTC: As34 LCP: (0x3031)
*!--- Both sides have CONFACKed the parameters !--- MRRU of 1524 bytes and the Endpoint
Discriminator have been negotiated* Jul 25 13:21:01.143 UTC: As34 LCP: State is Open *!--- LCP
negotiation complete* Jul 25 13:21:01.147 UTC: As34 PPP: Phase is AUTHENTICATING, by the peer *!---
- Received a challenge from the remote router* Jul 25 13:21:01.351 UTC: As34 CHAP: I CHALLENGE id
3 Len 36 from "bobslake-nas-01" Jul 25 13:21:01.351 UTC: As34 CHAP: O RESPONSE id 3 Len Jul 25
13:21:01.539 UTC: As34 CHAP: I SUCCESS id 3 Len 4 *!--- CHAP authentication successful* Jul 25
13:21:01.539 UTC: As34 PPP: Phase is VIRTUALIZED *!--- Virtualize Async 34 !--- Virtual Access
interface will represent the MP bundle* Jul 25 13:21:01.543 UTC: Vi1 VTEMPLATE: Reuse Vi1,
recycle queue size 0 Jul 25 13:21:01.543 UTC: Vi1 VTEMPLATE: Hardware address 0030.9401.f101 Jul
25 13:21:01.543 UTC: Vi1 PPP: Phase is DOWN, Setup Jul 25 13:21:01.543 UTC: %DIALER-6-BIND:
Interface Vi1 bound to profile Di1 Jul 25 13:21:01.543 UTC: Vi1 VTEMPLATE: Has a new cloneblk
dialer, now it has dialer Jul 25 13:21:01.547 UTC: %LINK-3-UPDOWN: Interface Virtual-Access1,
changed state to up Jul 25 13:21:01.547 UTC: Virtual-Access1 DDR: Dialer statechange to up *!---
Virtual Access Interface is up !--- Negotiate LCP and PPP parameters for Virtual-Access
Interface* Jul 25 13:21:01.547 UTC: Virtual-Access1 DDR: Dialer call has been placed Jul 25
13:21:01.547 UTC: Vi1 PPP: Treating connection as a callout Jul 25 13:21:01.547 UTC: Vi1 PPP:
Phase is ESTABLISHING, Active Open Jul 25 13:21:01.547 UTC: Vi1 PPP: No remote authentication
for call-out Jul 25 13:21:01.547 UTC: Vi1 LCP: O CONFREQ [Closed] id 1 Len 33 Jul 25
13:21:01.547 UTC: Vi1 LCP: MagicNumber 0x439575FC (0x0506439575FC) Jul 25 13:21:01.547 UTC: Vi1
LCP: MRRU 1524 (0x110405F4) Jul 25 13:21:01.551 UTC: Vi1 LCP: EndpointDisc 1 Local Jul 25
13:21:01.551 UTC: Vi1 LCP: (0x131301636C6561726C616B652D6C616E) Jul 25 13:21:01.551 UTC: Vi1
LCP: (0x2D3031) Jul 25 13:21:01.551 UTC: Vi1 PPP: Phase is UP Jul 25 13:21:01.551 UTC: Vi1 IPCP:
O CONFREQ [Closed] id 1 Len 10 Jul 25 13:21:01.551 UTC: Vi1 IPCP: Address 0.0.0.0
(0x030600000000) Jul 25 13:21:01.551 UTC: **As34 MLP: bobslake-nas-01, multilink up, first link
!--- First multilink connection is virtualized** Jul 25 13:21:01.651 UTC: Vi1 IPCP: I CONFREQ
[REQsent] id 1 Len 10 Jul 25 13:21:01.651 UTC: Vi1 IPCP: Address 172.21.104.254 (0x0306AC1568FE)
Jul 25 13:21:01.651 UTC: Vi1 IPCP: O CONFACK [REQsent] id 1 Len 10 Jul 25 13:21:01.651 UTC: Vi1
IPCP: Address 172.21.104.254 (0x0306AC1568FE) Jul 25 13:21:01.731 UTC: Vi1 IPCP: I CONFNAK
[ACKsent] id 1 Len 10 Jul 25 13:21:01.731 UTC: Vi1 IPCP: Address 172.21.104.48 (0x0306AC156830)
Jul 25 13:21:01.731 UTC: Vi1 IPCP: O CONFREQ [ACKsent] id 2 Len 10 Jul 25 13:21:01.731 UTC: Vi1

IPCP: Address 172.21.104.48 (0x0306AC156830) Jul 25 13:21:01.915 UTC: Vi1 IPCP: I CONFACK
[ACKsent] id 2 Len 10 Jul 25 13:21:01.915 UTC: Vi1 IPCP: Address 172.21.104.48 (0x0306AC156830)
Jul 25 13:21:01.915 UTC: Vi1 IPCP: State is Open Jul 25 13:21:01.915 UTC: Di1 IPCP: Install
negotiated IP interface address 172.21.104.48 *!--- IP address is assigned to virtual-access
interface* Jul 25 13:21:01.919 UTC: Vi1 DDR: dialer protocol up Jul 25 13:21:01.919 UTC: Di1
IPCP: Install route to 172.21.104.254 *!--- Route to loopback address of remote router* Jul 25
13:21:02.539 UTC: **%LINEPROTO-5-UPDOWN: Line protocol on Interface Async34,
changed state to up**
Jul 25 13:21:02.551 UTC:
**%LINEPROTO-5-UPDOWN: Line protocol on Interface
Virtual-Access1, changed state to up**
*!--- Full connectivity with first async connection !-- Begin dialout using second async
interface* Jul 25 13:21:08.191 UTC: As33 DDR: rotor dialout [priority] Jul 25 13:21:08.191 UTC:
As33 DDR: Attempting to dial

!--- Number to be dialed; this number is the PRI on the remote router Jul 25 13:21:08.191 UTC:
CHAT33: Attempting async line dialer script Jul 25 13:21:08.191 UTC: CHAT33: Dialing using Modem
script: async-mppp & System script: none *!--- Use chat script async-mppp for dialout* Jul 25
13:21:08.191 UTC: CHAT33: process started Jul 25 13:21:08.191 UTC: CHAT33: Asserting DTR Jul 25
13:21:08.191 UTC: CHAT33: Chat script async-mppp started Jul 25 13:21:33.859 UTC: CHAT33: Chat
script async-mppp finished, status = Success *!--- Chat script successful* Jul 25 13:21:35.859
UTC: %LINK-3-UPDOWN: Interface Async33, changed state to up Jul 25 13:21:35.859 UTC: Async33
DDR: Dialer statechange to up Jul 25 13:21:35.859 UTC: %DIALER-6-BIND: Interface As33 bound to
profile Di1 Jul 25 13:21:35.859 UTC: Async33 DDR: Dialer call has been placed *!--- PPP
negotiation begins* Jul 25 13:21:35.859 UTC: As33 PPP: Treating connection as a callout Jul 25
13:21:35.859 UTC: As33 PPP: Phase is ESTABLISHING, Active Open Jul 25 13:21:35.859 UTC: As33
PPP: No remote authentication for call-out *!--- CHAP challenge is configured for callin only !--
- LCP negotiation begins; Multilink parameters are also negotiated* Jul 25 13:21:35.863 UTC: As33
LCP: O CONFREQ [Closed] id 21 Len 43 Jul 25 13:21:35.863 UTC: As33 LCP: ACCM 0x000A0000
(0x0206000A0000) Jul 25 13:21:35.863 UTC: As33 LCP: MagicNumber 0x4395FC05(0x05064395FC05) Jul
25 13:21:35.863 UTC: As33 LCP: PFC (0x0702) Jul 25 13:21:35.863 UTC: As33 LCP: ACFC (0x0802) Jul
25 13:21:35.863 UTC: As33 LCP: MRRU 1524 (0x110405F4) *!--- negotiate Maximum Receive
Reconstructed Unit (MRRU)* Jul 25 13:21:35.863 UTC: As33 LCP: EndpointDisc 1 Local Jul 25
13:21:35.863 UTC: As33 LCP: (0x131301636C6561726C616B652D6C616E) Jul 25 13:21:35.863 UTC: As33
LCP: (0x2D3031) Jul 25 13:21:37.859 UTC: As33 LCP: TIMEOUT: State REQsent Jul 25 13:21:37.859
UTC: As33 LCP: O CONFREQ [REQsent] id 22 Len 43 Jul 25 13:21:37.859 UTC: As33 LCP: ACCM
0x000A0000 (0x0206000A0000) Jul 25 13:21:37.859 UTC: As33 LCP: MagicNumber 0x4395FC05
(0x05064395FC05) Jul 25 13:21:37.859 UTC: As33 LCP: PFC (0x0702) Jul 25 13:21:37.859 UTC: As33
LCP: ACFC (0x0802) Jul 25 13:21:37.859 UTC: As33 LCP: MRRU 1524 (0x110405F4) Jul 25 13:21:37.859
UTC: As33 LCP: EndpointDisc 1 Local Jul 25 13:21:37.859 UTC: As33 LCP:
(0x131301636C6561726C616B652D6C616E) Jul 25 13:21:37.859 UTC: As33 LCP: (0x2D3031) Jul 25
13:21:39.859 UTC: As33 LCP: TIMEOUT: State REQsent Jul 25 13:21:39.859 UTC: As33 LCP: O CONFREQ
[REQsent] id 23 Len 43 Jul 25 13:21:39.859 UTC: As33 LCP: ACCM 0x000A0000 (0x0206000A0000) Jul
25 13:21:39.859 UTC: As33 LCP: MagicNumber 0x4395FC05 (0x05064395FC05) Jul 25 13:21:39.859 UTC:
As33 LCP: PFC (0x0702) Jul 25 13:21:39.859 UTC: As33 LCP: ACFC (0x0802) Jul 25 13:21:39.859 UTC:
As33 LCP: MRRU 1524 (0x110405F4) Jul 25 13:21:39.859 UTC: As33 LCP: EndpointDisc 1 Local Jul 25
13:21:39.859 UTC: As33 LCP: (0x131301636C6561726C616B652D6C616E) Jul 25 13:21:39.859 UTC: As33
LCP: (0x2D3031) Jul 25 13:21:40.199 UTC: As33 LCP: I CONFREQ [REQsent] id 6 Len 47 Jul 25
13:21:40.199 UTC: As33 LCP: ACCM 0x000A0000 (0x0206000A0000) Jul 25 13:21:40.203 UTC: As33 LCP:
AuthProto CHAP (0x0305C22305) Jul 25 13:21:40.203 UTC: As33 LCP: MagicNumber 0xE16E950F
(0x0506E16E950F) Jul 25 13:21:40.203 UTC: As33 LCP: PFC (0x0702) Jul 25 13:21:40.203 UTC: As33
LCP: ACFC (0x0802) Jul 25 13:21:40.203 UTC: As33 LCP: MRRU 1524 (0x110405F4) Jul 25 13:21:40.203
UTC: As33 LCP: EndpointDisc 1 Local Jul 25 13:21:40.203 UTC: As33 LCP:
(0x131201626F62736C616B652D6E61732D) Jul 25 13:21:40.203 UTC: As33 LCP: (0x3031) Jul 25
13:21:40.203 UTC: **As33 LCP: O CONFACK [REQsent] id 6 Len 47**
!--- PPP parameters are agreed on (CONFACKed) by both sides Jul 25 13:21:40.203 UTC: As33 LCP:
ACCM 0x000A0000 (0x0206000A0000) Jul 25 13:21:40.203 UTC: As33 LCP: AuthProto CHAP
(0x0305C22305) Jul 25 13:21:40.203 UTC: As33 LCP: MagicNumber 0xE16E950F (0x0506E16E950F) Jul 25
13:21:40.203 UTC: As33 LCP: PFC (0x0702) Jul 25 13:21:40.203 UTC: As33 LCP: ACFC (0x0802) Jul 25
13:21:40.203 UTC: **As33 LCP: MRRU 1524 (0x110405F4)**

```

!--- MRRU of 1524 bytes is accepted Jul 25 13:21:40.203 UTC: As33 LCP: EndpointDisc 1 Local Jul
25 13:21:40.203 UTC: As33 LCP: (0x131201626F62736C616B652D6E61732D) Jul 25 13:21:40.203 UTC:
As33 LCP: (0x3031) Jul 25 13:21:40.207 UTC: As33 LCP: I CONFACK [ACKsent] id 23 Len 43
!--- PPP parameters are agreed on (CONFACKed) by both sides
Jul 25 13:21:40.207 UTC: As33 LCP: ACCM 0x000A0000 (0x0206000A0000)
Jul 25 13:21:40.207 UTC: As33 LCP: MagicNumber 0x4395FC05 (0x05064395FC05)
Jul 25 13:21:40.207 UTC: As33 LCP: PFC (0x0702)
Jul 25 13:21:40.207 UTC: As33 LCP: ACFC (0x0802)
Jul 25 13:21:40.207 UTC: As33 LCP: MRRU 1524 (0x110405F4)
!--- MRRU of 1524 bytes is accepted Jul 25 13:21:40.207 UTC: As33 LCP: EndpointDisc 1 Local Jul
25 13:21:40.207 UTC: As33 LCP: (0x131301636C6561726C616B652D6C616E) Jul 25 13:21:40.207 UTC:
As33 LCP: (0x2D3031) !--- LCP negotiation is complete Jul 25 13:21:40.207 UTC: As33 LCP: State
is Open Jul 25 13:21:40.207 UTC: As33 PPP: Phase is AUTHENTICATING, by the peer !--- CHAP
authentication begins Jul 25 13:21:40.419 UTC: As33 CHAP: I CHALLENGE id 3 Len 36 from
"bobslake-nas-01" !--- Received challenge from bobslake-nas-01 Jul 25 13:21:40.423 UTC: As33
CHAP: O RESPONSE id 3 Len 37 from "clearlake-lan-01" Jul 25 13:21:42.528 UTC: As33 CHAP: I
SUCCESS id 3 Len 4 !--- CHAP authentication is successful Jul 25 13:21:42.528 UTC: As33 PPP:
Phase is VIRTUALIZED !--- Async 33 is added to Virtualized MP bundle Jul 25 13:21:42.528 UTC:
As33 MLP: bobslake-nas-01, multilink up
!--- Multilink connection is up Jul 25 13:21:43.528 UTC: %LINEPROTO-5-UPDOWN: Line protocol on
Interface Async33, changed state to up clearlake-lan-01# Jul 25 13:23:52.028 UTC: Vll MLP:
Disabling particle-fastswitching in 'bobslake-nas-01' Jul 25 13:23:52.028 UTC: Vll MLP: Enabling
particle-fastswitching on 'bobslake-nas-01' !--- Cisco IOS adjusting fast switching strategy to
keep in step !--- with delivery of packet fragments Jul 25 13:23:53.872 UTC: Vll MLP: Disabling
particle-fastswitching in 'bobslake-nas-01' Jul 25 13:23:53.884 UTC: Vll MLP: Enabling particle-
fastswitching on 'bobslake-nas-01'

```

[Informazioni correlate](#)

- [Multilink PPP per DDR - Configurazione e verifica di base](#)
- [Connessione remota Async Multilink PPP da client Microsoft Windows®](#)
- [Multilink PPP su due interfacce asincrone seriali a livello fisico](#)
- [Configurazione del server NAS per Basic Dial Access](#)
- [Visualizzazione delle statistiche del chiamante](#)
- [Configurazione delle interfacce dei modelli virtuali](#)
- [Funzioni PPP di accesso virtuale in Cisco IOS](#)
- [Pagine di supporto PPP](#)
- [Supporto tecnico – Cisco Systems](#)