

# Multilink PPP ao longo de duas interfaces assíncronas de camada física em série

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## [Introdução](#)

Em alguns ambientes, talvez seja necessário agrupar vários links assíncronos para que atuem como um único link com largura de banda agregada. Este documento descreve como configurar um Cisco 2500 Access Server para agrupar duas interfaces assíncronas com o uso de um modelo virtual.

Esta configuração pode ser usada para roteadores conectados por linhas assíncronas via modems externos ou módulos de rede (modems internos). Você pode acrescentar recursos adicionais a esta configuração, dependendo das necessidades.

## [Pré-requisitos](#)

### [Requisitos](#)

Não existem requisitos específicos para este documento.

### [Componentes Utilizados](#)

As informações neste documento são baseadas nas versões de software e hardware abaixo.

- Roteadores Cisco 2511 e Cisco 2503 em um ambiente de laboratório com configurações limpas.

- O software Cisco IOS® Release 12.2(10b) está sendo executado em ambos os roteadores.
- Quatro modems externos.

As informações neste documento foram criadas a partir de dispositivos em um ambiente de laboratório específico. Todos os dispositivos utilizados neste documento foram iniciados com uma configuração (padrão) inicial. Se você estiver trabalhando em uma rede ativa, certifique-se de que entende o impacto potencial de qualquer comando antes de utilizá-lo.

## Produtos Relacionados

Essa configuração pode ser usada com qualquer par de roteadores, desde que eles tenham, cada um, duas interfaces WAN seriais e que sejam capazes de configurar a interface assíncrona. Interfaces seriais WIC-1T, WIC-2A/S, de 8 ou 16 portas assíncronas podem ser usadas.

## Convenções

Para obter mais informações sobre convenções de documento, consulte as [Convenções de dicas técnicas Cisco](#).

## Configurar

Nesta seção, você encontrará informações para configurar os recursos descritos neste documento.

**Note:** Para localizar informações adicionais sobre os comandos usados neste documento, utilize a Ferramenta Command Lookup (somente clientes [registrados](#)).

## Diagrama de Rede

Este documento utiliza a instalação de rede mostrada no diagrama abaixo.

## Configurações

Este documento utiliza as configurações mostradas abaixo.

**Note:** Essa configuração foi testada com o software Cisco IOS Release 12.2(10b) em roteadores Cisco 2500. A mesma configuração se aplica a uma topologia de roteador similar que esteja executando o software Cisco IOS a partir da release 11.0(3).

### **Roteador 1 (Cisco 2511)**

```
Current configuration : 1185 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname Router1
!
username Router2 password 0 xxxxx
ip subnet-zero
!
```

```

multilink virtual-template 1
!--- Applies the virtual interface template to the
multilink bundle. ! interface Loopback0 ip address
192.168.0.2 255.255.255.0 ! interface Ethernet0 ip
address 10.0.0.1 255.255.255.0 ! !--- Interface virtual-
template is a logical interface which creates !---
virtual access interfaces dynamically and applies them
to physical !--- asynchronous interfaces. interface
Virtual-Template1 ip unnumbered Loopback0 ppp
authentication chap !--- Enables multilink PPP on the
virtual template interface. ppp multilink ! !--- The
parameters configured in interface group-async are !---
applied to the group and range reduces the repeated
configuration !--- in asynchronous interfaces.
interface Group-Async0 ip unnumbered Loopback0
encapsulation ppp async default routing !--- Permits
routing over the async interface. !--- This is required
for a routing protocol to run across the async link.
async mode dedicated !--- Places the line into dedicated
asynchronous network mode. !--- This interface is now
automatically configured for PPP connections. ppp
authentication chap ppp multilink group-range 9 10 !---
Group-range indicates the asynchronous interfaces which
comes under !--- the Group-Async interface. ! router
ospf 1 redistribute connected subnets network
192.168.0.0 0.0.0.255 area 0 ! ip classless ! dialer-
list 1 protocol ip permit ! ! line con 0 line 1 8 flush-
at-activation line 9 10 modem InOut modem autoconfigure
type default transport input all autohangup speed 115200
line 11 16 flush-at-activation line aux 0 line vty 0 4
login ! end

```

## Roteador 2 (Cisco 2503)

```

Current configuration : 1645 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
!
hostname Router2
!
username Router1 password 0 xxxxx
!--- Username for remote router (Router1) and shared
secret. !--- Shared secret(used for CHAP authentication)
must be the same on both sides. ip subnet-zero ! chat-
script test "" "ATDT\T" TIMEOUT 120 CONNECT \C !--- A
chat script is a string of text that defines the
handshaking that occurs !--- between the router and the
modem to sucessfully handshake with the destination. !--
- In this chat-script called "test" the expected string
"" is !--- the null from the destination. The send
string "ATDT\T" instructs the !--- modem to dial the
telephone number in the dialer string !--- command. This
is 30116 and 30114 in the Interface dialer 3 TIMEOUT 120
CONNECT \C. !--- It waits up to 120 seconds for the
input string "CONNECT". \C is an escape !--- sequence to
end the chat-script. !--- Refer to the Modem-Router
Connection Guide and Chat-script !--- for more
information ! modemcap entry default !--- Modemcap named
"default" will be applied to the line 2 and line 3 of !-
-- Serial interfaces. Refer to the Modem-Router
Connection Guide and !--- modemcap entry for more

```

```

information. ! interface Loopback0 ip address
192.168.0.1 255.255.255.0 ! interface Ethernet0 ip
address 172.16.1.1 255.255.255.0 ! ! interface Serial2
physical-layer async no ip address encapsulation ppp
dialer in-band dialer rotary-group 3 !--- Dialer rotary-
group applies the the logical interface dialer 3 !---
configuration to physical serial Interfaces 2 and 3.
This simplifies the !--- configuration, else the
commands in interface dialer has to be repeatedly !---
configured in physical interfaces. async mode dedicated
! interface Serial3 physical-layer async no ip address
encapsulation ppp dialer in-band dialer rotary-group 3
dialer-group 1 async default routing async mode
dedicated ! interface Dialer3 ! -- This is a logical
interface applied to dialer rotary-group. ip unnumbered
Loopback0 encapsulation ppp dialer in-band dialer idle-
timeout 60 dialer map ip 192.168.0.2 name Router1 modem-
script test broadcast 30116 dialer map ip 192.168.0.2
name Router1 modem-script test broadcast 30114 !---
dialer map statements for the remote router Router1 !---
The name must match the one used by the remote router to
identify itself. !--- use modem chat script "test" for
this connection dialer hold-queue 15 dialer load-
threshold 1 either dialer-group 1 no cdp enable ppp
authentication chap ppp multilink ! router ospf 1
redistribute connected subnets network 192.168.0.0
0.0.0.255 area 0 ! ip classless ! dialer-list 1 protocol
ip permit !--- All IP traffic is defined interesting. !-
-- This is applied to Async interface 2 and 3 using
dialer-group 1. ! ! line con 0 line 2 3 modem InOut
modem autoconfigure type default !--- Apply the modemcap
"default" (configured previously) to !--- initialize the
modem. Refer to the link Modem-Router Connection Guide
!--- for more information. transport input all !---
Allows all protocols to be passed to the access server
!--- through the line. autohangup !--- Disconnects the
line automatically after the connection closes. speed
115200 line aux 0 line vty 0 4 login ! end

```

Para implementar essa configuração, você deve configurar o seguinte:

- Crie um número de modelo virtual multilink no Roteador 1.
- Configure **ppp multilink** nas interfaces de ambos os roteadores.
- Configure a autenticação nas interfaces de ambos os roteadores.

Na configuração usada neste documento, o Roteador 1 foi configurado para só receber chamadas, enquanto o Roteador 2 inicia a chamada e se conecta ao Roteador 1. Ambos os roteadores são configurados para PPP multilink. Quando a conexão ocorre, um grupo mestre é criado, e ambos os links assíncronos são agrupados juntos em uma interface de acesso virtual.

As interfaces 9 e 10 no Roteador 1 recebem apenas chamadas assíncronas. É normal não ver as interfaces 9 e 10 quando elas fazem parte do group-async 1. Certifique-se de criar um modelo virtual multilink; caso contrário, será possível se conectar no primeiro canal, mas não passar o tráfego (IP Control Protocol [IPCP] fechado). Sem um modelo virtual e PPP multilink, essa configuração só funcionaria para uma única conexão assíncrona, não para ambas.

As interfaces 2 e 3 no Roteador 2 são configuradas com o **comando physical-layer async** e aceitarão comandos PPP multilink. Essas interfaces serão removidas automaticamente quando se tornarem parte do dialer rotary-group. Assim que você inserir o comando **dialer rotary-group 3**, o comando serial ppp multilink será excluído da configuração. Use o comando **ppp multilink** no

discador da interface 3.

## Verificar

Esta seção fornece informações que você pode usar para confirmar se sua configuração está funcionando adequadamente.

A [Output Interpreter Tool \(somente clientes registrados\)](#) oferece suporte a determinados comandos show, o que permite exibir uma análise da saída do comando show.

```
Router1#show ip route
```

```
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route
```

```
Gateway of last resort is not set
```

```
       172.16.0.0/24 is subnetted, 1 subnets
O E2   172.16.1.0 [110/20] via 192.168.0.1, 00:32:54, Virtual-Access1
       10.0.0.0/24 is subnetted, 1 subnets
C      10.0.0.0 is directly connected, Ethernet0
       192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks
C      192.168.0.0/24 is directly connected, Loopback0
C      192.168.0.1/32 is directly connected, Virtual-Access1
```

```
Router1#show ppp multilink
```

```
Virtual-Access1, bundle name is Router2
```

```
! --- Virtualized MP bundle. Bundle name is derived from the username used !--- during
authentication Bundle up for 00:34:48 0 lost fragments, 0 reordered, 0 unassigned 0 discarded, 0
lost received, 1/255 load 0xC8 received sequence, 0xC8 sent sequence Member links: 2 (max not
set, min not set)
  Async9, since 00:34:52, last rcvd seq 0000C6
  Async10, since 00:32:11, last rcvd seq 0000C7
```

```
Router2#show ip route
```

```
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route
```

```
Gateway of last resort is not set
```

```
       172.16.0.0/24 is subnetted, 1 subnets
C      172.16.1.0 is directly connected, Ethernet0
       10.0.0.0/24 is subnetted, 1 subnets
O E2   10.0.0.0 [110/20] via 192.168.0.2, 00:45:10, Dialer3
       192.168.0.0/24 is variably subnetted, 2 subnets, 2 masks
C      192.168.0.0/24 is directly connected, Loopback0
C      192.168.0.2/32 is directly connected, Dialer3
```

Router2#show ppp multilink

Virtual-Access1, bundle name is Router1

!--- Virtualized MP bundle. Bundle name is derived from the username used !--- during authentication. Bundle up for 00:35:10 Dialer interface is Dialer3 !--- This Virtual Access Interface used Interface Dialer3. 0 lost fragments, 0 reordered, 0 unassigned 0 discarded, 0 lost received, 1/255 load 0xC9 received sequence, 0xCA sent sequence **Member links: 2 (max not set, min not set)**

Serial13, since 00:35:10, last rcvd seq 0000C8

Serial12, since 00:32:29, last rcvd seq 0000C7

Router1#show caller

Line	User	Service	Active Time	Idle Time
con 0	-	TTY	00:12:03	00:00:00
tty 2	-	TTY	1d08h	00:00:00
tty 4	-	TTY	1d08h	00:00:00
tty 9	Router2	Async	00:43:17	00:00:05
tty 10	Router2	Async	00:40:36	00:00:15

!--- First connection As9 Router2 PPP 00:43:13 - !--- Second connection As10 Router2 PPP 00:40:32 - !--- MP bundle !--- Router2 has two async lines, two TTY, and one virtual interface bundle. Vi1 Router2 PPP Bundle 00:43:10 00:00:05 Router2#show caller

Line	User	Service	Active Time	Idle Time
con 0	-	TTY	00:11:36	00:00:00
tty 2	Router1	Async	-	00:00:07
tty 3	Router1	Async	-	00:00:18

! --- Second connection Se2 Router1 PPP 00:39:58 - ! --- First connection Se3 Router1 PPP 00:42:39 - ! --- MP bundle ! --- Router1 has two async lines, two TTY, and one virtual interface bundle. Vi1 Router1 PPP Bundle 00:42:39 00:00:01 Router2#show caller user Router1

User: Router1, line tty 2, service Async

Idle time 00:00:16

Timeouts:	Absolute	Idle Session	Idle Exec
Limits:	-	-	00:10:00
Disconnect in:	-	-	-

TTY: Line 2, running PPP on Se2

Line: Baud rate (TX/RX) is 115200/115200, no parity, 2 stopbits, 8 databits

Status: Ready, Active, Async Interface Active, Modem Detected

Capabilities: Modem Callout, Modem RI is CD,

Line is permanent async interface, Hangup on Last Close

Modem Autoconfigure

Modem State: Ready, Modem Configured

User: Router1, line tty 3, service Async

Idle time 00:00:08

Timeouts:	Absolute	Idle Session	Idle Exec
Limits:	-	-	00:10:00
Disconnect in:	-	-	-

TTY: Line 3, running PPP on Se3

Line: Baud rate (TX/RX) is 115200/115200, no parity, 2 stopbits, 8 databits

Status: Ready, Active, Async Interface Active, Modem Detected

Capabilities: Modem Callout, Modem RI is CD,

Line is permanent async interface, Hangup on Last Close

Modem Autoconfigure

Modem State: Ready, Modem Configured

User: Router1, line Se2, service PPP

Active time 23:14:47, Idle time 00:00:00

Timeouts:	Absolute	Idle
Limits:	-	-
Disconnect in:	-	-

```
PPP: LCP Open, multilink Open, CHAP (local <--> local)
Dialer: Connected to 30116, outbound
        Type is IN-BAND ASYNC, group Di3
        Cause: Multilink bundle overloaded
IP: Local 192.168.0.1
Bundle: Member of Router1, last input 00:00:01
Counts: 10194 packets input, 769456 bytes, 0 no buffer
        0 input errors, 0 CRC, 0 frame, 0 overrun
        10247 packets output, 773761 bytes, 0 underruns
        0 output errors, 0 collisions, 31 interface resets
```

```
User: Router1, line Se3, service PPP
        Active time 23:17:30, Idle time 00:00:01
Timeouts:          Absolute Idle
Limits:            -         -
Disconnect in:    -         -
```

```
PPP: LCP Open, multilink Open, CHAP (local <--> local)
Dialer: Connected to 30116, outbound
        Type is IN-BAND ASYNC, group Di3
        Cause: ip (s=192.168.0.1, d=224.0.0.5)
IP: Local 192.168.0.1
Bundle: Member of Router1, last input 00:00:00
Counts: 10432 packets input, 783562 bytes, 0 no buffer
        0 input errors, 0 CRC, 0 frame, 0 overrun
        10718 packets output, 799155 bytes, 0 underruns
        0 output errors, 0 collisions, 41 interface resets
```

```
User: Router1, line Vi1, service PPP Bundle
        Active time 23:17:30, Idle time 00:00:05
Timeouts:          Absolute Idle
Limits:            -         00:01:00
Disconnect in:    -         00:00:54
```

```
!--- Idle-timeout is 60 seconds(1 Minute). PPP: LCP Open, multilink Open, IPCP
Dialer: Connected to 30116, outbound
        Idle timer 60 secs, idle 6 secs
        Type is IN-BAND SYNC, group Di3
IP: Local 192.168.0.1, remote 192.168.0.2
!--- IP address assigned to the bundle !--- and loopback address of the remote router. Bundle:
First link of Router1, 2 links, last input 00:00:07 Counts: 8622 packets input, 623202 bytes, 0
no buffer 0 input errors, 0 CRC, 0 frame, 0 overrun 8776 packets output, 618523 bytes, 0
underruns 0 output errors, 0 collisions, 0 interface resets Router2#show dialer
```

```
Di3 - dialer type = IN-BAND SYNC NO-PARITY
Load threshold for dialing additional calls is 1
!--- Load threshold Idle timer (60 secs), Fast idle timer (20 secs) Wait for carrier (30 secs),
Re-enable (15 secs) Number of active calls = 2 Dial String Successes Failures Last DNIS Last
status 30114 3 69 00:41:45 successful 30116 4294967293 75 00:44:00 failed Se2 - dialer type =
IN-BAND ASYNC NO-PARITY Rotary group 3, priority 0 !--- Member of interface dialer 3 Idle timer
(60 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 Connected to 30116 (Router1) !--- Phone
number that was dialed Se3 - dialer type = IN-BAND ASYNC NO-PARITY Rotary group 3, priority 0 !-
-- Member of interface dialer 3 Idle timer (60 secs), Fast idle timer (20 secs) Wait for carrier
(30 secs), Re-enable (15 secs) Dialer state is multilink member Dial reason: ip (s=192.168.0.1,
d=224.0.0.5) !--- Interface was the first link in the bundle, triggered by OSPF ALL !--- Routers
advrt packet. Connected to 30116 (Router1) ! --- Phone number that was dialed
```

## Troubleshooting

Esta seção fornece informações que podem ser usadas para o troubleshooting da sua configuração.

As saídas a seguir foram obtidas dos roteadores Cisco 2511 e Cisco 2503. Elas mostram a discagem do Cisco 2503 para links PSTN do roteador Cisco 2511 e o estabelecimento de uma conexão MP.

```
Router1#debug ppp negotiation
```

```
PPP protocol negotiation debugging is on
```

```
Router1#debug vtemplate
```

```
Virtual Template debugging is on
```

```
Router1#show debug
```

```
PPP:
```

```
PPP protocol negotiation debugging is on
```

```
VTEMPLATE:
```

```
Virtual Template debugging is on
```

```
Oct  1 20:15:20.463: As9 LCP: I CONFREQ [Closed] id 81 len 39
Oct  1 20:15:20.463: As9 LCP:   ACCM 0x000A0000 (0x0206000A0000)
Oct  1 20:15:20.467: As9 LCP:   AuthProto CHAP (0x0305C22305)
Oct  1 20:15:20.471: As9 LCP:   MagicNumber 0x57D7985D (0x050657D7985D)
Oct  1 20:15:20.471: As9 LCP:   PFC (0x0702)
Oct  1 20:15:20.475: As9 LCP:   ACFC (0x0802)
Oct  1 20:15:20.479: As9 LCP:   MRRU 1524 (0x110405F4)
Oct  1 20:15:20.479: As9 LCP:   EndpointDisc 1 Router2 (0x130A01526F7574657232)
Oct  1 20:15:20.483: As9 LCP: Lower layer not up, Fast Starting
Oct  1 20:15:20.487: As9 PPP: Treating connection as a dedicated line
Oct  1 20:15:20.487: As9 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load]
Oct  1 20:15:20.495: As9 LCP: O CONFREQ [Closed] id 52 len 39
Oct  1 20:15:20.499: As9 LCP:   ACCM 0x000A0000 (0x0206000A0000)
Oct  1 20:15:20.499: As9 LCP:   AuthProto CHAP (0x0305C22305)
Oct  1 20:15:20.503: As9 LCP:   MagicNumber 0x078F2456 (0x0506078F2456)
Oct  1 20:15:20.507: As9 LCP:   PFC (0x0702)
Oct  1 20:15:20.507: As9 LCP:   ACFC (0x0802)
Oct  1 20:15:20.511: As9 LCP:   MRRU 1524 (0x110405F4)
Oct  1 20:15:20.515: As9 LCP:   EndpointDisc 1 Router1 (0x130A01526F7574657231)
Oct  1 20:15:20.519: As9 LCP: O CONFACK [REQsent] id 81 len 39
Oct  1 20:15:20.523: As9 LCP:   ACCM 0x000A0000 (0x0206000A0000)
Oct  1 20:15:20.527: As9 LCP:   AuthProto CHAP (0x0305C22305)
Oct  1 20:15:20.527: As9 LCP:   MagicNumber 0x57D7985D (0x050657D7985D)
Oct  1 20:15:20.531: As9 LCP:   PFC (0x0702)
Oct  1 20:15:20.531: As9 LCP:   ACFC (0x0802)
Oct  1 20:15:20.535: As9 LCP:   MRRU 1524 (0x110405F4)
Oct  1 20:15:20.539: As9 LCP:   EndpointDisc 1 Router2 (0x130A01526F7574657232)
Oct  1 20:15:20.547: %LINK-3-UPDOWN: Interface Async9, changed state to up
Oct  1 20:15:20.695: As9 LCP: I CONFACK [ACKsent] id 52 len 39
Oct  1 20:15:20.699: As9 LCP:   ACCM 0x000A0000 (0x0206000A0000)
Oct  1 20:15:20.703: As9 LCP:   AuthProto CHAP (0x0305C22305)
Oct  1 20:15:20.707: As9 LCP:   MagicNumber 0x078F2456 (0x0506078F2456)
Oct  1 20:15:20.707: As9 LCP:   PFC (0x0702)
Oct  1 20:15:20.711: As9 LCP:   ACFC (0x0802)
Oct  1 20:15:20.711: As9 LCP:   MRRU 1524 (0x110405F4)
Oct  1 20:15:20.715: As9 LCP:   EndpointDisc 1 Router1 (0x130A01526F7574657231)
Oct  1 20:15:20.719: As9 LCP: State is Open
Oct  1 20:15:20.723: As9 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load]
Oct  1 20:15:20.727: As9 CHAP: O CHALLENGE id 45 len 28 from "Router1"
Oct  1 20:15:20.739: As9 CHAP: I CHALLENGE id 40 len 28 from "Router2"
Oct  1 20:15:20.743: As9 CHAP: O RESPONSE id 40 len 28 from "Router1"
Oct  1 20:15:20.899: As9 CHAP: I RESPONSE id 45 len 28 from "Router2"
Oct  1 20:15:20.903: As9 CHAP: I SUCCESS id 40 len 4
Oct  1 20:15:20.919: As9 CHAP: O SUCCESS id 45 len 4
!--- Call is virtualized after authentication Oct  1 20:15:20.923: As9 PPP: Phase is VIRTUALIZED
[0 sess, 1 load]
```



```
!--- creation of Virtual access interface 1 Oct 1 20:15:20.935: Vi1 VTEMPLATE: Reuse Vi1,
recycle queue size 0 Oct 1 20:15:20.939: Vi1 VTEMPLATE: Set default settings with ip unnumbered
Oct 1 20:15:21.335: Vi1 VTEMPLATE: Hardware address 0000.0c47.7c6c Oct 1 20:15:21.335: Vi1 PPP:
Phase is DOWN, Setup [0 sess, 1 load] Oct 1 20:15:21.339: Vi1 VTEMPLATE: Has a new cloneblk
vtemplate, now it has vtemplate !--- Banner: Cloning is in progress on virtual access interface
1 Oct 1 20:15:21.347: Vi1 VTEMPLATE: ***** CLONE VACCESS1 ***** Oct 1 20:15:21.351:
Vi1 VTEMPLATE: Clone from Virtual-Templat1
!--- The following configuration of Virtual-template is cloned to the !--- Virtual-access
interface. interface Virtual-Access1 default ip address no ip address encaps ppp ip unnumbered
Loopback0 no ip unnumbered Loopback0 ip addr 192.168.0.2 255.255.255.0 no ip add ip unnumbered
lo 0 ip add 192.168.0.2 255.255.255.0 ip add 192.168.1.2 255.255.255.0 no ip add ip unnumbered
lo 0 end Oct 1 20:15:21.367: As9 IPCP: Packet buffered while building MLP bundle interface Oct 1
20:15:22.319: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async9, changed state to up Oct 1
20:15:23.267: As9 IPCP: Packet buffered while building MLP bundle interface Oct 1 20:15:24.447:
Vi1 VTEMPLATE: Messages from (un)cloning ... 192.168.0.0 overlaps with Loopback0 Oct 1
20:15:24.823: Vi1 VTEMPLATE: Messages from (un)cloning ... 192.168.0.0 overlaps with Loopback0
Oct 1 20:15:24.835: %LINK-3-UPDOWN: Interface Virtual-Access1,
changed state to up
Oct 1 20:15:24.843: Vi1 PPP: Treating connection as a dedicated line
Oct 1 20:15:24.847: Vi1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 1 load]
Oct 1 20:15:24.851: Vi1 LCP: O CONFREQ [Closed] id 1 len 29
Oct 1 20:15:24.855: Vi1 LCP: AuthProto CHAP (0x0305C22305)
Oct 1 20:15:24.859: Vi1 LCP: MagicNumber 0x078F3560 (0x0506078F3560)
Oct 1 20:15:24.859: Vi1 LCP: MRRU 1524 (0x110405F4)
Oct 1 20:15:24.863: Vi1 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231)

Oct 1 20:15:24.879: Vi1 PPP: Phase is UP [0 sess, 1 load]
Oct 1 20:15:24.883: Vi1 IPCP: O CONFREQ [Closed] id 1 len 10
Oct 1 20:15:24.883: Vi1 IPCP: Address 192.168.0.2 (0x0306C0A80002)
! -- Asynchronornous interface 9 is added to the Virtual access interface 1 !--- and the name of
the bundle is Router2. Oct 1 20:15:24.891: Vi1 MLP: Added first link As9 to bundle Router2
Oct 1 20:15:24.891: Vi1 PPP: Pending ncpQ size is 2
Oct 1 20:15:24.895: As9 IPCP: Redirect packet to Vi1
Oct 1 20:15:24.895: Vi1 IPCP: I CONFREQ [REQsent] id 1 len 10
Oct 1 20:15:24.899: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 1 20:15:24.903: Vi1 IPCP: O CONFACK [REQsent] id 1 len 10
Oct 1 20:15:24.907: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 1 20:15:24.911: As9 IPCP: Redirect packet to Vi1
Oct 1 20:15:24.915: Vi1 IPCP: I CONFREQ [ACKsent] id 2 len 10
Oct 1 20:15:24.919: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 1 20:15:24.919: Vi1 IPCP: O CONFACK [ACKsent] id 2 len 10
Oct 1 20:15:24.923: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 1 20:15:25.007: Vi1 IPCP: I CONFACK [ACKsent] id 1 len 10
!--- IP address of virtual bundle was previously obtained from the loopback !--- interface. Oct
1 20:15:25.011: Vi1 IPCP: Address 192.168.0.2 (0x0306C0A80002) Oct 1 20:15:25.015: Vi1 IPCP:
State is Open !--- Adds route for virtual bundle to routing table to reach the remote router.
Oct 1 20:15:25.039: Vi1 IPCP: Install route to 192.168.0.1
Oct 1 20:15:25.947: %LINEPROTO-5-UPDOWN: Line protocol on Interface Virtual-Access1,
changed state to up
Oct 1 20:15:31.199: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.0.1 on Virtual-Access1 from
LOADING to FULL, Loading Done

Oct 1 20:18:01.439: As10 LCP: I CONFREQ [Closed] id 61 len 39
Oct 1 20:18:01.443: As10 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 1 20:18:01.447: As10 LCP: AuthProto CHAP (0x0305C22305)
Oct 1 20:18:01.451: As10 LCP: MagicNumber 0x57DA0D94 (0x050657DA0D94)
Oct 1 20:18:01.451: As10 LCP: PFC (0x0702)
Oct 1 20:18:01.455: As10 LCP: ACFC (0x0802)
Oct 1 20:18:01.455: As10 LCP: MRRU 1524 (0x110405F4)
Oct 1 20:18:01.459: As10 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232)
Oct 1 20:18:01.463: As10 LCP: Lower layer not up, Fast Starting
Oct 1 20:18:01.467: As10 PPP: Treating connection as a dedicated line
Oct 1 20:18:01.467: As10 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load]
Oct 1 20:18:01.475: As10 LCP: O CONFREQ [Closed] id 30 len 39
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Oct 1 20:18:01.475: As10 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 1 20:18:01.479: As10 LCP: AuthProto CHAP (0x0305C22305)
Oct 1 20:18:01.483: As10 LCP: MagicNumber 0x0791992D (0x05060791992D)
Oct 1 20:18:01.483: As10 LCP: PFC (0x0702)
Oct 1 20:18:01.487: As10 LCP: ACFC (0x0802)
Oct 1 20:18:01.491: As10 LCP: MRRU 1524 (0x110405F4)
Oct 1 20:18:01.491: As10 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231)
Oct 1 20:18:01.499: As10 LCP: O CONFACK [REQsent] id 61 len 39
Oct 1 20:18:01.503: As10 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 1 20:18:01.507: As10 LCP: AuthProto CHAP (0x0305C22305)
Oct 1 20:18:01.507: As10 LCP: MagicNumber 0x57DA0D94 (0x050657DA0D94)
Oct 1 20:18:01.511: As10 LCP: PFC (0x0702)
Oct 1 20:18:01.511: As10 LCP: ACFC (0x0802)
Oct 1 20:18:01.515: As10 LCP: MRRU 1524 (0x110405F4)
Oct 1 20:18:01.519: As10 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232)
Oct 1 20:18:01.531: %LINK-3-UPDOWN: Interface Async10, changed state to up
Oct 1 20:18:01.703: As10 LCP: I CONFACK [ACKsent] id 30 len 39
Oct 1 20:18:01.703: As10 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 1 20:18:01.707: As10 LCP: AuthProto CHAP (0x0305C22305)
Oct 1 20:18:01.711: As10 LCP: MagicNumber 0x0791992D (0x05060791992D)
Oct 1 20:18:01.715: As10 LCP: PFC (0x0702)
Oct 1 20:18:01.715: As10 LCP: ACFC (0x0802)
Oct 1 20:18:01.719: As10 LCP: MRRU 1524 (0x110405F4)
Oct 1 20:18:01.723: As10 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231)
Oct 1 20:18:01.723: As10 LCP: State is Open
Oct 1 20:18:01.727: As10 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load]
Oct 1 20:18:01.731: As10 CHAP: O CHALLENGE id 25 len 28 from "Router1"
Oct 1 20:18:01.743: As10 CHAP: I CHALLENGE id 30 len 28 from "Router2"
Oct 1 20:18:01.755: As10 CHAP: O RESPONSE id 30 len 28 from "Router1"
Oct 1 20:18:01.851: As10 CHAP: I RESPONSE id 25 len 28 from "Router2"
Oct 1 20:18:01.867: As10 CHAP: O SUCCESS id 25 len 4
Oct 1 20:18:01.879: As10 CHAP: I SUCCESS id 30 len 4
Oct 1 20:18:01.879: As10 PPP: Phase is VIRTUALIZED [0 sess, 0 load]
Oct 1 20:18:01.891: Vl1 MLP: Added link As10 to bundle Router2
Oct 1 20:18:02.899: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async10,
changed state to up
Router1#

Router2#debug ppp negotiation
PPP protocol negotiation debugging is on

Router2#debug ppp multilink events
Multilink events debugging is on

Router2#debug dialer
Dial on demand events debugging is on

Router2#show debug
  Dial on demand:
  Dial on demand events debugging is on
  PPP:
  PPP protocol negotiation debugging is on
  Multilink events debugging is on

Oct  2 20:15:07.442: %SYS-5-CONFIG_I: Configured from console by console
Oct  2 20:15:08.038: %LINK-3-UPDOWN: Interface Dialer3, changed state to up
Oct  2 20:15:08.046: Se3 DDR: rotor dialout [priority]
!--- Dialing Reason Oct  2 20:15:08.050: Se3 DDR: Dialing cause ip (s=192.168.0.1, d=224.0.0.5)
!--- Number being dialed Oct  2 20:15:08.054: Se3 DDR: Attempting to dial 30116
Oct  2 20:15:08.058: CHAT3: Attempting async line dialer script
!--- Using chat script "test" for dialout Oct  2 20:15:08.058: CHAT3: Dialing using Modem script:
test & System script: none Oct  2 20:15:08.066: CHAT3: process started Oct  2 20:15:08.070: CHAT3:
Asserting DTR Oct  2 20:15:08.070: CHAT3: Chat script test started !--- Call being established;

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*note the time elapsed for call setup.* Oct 2 20:15:35.814: CHAT3: Chat script test finished, status = Success Oct 2 20:15:35.830: Di3 IPCP: Install route to 192.168.0.2 ! -- *Physical Layer (Serial Interface) is up. !--- Only now can PPP negotiation begin.* Oct 2 20:15:37.818: %LINK-3-UPDOWN: Interface Serial3, changed state to up  
Oct 2 20:15:37.822: Se3 DDR: Dialer statechange to up  
Oct 2 20:15:37.822: Se3 DDR: Dialer call has been placed  
*!--- PPP negotiation begins* Oct 2 20:15:37.826: Se3 PPP: Treating connection as a callout *!--- PPP Phase is ESTABLISHING. LCP negotiation will now occur* Oct 2 20:15:37.826: Se3 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load] *!--- Outgoing CONFREQ with Field ID 81* Oct 2 20:15:37.834: Se3 LCP: O CONFREQ [Closed] id 81 len 39  
Oct 2 20:15:37.838: Se3 LCP: ACCM 0x000A0000 (0x0206000A0000)  
*!--- This router is requesting: ! -- Option: Authentication Protocol, Value: CHAP ! -- Option: MagicNumber (used to detect loopbacks and is always sent)* Oct 2 20:15:37.838: Se3 LCP: AuthProto CHAP (0x0305C22305)  
Oct 2 20:15:37.842: Se3 LCP: MagicNumber 0x57D7985D (0x050657D7985D)  
Oct 2 20:15:37.846: Se3 LCP: PFC (0x0702)  
Oct 2 20:15:37.846: Se3 LCP: ACFC (0x0802)  
*! -- Negotiate Maximum Receive Reconstructed Unit (MRRU) ! -- MRRU is the maximum packet size this end will reconstruct* Oct 2 20:15:37.850: Se3 LCP: MRRU 1524 (0x110405F4) Oct 2 20:15:37.854: Se3 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232) ! -- *Incoming CONFREQ. ID field is 52* Oct 2 20:15:38.162: Se3 LCP: I CONFREQ [REQsent] id 52 len 39 Oct 2 20:15:38.166: Se3 LCP: ACCM 0x000A0000 (0x0206000A0000) ! -- *The peer has requested: ! -- Option: Authentication Protocol, Value: CHAP ! -- Option: MagicNumber (used to detect loopbacks and is always sent)* Oct 2 20:15:38.166: Se3 LCP: AuthProto CHAP (0x0305C22305) Oct 2 20:15:38.170: Se3 LCP: MagicNumber 0x078F2456 (0x0506078F2456) Oct 2 20:15:38.174: Se3 LCP: PFC (0x0702) Oct 2 20:15:38.174: Se3 LCP: ACFC (0x0802) Oct 2 20:15:38.178: Se3 LCP: MRRU 1524 (0x110405F4) Oct 2 20:15:38.182: Se3 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231) ! -- *Outgoing CONFACK for message with Field ID 52* Oct 2 20:15:38.186: Se3 LCP: O CONFACK [REQsent] id 52 len 39  
Oct 2 20:15:38.190: Se3 LCP: ACCM 0x000A0000 (0x0206000A0000)  
Oct 2 20:15:38.194: Se3 LCP: AuthProto CHAP (0x0305C22305)  
Oct 2 20:15:38.198: Se3 LCP: MagicNumber 0x078F2456 (0x0506078F2456)  
Oct 2 20:15:38.198: Se3 LCP: PFC (0x0702)  
Oct 2 20:15:38.202: Se3 LCP: ACFC (0x0802)  
Oct 2 20:15:38.202: Se3 LCP: MRRU 1524 (0x110405F4)  
Oct 2 20:15:38.206: Se3 LCP: EndpointDisc 1 Router1 (0x130A01526F7574657231)  
*! -- Incoming CONFACK for message with Field ID 81* Oct 2 20:15:38.214: Se3 LCP: I CONFACK [ACKsent] id 81 len 39 Oct 2 20:15:38.214: Se3 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 2 20:15:38.218: Se3 LCP: AuthProto CHAP (0x0305C22305)  
Oct 2 20:15:38.222: Se3 LCP: MagicNumber 0x57D7985D (0x050657D7985D)  
Oct 2 20:15:38.222: Se3 LCP: PFC (0x0702)  
Oct 2 20:15:38.226: Se3 LCP: ACFC (0x0802)  
*! -- Both sides have CONFACKed the parameters ! -- MRRU of 1524 bytes and the Endpoint Discriminator have been negotiated* Oct 2 20:15:38.230: Se3 LCP: MRRU 1524 (0x110405F4) Oct 2 20:15:38.230: Se3 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232) ! -- *LCP negotiation complete and LCP state goes to Open* Oct 2 20:15:38.234: Se3 LCP: State is Open  
*! -- PPP Phase is AUTHENTICATING. PPP Authentication occurs now ! -- Two-way authentication will be performed (indicated by the both keyword)* Oct 2 20:15:38.238: Se3 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load] ! -- *Outgoing CHAP Challenge. ! -- In LCP we had agreed upon CHAP as the authentication protocol* Oct 2 20:15:38.238: Se3 CHAP: O CHALLENGE id 40 len 28 from "Router2" ! -- *Incoming Challenge from peer* Oct 2 20:15:38.398: Se3 CHAP: I CHALLENGE id 45 len 28 from "Router1" ! -- *Incoming response from peer* Oct 2 20:15:38.402: Se3 CHAP: I RESPONSE id 40 len 28 from "Router1" ! -- *Outgoing Response* Oct 2 20:15:38.410: Se3 CHAP: O RESPONSE id 45 len 28 from "Router2" ! -- *CHAP authentication successful* Oct 2 20:15:38.418: Se3 CHAP: O SUCCESS id 40 len 4 Oct 2 20:15:38.538: Se3 CHAP: I SUCCESS id 45 len 4 Oct 2 20:15:38.542: Se3 MLP: Request add link to bundle ! -- *Virtualize Se3 ! -- Virtual Access interface will represent the MP bundle* Oct 2 20:15:38.542: Se3 PPP: Phase is VIRTUALIZED [0 sess, 1 load] Oct 2 20:15:38.546: Se3 MLP: Adding link to bundle Oct 2 20:15:38.550: Vi1 PPP: Phase is DOWN, Setup [0 sess, 0 load] Oct 2 20:15:38.558: Vi1 PPP: No remote authentication for call-out Oct 2 20:15:38.566: Vi1 MLP: Added to huntgroup Di3 Oct 2 20:15:38.570: Vi1 MLP: Clone from Di3 Oct 2 20:15:38.574: %LINK-3-UPDOWN: Interface Virtual-Access1, changed state to up Oct 2 20:15:38.578: Vi1 DDR: Dialer statechange to up ! -- *Virtual Access Interface is up ! -- Negotiate LCP and PPP parameters for Virtual-Access Interface* Oct 2 20:15:38.582: Vi1 DDR: Dialer call has been placed Oct 2 20:15:38.586: Vi1 PPP: Treating connection as a callout Oct 2 20:15:38.586: Vi1 PPP: Phase

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is ESTABLISHING, Active Open [0 sess, 0 load] Oct 2 20:15:38.594: Vi1 LCP: O CONFREQ [Closed] id
1 len 29 Oct 2 20:15:38.594: Vi1 LCP: AuthProto CHAP (0x0305C22305) Oct 2 20:15:38.598: Vi1 LCP:
MagicNumber 0x57D79B57 (0x050657D79B57) Oct 2 20:15:38.602: Vi1 LCP: MRRU 1524 (0x110405F4) Oct
2 20:15:38.606: Vi1 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232 Oct 2 20:15:38.614: Vi1
PPP: Phase is UP [0 sess, 0 load] Oct 2 20:15:38.618: Vi1 IPCP: O CONFREQ [Closed] id 1 len 10
Oct 2 20:15:38.622: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001) ! -- First multilink
connection is brought up in the virtual access interface Oct 2 20:15:38.626: Vi1 MLP: Added
first link Se3 to bundle Router1
Oct 2 20:15:38.630: Di3 IPCP: Remove route to 192.168.0.2
Oct 2 20:15:39.542: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial3,
changed state to up
Oct 2 20:15:39.614: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Virtual-Access1, changed state to up
Oct 2 20:15:40.614: Vi1 IPCP: TIMEOUT: State REQsent
Oct 2 20:15:40.618: Vi1 IPCP: O CONFREQ [REQsent] id 2 len 10
Oct 2 20:15:40.618: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 2 20:15:41.046: Vi1 MLP: Load (1) above threshold in bundle Router1
Oct 2 20:15:41.046: Se2 DDR: rotor dialout [priority]
Oct 2 20:15:41.050: Se2 DDR: Attempting to dial 30116
Oct 2 20:15:41.054: CHAT2: Attempting async line dialer script
Oct 2 20:15:41.054: CHAT2: Dialing using Modem script:
test & System script: none
Oct 2 20:15:41.062: CHAT2: process started
Oct 2 20:15:41.066: CHAT2: Asserting DTR
Oct 2 20:15:41.066: CHAT2: Chat script test started
Oct 2 20:15:42.506: Vi1 IPCP: I CONFREQ [REQsent] id 1 len 10
Oct 2 20:15:42.510: Vi1 IPCP: Address 192.168.0.2 (0x0306C0A80002)
Oct 2 20:15:42.514: Vi1 IPCP: O CONFACK [REQsent] id 1 len 10
Oct 2 20:15:42.518: Vi1 IPCP: Address 192.168.0.2 (0x0306C0A80002)
Oct 2 20:15:42.530: Vi1 IPCP: I CONFACK [ACKsent] id 1 len 10
Oct 2 20:15:42.534: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 2 20:15:42.538: Vi1 IPCP: ID 1 didn't match 2, discarding packet
Oct 2 20:15:42.546: Vi1 IPCP: I CONFACK [ACKsent] id 2 len 10
Oct 2 20:15:42.550: Vi1 IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 2 20:15:42.554: Vi1 IPCP: State is Open
Oct 2 20:15:42.562: Vi1 DDR: dialer protocol up
Oct 2 20:15:42.570: Vi1 DDR: Call connected, 4 packets unqueued,
4 transmitted 0 discarded
! -- Adds route for virtual bundle to routing table to reach the remote router Oct 2
20:15:42.582: Di3 IPCP: Install route to 192.168.0.2 Oct 2 20:15:48.714: %OSPF-5-ADJCHG:
Process 1, Nbr 192.168.0.2 on Dialer3
from LOADING to FULL, Loading Done
Oct 2 20:17:41.070: CHAT2: Chat script test finished, status = Connection timed
out; remote host not responding
Oct 2 20:17:41.074: Se2 DDR: disconnecting call
Oct 2 20:17:56.074: Se2 DDR: re-enable timeout
Oct 2 20:17:56.074: Se2 DDR: Attempting to dial 30114
Oct 2 20:17:56.078: CHAT2: Attempting async line dialer script
Oct 2 20:17:56.078: CHAT2: Dialing using Modem script: test & System script:
none
Oct 2 20:17:56.086: CHAT2: process started
Oct 2 20:17:56.090: CHAT2: Asserting DTR
Oct 2 20:17:56.090: CHAT2: Chat script test started
! -- Call is being established; note the time elapsed for call setup Oct 2 20:18:16.890: CHAT2:
Chat script test finished, status = Success Oct 2 20:18:18.894: %LINK-3-UPDOWN: Interface
Serial2, changed state to up
Oct 2 20:18:18.898: Se2 DDR: Dialer statechange to up
Oct 2 20:18:18.898: Se2 DDR: Dialer call has been placed
! -- PPP negotiation begins Oct 2 20:18:18.902: Se2 PPP: Treating connection as a callout Oct 2
20:18:18.906: Se2 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load] ! -- LCP negotiation
begins; Multilink parameters are also negotiated Oct 2 20:18:18.910: Se2 LCP: O CONFREQ [Closed]
id 61 len 39 Oct 2 20:18:18.914: Se2 LCP: ACCM 0x000A0000 (0x0206000A0000) Oct 2 20:18:18.918:
Se2 LCP: AuthProto CHAP (0x0305C22305) Oct 2 20:18:18.918: Se2 LCP: MagicNumber 0x57DA0D94
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(0x050657DA0D94) Oct 2 20:18:18.922: Se2 LCP: PFC (0x0702) Oct 2 20:18:18.926: Se2 LCP: ACFC
(0x0802) ! -- Negotiate Maximum Receive Reconstructed Unit (MRRU) ! -- MRRU is the maximum
packet size this end will reconstruct Oct 2 20:18:18.926: Se2 LCP: MRRU 1524 (0x110405F4) Oct 2
20:18:18.930: Se2 LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232) Oct 2 20:18:19.142: Se2
LCP: I CONFREQ [REQsent] id 30 len 39
Oct 2 20:18:19.146: Se2 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 2 20:18:19.146: Se2 LCP: AuthProto CHAP (0x0305C22305)
Oct 2 20:18:19.150: Se2 LCP: MagicNumber 0x0791992D (0x05060791992D)
Oct 2 20:18:19.154: Se2 LCP: PFC (0x0702)
Oct 2 20:18:19.154: Se2 LCP: ACFC (0x0802)
Oct 2 20:18:19.158: Se2 LCP: MRRU 1524 (0x110405F4)
Oct 2 20:18:19.162: Se2 LCP: EndpointDisc 1 Router1
(0x130A01526F7574657231)
Oct 2 20:18:19.166: Se2 LCP: O CONFACK [REQsent] id 30 len 39
Oct 2 20:18:19.170: Se2 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 2 20:18:19.174: Se2 LCP: AuthProto CHAP (0x0305C22305)
Oct 2 20:18:19.174: Se2 LCP: MagicNumber 0x0791992D (0x05060791992D)
Oct 2 20:18:19.178: Se2 LCP: PFC (0x0702)
Oct 2 20:18:19.178: Se2 LCP: ACFC (0x0802)
Oct 2 20:18:19.182: Se2 LCP: MRRU 1524 (0x110405F4)
Oct 2 20:18:19.186: Se2 LCP: EndpointDisc 1 Router1
(0x130A01526F7574657231)
Oct 2 20:18:19.194: Se2 LCP: I CONFACK [ACKsent] id 61 len 39
Oct 2 20:18:19.198: Se2 LCP: ACCM 0x000A0000 (0x0206000A0000)
Oct 2 20:18:19.198: Se2 LCP: AuthProto CHAP (0x0305C22305)
Oct 2 20:18:19.202: Se2 LCP: MagicNumber 0x57DA0D94 (0x050657DA0D94)
Oct 2 20:18:19.206: Se2 LCP: PFC (0x0702)
Oct 2 20:18:19.206: Se2 LCP: ACFC (0x0802)
Oct 2 20:18:19.210: Se2 LCP: MRRU 1524 (0x110405F4)
Oct 2 20:18:19.214: Se2 LCP: EndpointDisc 1 Router2
(0x130A01526F7574657232)
Oct 2 20:18:19.214: Se2 LCP: State is Open
Oct 2 20:18:19.218: Se2 PPP: Phase is AUTHENTICATING, by both [0 sess, 0 load]
Oct 2 20:18:19.222: Se2 CHAP: O CHALLENGE id 30 len 28 from "Router2"
Oct 2 20:18:19.358: Se2 CHAP: I CHALLENGE id 25 len 28 from "Router1"
Oct 2 20:18:19.362: Se2 CHAP: O RESPONSE id 25 len 28 from "Router2"
Oct 2 20:18:19.382: Se2 CHAP: I RESPONSE id 30 len 28 from "Router1"
Oct 2 20:18:19.390: Se2 CHAP: O SUCCESS id 30 len 4
Oct 2 20:18:19.482: Se2 CHAP: I SUCCESS id 25 len 4
Oct 2 20:18:19.486: Se2 MLP: Request add link to bundle
Oct 2 20:18:19.486: Se2 PPP: Phase is VIRTUALIZED [0 sess, 0 load]
!--- Virtualize Se2 !--- Virtual Access interface will represent the MP bundle Oct 2
20:18:19.490: Se2 MLP: Adding link to bundle
!--- Second multilink connection is virtualized and added to Virtual !--- access interface. Oct
2 20:18:19.494: Se2 IPCP: Route to 192.168.0.2 still needed by Vi1 Oct 2 20:18:19.498: DDR: MLP
bundle, 0 packets unqueued and discarded Oct 2 20:18:19.498: Vi1 MLP: Added link Se2 to bundle
Router1 Oct 2 20:18:20.482: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial2,
changed state to up

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## Comandos para Troubleshooting

A [Output Interpreter Tool \(somente clientes registrados\)](#) oferece suporte a determinados comandos show, o que permite exibir uma análise da saída do comando show.

**Note:** Antes de emitir comandos debug, consulte [Informações importantes sobre comandos debug](#).

- **debug ppp negotiation** - Para ver se um cliente está passando a negociação PPP; esse comando é usado para verificar a negociação de endereços.
- **debug ppp authentication** - Para ver se um cliente foi aprovado na autenticação. Se você

estiver usando uma release do software Cisco IOS anterior à 11.2, use o comando debug ppp chap.

- debug ppp error – Para exibir erros do protocolo e estatísticas de erros associados à negociação e operação da conexão PPP
- debug vtemplate – Para exibir a clonagem do molde virtual a fim de formar uma interface de acesso virtual.
- debug ppp multilink events - Para ver a depuração de eventos PPP multilink. Mostra informações sobre eventos que afetam grupos multilink.
- debug dialer – Para exibir as informações de depuração sobre os pacotes recebidos em uma interface de discador.
- **show caller** - Mostra estatísticas ou informações de depuração de conexões.
- show dialer – Exibe as informações gerais de diagnóstico para interfaces configuradas para DDR.
- **show caller user** - Mostra a lista de usuários e suas respectivas portas de modem.
- show ppp multilink – Para ver os membros do conjunto multilink.

## [Informações Relacionadas](#)

- [Configuração do NAS para Acesso de Discagem Básico](#)
- [Configurando hubs DDR anterior](#)
- [Informações sobre Estatísticas de Chamadas](#)
- [RFC 1717 do Multilink PPP do RFC 1717 do Multilink PPP](#)
- [Configurando o DDR ponto a ponto com perfis de discadores](#)
- [Páginas de suporte de tecnologia de acesso](#)
- [Suporte Técnico - Cisco Systems](#)