

Multilink PPP на двух последовательных асинхронных интерфейсах физического уровня

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Введение

В некоторых средах может быть необходимо связать множественные асинхронные каналы для действия как одно соединение с объединенной пропускной способностью. Этот документ описывает, как настроить Cisco Access Server 2500 для связывания двух интерфейсов asynchronous с помощью виртуального шаблона.

Эта конфигурация может использоваться для маршрутизаторов, связанных асинхронными линиями с внешними модемами или сетевыми модулями использования (встроенные модемы). You can add additional features to this configuration depending on your needs.

Предварительные условия

Требования

Для данного документа отсутствуют предварительные условия.

Используемые компоненты

Сведения в этом документе основаны на версиях оборудования и программного обеспечения, указанных ниже.

- Cisco 2511 и маршрутизаторы Cisco 2503 в лабораторной среде с очищенными конфигурациями.
- Программное обеспечение Cisco IOS Release 12.2 (10b) работает на обоих маршрутизаторах.
- Четыре внешних модема.

Сведения, содержащиеся в данном документе, были получены с устройств в специальной лабораторной среде. Все устройства, описанные в данном документе, были запущены с конфигурацией по умолчанию. При работе с реальной сетью необходимо полностью осознавать возможные результаты использования всех команд.

[Родственные продукты](#)

Эта конфигурация может использоваться с любыми двумя маршрутизаторами, что каждый имеет два последовательных интерфейса глобальной сети (WAN) и способен к настройке асинхронного интерфейса. WIC-1T, WIC-2A/S, 8 или 16 последовательных интерфейсов асинхронного порта могут использоваться.

[Условные обозначения](#)

[Дополнительные сведения об условных обозначениях см. в документе Технические рекомендации Cisco. Условные обозначения.](#)

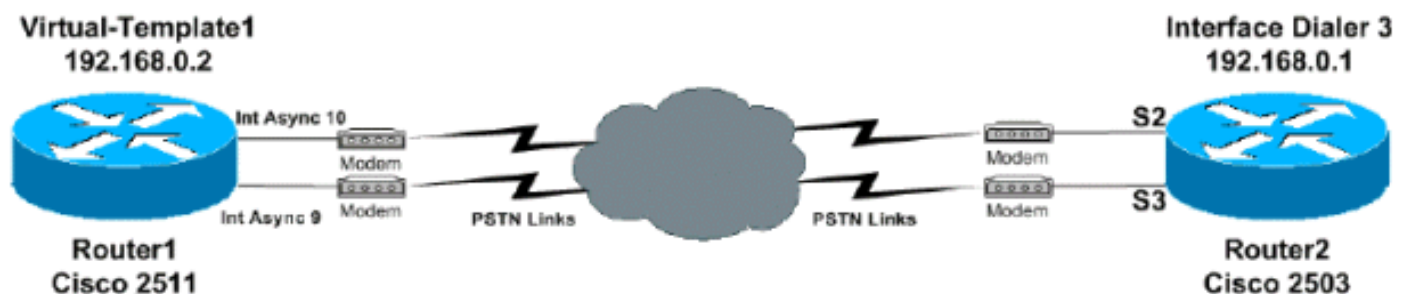
[Настройка](#)

В этом разделе содержатся сведения о настройке функций, описанных в этом документе.

Примечание: [Поиск дополнительной информации о командах в данном документе можно выполнить с помощью средства "Command Lookup" \(Поиск команд\) \(только для зарегистрированных клиентов\).](#)

[Схема сети](#)

В данном документе используется сетевая установка, показанная на следующей схеме.



[Конфигурации](#)

В данном документе используются следующие конфигурации.

Примечание: Эта конфигурация была протестирована с помощью Cisco IOS Software Release 12.2 (10b) на маршрутизаторах Cisco серии 2500. Одинаковая конфигурация

применяется к топологии аналогового маршрутизатора, выполняющей Cisco IOS Software Release, запускающиеся с Выпуска 11.0 (3).

Маршрутизатор 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-Templatel 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
```

Маршрутизатор 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 successfully 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

```

Для реализации этой конфигурации необходимо настроить придерживающиеся:

- Создайте номер многоканального виртуального шаблона на маршрутизаторе 1.
- Настройте **ppp multilink** под интерфейсами на обоих маршрутизаторах.
- Настройте аутентификацию под интерфейсами на обоих маршрутизаторах.

В то время как маршрутизатор 2 инициирует вызов и подключения к маршрутизатору 1, в конфигурации, используемой в этом документе, маршрутизатор 1 был настроен, чтобы

только получить вызовы. Оба маршрутизатора настроены для протокола PPP. Когда соединение подходит, основная связка создана, и оба асинхронных соединения связаны вместе под интерфейсом виртуального доступа.

Интерфейсы 9 и 10 на маршрутизаторе 1 только получают асинхронные вызовы. Это обычно для не наблюдения интерфейса 9 и 10, когда они - часть group-async 1. Обязательно создайте многоканальный виртуальный шаблон; иначе, возможно соединиться на первом канале, но не трафике прохода (IP Control Protocol закрытый [IPCP]). Без virtual-template и протокола PPP, эта конфигурация работала бы для одного асинхронного подключения, но не для обоих.

Интерфейсы 2 и 3 на маршрутизаторе 2 настроены с командой **physical-layer async** и примут команды протокола PPP. Эти интерфейсы будут автоматически демонтированы, когда они станут частью группы импульсного набора номера. Как только вы вводите команду **dialer rotary-group 3**, последовательная команда **ppp multilink** удалена из конфигурации. Используйте команду **ppp multilink** под interface dialer 3 вместо этого.

Проверка

В этом разделе содержатся сведения, которые помогают убедиться в надлежащей работе конфигурации.

Некоторые команды show поддерживаются Средством интерпретации выходных данных(только зарегистрированные клиенты), которое позволяет просматривать аналитику выходных данных команды 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) Serial3, since 00:35:10, last rcvd seq 0000C8 Serial2, since
00:32:29, last rcvd seq 0000C7 Router1#show caller Active Idle Line User Service Time 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 Active Idle Line User Service Time 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 Idle Session 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 Idle Session 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

```

Устранение неполадок

В этом разделе описывается процесс устранения неполадок конфигурации.

Следующие результаты были получены из Cisco 2511 и маршрутизаторов Cisco 2503. Они показывают набор номера Cisco 2503 ссылкой PSTN маршрутизатора Cisco 2511 и установлению соединения 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-Template1** *!--- 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: **Vil 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** 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: **Vil 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; 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: Vil PPP: Phase is DOWN, Setup [0 sess, 0 load] Oct 2
20:15:38.558: Vil PPP: No remote authentication for call-out Oct 2 20:15:38.566: Vil MLP: Added
to huntgroup Di3 Oct 2 20:15:38.570: Vil 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: Vil 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: Vil DDR: Dialer call has been placed Oct 2 20:15:38.586:
Vil PPP: Treating connection as a callout Oct 2 20:15:38.586: Vil PPP: Phase is ESTABLISHING,
Active Open [0 sess, 0 load] Oct 2 20:15:38.594: Vil LCP: O CONFREQ [Closed] id 1 len 29 Oct 2
20:15:38.594: Vil LCP: AuthProto CHAP (0x0305C22305) Oct 2 20:15:38.598: Vil LCP: MagicNumber
0x57D79B57 (0x050657D79B57) Oct 2 20:15:38.602: Vil LCP: MRRU 1524 (0x110405F4) Oct 2
20:15:38.606: Vil LCP: EndpointDisc 1 Router2 (0x130A01526F7574657232 Oct 2 20:15:38.614: Vil
PPP: Phase is UP [0 sess, 0 load] Oct 2 20:15:38.618: Vil IPCP: O CONFREQ [Closed] id 1 len 10
Oct 2 20:15:38.622: Vil IPCP: Address 192.168.0.1 (0x0306C0A80001) ! -- *First multilink
connection is brought up in the virtual access interface* Oct 2 20:15:38.626: **Vil 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: Vil IPCP: TIMEOUT: State REQsent Oct 2 20:15:40.618: Vil IPCP: O CONFREQ
[REQsent] id 2 len 10 Oct 2 20:15:40.618: Vil IPCP: Address 192.168.0.1 (0x0306C0A80001) Oct 2
20:15:41.046: Vil 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: Vil IPCP: I CONFREQ [REQsent] id 1 len 10 Oct 2 20:15:42.510: Vil IPCP: Address
192.168.0.2 (0x0306C0A80002) Oct 2 20:15:42.514: Vil IPCP: O CONFACK [REQsent] id 1 len 10 Oct 2
20:15:42.518: Vil IPCP: Address 192.168.0.2 (0x0306C0A80002) Oct 2 20:15:42.530: Vil IPCP: I
CONFACK [ACKsent] id 1 len 10 Oct 2 20:15:42.534: Vil IPCP: Address 192.168.0.1 (0x0306C0A80001)
Oct 2 20:15:42.538: Vil IPCP: ID 1 didn't match 2, discarding packet Oct 2 20:15:42.546: Vil
IPCP: I CONFACK [ACKsent] id 2 len 10 Oct 2 20:15:42.550: Vil IPCP: Address 192.168.0.1
(0x0306C0A80001) Oct 2 20:15:42.554: Vil IPCP: State is Open Oct 2 20:15:42.562: Vil DDR: dialer
protocol up Oct 2 20:15:42.570: Vil 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 (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

Команды для устранения неполадок

Некоторые команды show поддерживаются Средством интерпретации выходных данных(только зарегистрированные клиенты), которое позволяет просматривать аналитику выходных данных команды show.

Примечание: Прежде чем применять команды отладки, ознакомьтесь с разделом "Важные сведения о командах отладки".

- **debug ppp negotiation** - Чтобы видеть, передает ли клиент согласование PPP; этот commnad используется для проверки для согласования адреса.
- **debug ppp authentication** - Получение сведений о том, проходит ли клиент аутентификацию. При использовании Cisco IOS Software Release до 11.2 используйте

- команду debug ppp chap вместо этого.
- команда debug ppp error — Отображает ошибки протокола и статистику ошибок, связанную с работой и согласованием соединения PPP.
 - debug vtemplate – отобразить клонирование виртуального шаблона для формирования интерфейса виртуального доступа.
 - debug ppp multilink events – Для просмотра отладки событий PPP. Отображает информацию о событиях, влияющих на многоканальные группы.
 - "debug dialer" - показывает отладочную информацию о пакетах, полученных на интерфейс устройства набора номера.
 - show caller - Статистические данные Показов или отладочная информация для соединений.
 - "show dialer" – отображает общую диагностическую информацию для интерфейсов, настроенных для использования DDR.
 - show caller user - Список Показов которого пользователь использует который порт модема.
 - show ppp multilink - позволяет отобразить элементы многоканальной связки.

Дополнительные сведения

- [Настройка NAS для доступа базового соединения](#)
- [Настройка традиционных концентраторов DDR](#)
- [Отображение статистики вызывающей программы](#)
- [RFC Multilink PPP 1717 RFC Multilink PPP 1717](#)
- [Настройка конфигурации однорангового DDR с профилями программы для набора номера](#)
- [Страницы поддержки технологии доступа](#)
- [Техническая поддержка - Cisco Systems](#)