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## [简介](#)

多链路 PPP (MLP) 对拨号程序接口 (如 ISDN、同步和异步接口) 上的负载进行均衡。MLP 对数据包进行分割, 并通过并行电路发送各个片段。这样, MLP 可以提高吞吐量, 并减小系统间的延迟。MLP 提供了一种跨多个逻辑数据链路对数据报进行分割、重新组合和排序的方法。通过 MLP, 可对数据包进行分段, 并通过多个点对点链路同时将各个片段发送到同一远程地址。

本文档通过虚拟模板配置来说明串行接口之间的多链路连接。

## [先决条件](#)

### [要求](#)

本文档没有任何特定的要求。

### [使用的组件](#)

本文档中的信息基于以下软件和硬件版本：

- Cisco IOS® 软件版本 11.2 或更高版本。
- 两台 Cisco 2503 路由器, 每台路由器具有两个 WAN 串行接口。这些路由器运行 Cisco IOS 软件版本 12.2(7b)。

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始 (默认) 配置。如果您使用的是真实网络, 请确保您已经了解所有命令的潜在影响。

## 相关产品

此配置也可用于以下硬件和软件版本。

- 任何具有两个 WAN 串行接口的路由器。您可以使用 WIC-1T、WIC-2T 和固定 WAN 串行接口。

## 规则

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

## 配置

本部分提供有关如何配置本文档所述功能的信息。

**注意：** 有关本文档所用命令的详细信息，请使用 [命令查找工具](#) ( [仅限注册用户](#) )。

## 网络图

本文档使用以下网络设置：

Virtual-Template1 - 10.1.1.1

Virtual-Template1 - 192.168.10.2



路由器 Montecito 和 Goleta 将通过接口 Serial0 和 Serial1 进行背对背连接。此配置在每一侧均使用一个虚拟模板 (多链路点对点协议 (PPP))，并在路由器之间桥接和路由 IP 和 IPX。

## 配置

本文档使用以下配置：

- [Montecito](#)
- [Goleta](#)

### Montecito

```
Montecito#write terminal Building configuration...
Current configuration : 945 bytes ! version 12.2 service
timestamps debug uptime service timestamps log uptime no
service password-encryption ! hostname Montecito ! boot
system flash c2500-d-1.122-7b.bin no logging buffered !
ip subnet-zero no ip domain-lookup ! ! multilink
virtual-template 1 !--- Applies the virtual interface
template to the multilink bundle. !--- All multilink
calls have virtual-access interfaces cloned !--- from
```

```

virtual-template 1. ! ipx routing 0000.0c31.aac2 !
interface Loopback0 ip address 10.1.1.1 255.0.0.0 ipx
network BEEF ! interface Ethernet0 no ip address
shutdown ! ! !--- Virtual-template is a logical
interface that creates virtual access !--- interfaces
dynamically, and applies them to physical serial
interfaces. interface Virtual-Template1 !--- Assumes the
IP & IPX address of Loopback0. ip unnumbered Loopback0
ipx ppp-client Loopback0 ppp multilink !--- Enables
Multilink PPP on the interface. bridge-group 1 !
interface Serial0 no ip address encapsulation ppp no ip
route-cache no ip mroute-cache no fair-queue !---
Enables Multilink PPP on the interface. ppp multilink !
interface Serial1 no ip address encapsulation ppp no ip
route-cache no ip mroute-cache no fair-queue !---
Enables Multilink PPP on the interface. ppp multilink !
interface BRI0 no ip address shutdown ! no ip classless
! bridge 1 protocol ieee ! line con 0 line aux 0 line
vty 0 4 login ! end

```

## Goleta

```

Goleta#write terminal Building configuration... Current
configuration : 960 bytes version 12.2 service
timestamps debug uptime service timestamps log uptime no
service password-encryption ! hostname Goleta ! ! ip
subnet-zero no ip domain-lookup ! !--- Applies the
virtual interface template to the multilink bundle. !---
Skip this step for ISDN or dialer interfaces. multilink
virtual-template 1 ipx routing 0000.0c47.4e9a ! ! !
interface Loopback0 ip address 192.168.10.2
255.255.255.0 ipx network BEEF ! interface Ethernet0 no
ip address shutdown ! !--- Virtual-template is a logical
interface that Creates virtual access !--- interfaces
dynamically and applies them to physical serial
interfaces. interface Virtual-Template1 !--- Assumes the
IP & IPX address of Loopback0. ip unnumbered Loopback0
ipx ppp-client Loopback0 ! !--- Enables Multilink PPP on
the interface. ppp multilink bridge-group 1 ! interface
Serial0 no ip address encapsulation ppp no fair-queue
clockrate 1000000 ! !--- Enables Multilink PPP on the
interface. ppp multilink ! interface Serial1 no ip
address encapsulation ppp no fair-queue clockrate
1000000 ! !--- Enables Multilink PPP on the interface.
ppp multilink ! interface BRI0 no ip address shutdown !
ip classless ! bridge 1 protocol ieee ! line con 0 line
aux 0 line vty 0 4 ! end

```

## 验证

使用本部分可确认配置能否正常运行。

[命令输出解释程序 \(仅限注册用户\)](#) (OIT) 支持某些 **show** 命令。使用 OIT 可查看对 show 命令输出的分析。

- **show ppp multilink ?** 显示关于活跃的多链路捆绑的信息。使用此指令验证多链路连接。
- **show interface virtual-access ?** 显示状态、数据流数据和配置信息关于一个特定虚拟访问接口。
- **show interface serial ?** 使您排除故障与 serial interfaces 的所有问题

## show 输出示例

### 建立连接后 Montecito 上的 show 命令

```
Montecito#show interface virtual-access 1 Virtual-Access1 is up, line protocol is up Hardware
is Virtual Access interface Interface is unnumbered. Using address of Loopback0 (10.1.1.1) MTU
1500 bytes, BW 3088 Kbit, DLY 100000 usec, reliability 255/255, txload 1/255, rxload 1/255
Encapsulation PPP, loopback not set Keepalive set (10 sec) DTR is pulsed for 5 seconds on
reset LCP Open, multilink Open Open: BRIDGECP, IPCP, IPXCP Last input 00:00:00, output never,
output hang never Last clearing of "show interface" counters 00:02:09 Input queue: 0/75/0/0
(size/max/drops/flushes); Total output drops: 0 Queueing strategy: fifo Output queue :0/40
(size/max) 5 minute input rate 0 bits/sec, 0 packets/sec 5 minute output rate 0 bits/sec, 0
packets/sec 22 packets input, 743 bytes, 0 no buffer Received 0 broadcasts, 0 runts, 0
giants, 0 throttles 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort 8
packets output, 124 bytes, 0 underruns 0 output errors, 0 collisions, 0 interface resets
0 output buffer failures, 0 output buffers swapped out 0 carrier transitions
Montecito#show interface serial 0 Serial0 is up, line protocol is up Hardware is HD64570
MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec, reliability 255/255, txload 1/255, rxload 1/255
Encapsulation PPP, loopback not set Keepalive set (10 sec) LCP Open, multilink Open Last
input 00:00:00, output 00:00:06, output hang never Last clearing of "show interface" counters
02:04:30 Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0 Queueing
strategy: fifo Output queue :0/40 (size/max) 5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec 3320 packets input, 107170 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants, 0 throttles 0 input errors, 0 CRC, 0 frame, 0
overrun, 0 ignored, 0 abort 1483 packets output, 24622 bytes, 0 underruns 0 output errors, 0
collisions, 6 interface resets 0 output buffer failures, 0 output buffers swapped out 8
carrier transitions DCD=up DSR=up DTR=up RTS=up CTS=up Montecito#show interface serial 1
Serial1 is up, line protocol is up Hardware is HD64570 MTU 1500 bytes, BW 1544 Kbit, DLY
20000 usec, reliability 255/255, txload 1/255, rxload 1/255 Encapsulation PPP, loopback not
set Keepalive set (10 sec) LCP Open, multilink Open Last input 00:00:00, output 00:00:00,
output hang never Last clearing of "show interface" counters 02:04:32 Input queue: 0/75/0/0
(size/max/drops/flushes); Total output drops: 0 Queueing strategy: fifo Output queue :0/40
(size/max) 5 minute input rate 0 bits/sec, 0 packets/sec 5 minute output rate 0 bits/sec, 0
packets/sec 3320 packets input, 107161 bytes, 0 no buffer Received 0 broadcasts, 0 runts, 0
giants, 0 throttles 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort 1482
packets output, 24646 bytes, 0 underruns 0 output errors, 0 collisions, 6 interface resets 0
output buffer failures, 0 output buffers swapped out 8 carrier transitions DCD=up DSR=up
DTR=up RTS=up CTS=up Montecito#show ppp multilink Virtual-Access1, bundle name is Goleta
Bundle up for 00:01:39 0 lost fragments, 0 reordered, 0 unassigned 0 discarded, 0 lost
received, 1/255 load 0x3D received sequence, 0xB sent sequence Member links: 2 (max not set,
min not set) Serial1, since 00:01:40, last rcvd seq 00003C Serial0, since 00:01:39, last
rcvd seq 00003B Montecito#show bridge group Bridge Group 1 is running the IEEE compatible
Spanning Tree protocol Port 10 (Virtual-Access1) of bridge group 1 is forwarding Port 9
(Virtual-Template1) of bridge group 1 is down Montecito#
```

### 建立连接后 Goleta 上的 show 命令

```
Goleta#show interface virtual-access 1 Virtual-Access1 is up, line protocol is up Hardware
is Virtual Access interface Interface is unnumbered. Using address of Loopback0 (192.168.10.2)
MTU 1500 bytes, BW 3088 Kbit, DLY 100000 usec, reliability 255/255, txload 1/255, rxload 1/255
Encapsulation PPP, loopback not set Keepalive set (10 sec) DTR is pulsed for 5 seconds on
reset LCP Open, multilink Open Open: BRIDGECP, IPCP, IPXCP Last input 00:00:10, output
never, output hang never Last clearing of "show interface" counters 00:02:18 Input queue:
0/75/0/0 (size/max/drops/flushes); Total output drops: 0 Queueing strategy: fifo Output
queue :0/40 (size/max) 5 minute input rate 0 bits/sec, 0 packets/sec 5 minute output rate 0
bits/sec, 0 packets/sec 4 packets input, 52 bytes, 0 no buffer Received 0 broadcasts, 0
runts, 0 giants, 0 throttles 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
28 packets output, 892 bytes, 0 underruns 0 output errors, 0 collisions, 0 interface resets
0 output buffer failures, 0 output buffers swapped out 0 carrier transitions Goleta#show
interface serial 0 Serial0 is up, line protocol is up Hardware is HD64570 MTU 1500 bytes,
BW 1544 Kbit, DLY 20000 usec, reliability 255/255, txload 1/255, rxload 1/255 Encapsulation
PPP, loopback not set Keepalive set (10 sec) LCP Open, multilink Open Last input 01:52:28,
```

```
output 00:00:00, output hang never Last clearing of "show interface" counters 02:55:09 Input
queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0 Queueing strategy: fifo
Output queue :0/40 (size/max) 5 minute input rate 0 bits/sec, 0 packets/sec 5 minute output
rate 0 bits/sec, 0 packets/sec 2364 packets input, 41972 bytes, 0 no buffer Received 0
broadcasts, 0 runts, 0 giants, 0 throttles 0 input errors, 0 CRC, 0 frame, 0 overrun, 0
ignored, 0 abort 4465 packets output, 134689 bytes, 0 underruns 0 output errors, 0
collisions, 148 interface resets 0 output buffer failures, 0 output buffers swapped out 294
carrier transitions DCD=up DSR=up DTR=up RTS=up CTS=up Goleta#show interface serial 1
Serial1 is up, line protocol is up Hardware is HD64570 MTU 1500 bytes, BW 1544 Kbit, DLY
20000 usec, reliability 255/255, txload 1/255, rxload 1/255 Encapsulation PPP, loopback not
set Keepalive set (10 sec) LCP Open, multilink Open Last input 01:52:38, output 00:00:00,
output hang never Last clearing of "show interface" counters 02:55:18 Input queue: 0/75/0/0
(size/max/drops/flushes); Total output drops: 0 Queueing strategy: fifo Output queue :0/40
(size/max) 5 minute input rate 0 bits/sec, 0 packets/sec 5 minute output rate 0 bits/sec, 0
packets/sec 2366 packets input, 42030 bytes, 0 no buffer Received 0 broadcasts, 0 runts, 0
giants, 0 throttles 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort 4472
packets output, 134930 bytes, 0 underruns 0 output errors, 0 collisions, 147 interface resets
0 output buffer failures, 0 output buffers swapped out 289 carrier transitions DCD=up DSR=up
DTR=up RTS=up CTS=up Goleta#sh ppp multilink Virtual-Access1, bundle name is Montecito
Bundle up for 00:01:35 0 lost fragments, 0 reordered, 0 unassigned 0 discarded, 0 lost
received, 1/255 load 0xB received sequence, 0x3B sent sequence Member links: 2 (max not set,
min not set) Serial0, since 00:01:36, last rcvd seq 00000A Serial1, since 00:01:35, last
rcvd seq 000009 Goleta#show bridge group Bridge Group 1 is running the IEEE compatible
Spanning Tree protocol Port 10 (Virtual-Access1) of bridge group 1 is forwarding Port 9
(Virtual-Template1) of bridge group 1 is down
```

## 故障排除

使用本部分可排除配置故障。

## 故障排除资源

根据需要，可使用以下故障排除资源：

- [故障检修串联线问题](#)
- [HDLC 背对背连接](#)
- [对租用线路进行故障排除](#)

## 故障排除命令

[命令输出解释程序 \(仅限注册用户\)](#) (OIT) 支持某些 **show** 命令。使用 OIT 可查看对 **show** 命令输出的分析。

**注意：** 使用 **debug** 命令之前，请参阅[有关 Debug 命令的重要信息](#)。

- **debug ppp协商**？指示客户端是否通过PPP协商。还将检查地址协商。
- **debug ppp authentication**？指示客户端是否通过验证。如果您使用的是 Cisco IOS 软件版本 11.2 或更高版本，请使用此命令。
- **debug ppp chap**？指示客户端是否通过验证。如果您使用的是早于版本 11.2 的 Cisco IOS 软件版本，请使用此命令。
- **debug ppp error**？显示协议错误和错误统计信息关联与PPP连接协商和操作。
- **debug vtemplate**？使您发现使用什么虚拟模板配置。
- **debug vprofile**？使您发现什么配置选项应用对虚拟访问接口。

## 调试输出示例

下面是成功呼叫的一些调试输出。请注意**粗体**字体部分。您可比较一下自己获得的输出与下面所示

的结果：

## Montecito 上的 PPP 调试

```
Montecito#debug ppp negotiation      PPP protocol negotiation debugging is on      Montecito#
00:07:30: %LINK-3-UPDOWN: Interface Serial1, changed state to up      00:07:30: Se1 PPP: Treating
connection as a dedicated line      00:07:30: Se1 PPP: Phase is ESTABLISHING, Active Open [0
sess, 2 load]      00:07:30: Se1 LCP: O CONFREQ [Closed] id 4 len 26      00:07:30: Se1 LCP:
MagicNumber 0x6063D57E (0x05066063D57E)      00:07:30: Se1 LCP: MRRU 1524 (0x110405F4)
00:07:30: Se1 LCP: EndpointDisc 1 Montecito (0x130C014D6F6E74656369746F)      00:07:30: Se1
LCP: I CONFREQ [REQsent] id 101 len 23      00:07:30: Se1 LCP: MagicNumber 0x60944B81
(0x050660944B81)      00:07:30: Se1 LCP: MRRU 1524 (0x110405F4)      00:07:30: Se1 LCP:
EndpointDisc 1 Goleta (0x130901476F6C657461)      00:07:30: Se1 LCP: O CONFACK [REQsent] id 101
len 23      00:07:30: Se1 LCP: MagicNumber 0x60944B81 (0x050660944B81)      00:07:30: Se1 LCP:
MRRU 1524 (0x110405F4)      00:07:30: Se1 LCP: EndpointDisc 1 Goleta (0x130901476F6C657461)
00:07:30: Se1 LCP: I CONFACK [ACKsent] id 4 len 26      00:07:30: Se1 LCP: MagicNumber
0x6063D57E (0x05066063D57E)      00:07:30: Se1 LCP: MRRU 1524 (0x110405F4)      00:07:30: Se1
LCP: EndpointDisc 1 Montecito (0x130C014D6F6E74656369746F)      00:07:30: Se1 LCP: State is
Open      00:07:30: Se1 PPP: Phase is VIRTUALIZED [0 sess, 1 load]      00:07:31: Vi1 PPP: Phase
is DOWN, Setup [0 sess, 0 load]      00:07:31: Vi1 PPP: Phase is ESTABLISHING [0 sess, 0 load]
00:07:31: %LINK-3-UPDOWN: Interface Serial0, changed state to up      00:07:31: Se0 PPP: Treating
connection as a dedicated line      00:07:31: Se0 PPP: Phase is ESTABLISHING, Active Open [0
sess, 0 load]      00:07:31: Se0 LCP: O CONFREQ [Closed] id 4 len 26      00:07:31: Se0 LCP:
MagicNumber 0x6063D8DC (0x05066063D8DC)      00:07:31: Se0 LCP: MRRU 1524 (0x110405F4)
00:07:31: Se0 LCP: EndpointDisc 1 Montecito (0x130C014D6F6E74656369746F)      00:07:31: %LINK-
3-UPDOWN: Interface Virtual-Access1, changed state to up      00:07:31: Vi1 PPP: Treating
connection as a dedicated line      00:07:31: Vi1 LCP: O CONFREQ [Closed] id 1 len 26
00:07:31: Vi1 LCP: MagicNumber 0x6063D8F9 (0x05066063D8F9)      00:07:31: Vi1 LCP: MRRU
1524 (0x110405F4)      00:07:31: Vi1 LCP: EndpointDisc 1 Montecito
(0x130C014D6F6E74656369746F)      00:07:31: Vi1 PPP: Phase is UP [0 sess, 0 load]      00:07:31:
Vi1 BNCP: O CONFREQ [Closed] id 1 len 4      00:07:31: Vi1 IPCP: O CONFREQ [Closed] id 1 len 10
00:07:31: Vi1 IPCP: Address 10.1.1.1 (0x03060A010101)      00:07:31: Vi1 IPXCP: O CONFREQ
[Closed] id 1 len 18      00:07:31: Vi1 IPXCP: Network 0x0000BEEF (0x01060000BEEF)
00:07:31: Vi1 IPXCP: Node 0000.0c31.aac2 (0x020800000C31AAC2)      00:07:31: Vi1 MLP: Added
first link Se1 to bundle Goleta      00:07:31: Se0 LCP: I CONFREQ [REQsent] id 101 len 23
00:07:31: Se0 LCP: MagicNumber 0x60944EF7 (0x050660944EF7)      00:07:31: Se0 LCP: MRRU
1524 (0x110405F4)      00:07:31: Se0 LCP: EndpointDisc 1 Goleta (0x130901476F6C657461)
00:07:31: Se0 LCP: O CONFACK [REQsent] id 101 len 23      00:07:31: Se0 LCP: MagicNumber
0x60944EF7 (0x050660944EF7)      00:07:31: Se0 LCP: MRRU 1524 (0x110405F4)      00:07:31: Se0
LCP: EndpointDisc 1 Goleta (0x130901476F6C657461)      00:07:31: Se1 BNCP: MLP bundle
interface is built, process packets now      00:07:31: Se1 BNCP: Redirect packet to Vi1
00:07:31: Vi1 BNCP: I CONFREQ [REQsent] id 1 len 4      00:07:31: Vi1 BNCP: O CONFACK [REQsent]
id 1 len 4      00:07:31: Vi1 IPCP: I CONFREQ [REQsent] id 1 len 10      00:07:31: Vi1 IPCP:
Address 192.168.10.2 (0x0306C0A80A02)      00:07:31: Vi1 IPCP: O CONFACK [REQsent] id 1 len 10
00:07:31: Vi1 IPCP: Address 192.168.10.2 (0x0306C0A80A02)      00:07:31: Vi1 IPXCP: I CONFREQ
[REQsent] id 1 len 18      00:07:31: Vi1 IPXCP: Network 0x0000BEEF (0x01060000BEEF)
00:07:31: Vi1 IPXCP: Node 0000.0c47.4e9a (0x020800000C474E9A)      00:07:31: Vi1 IPXCP: O
CONFACK [REQsent] id 1 len 18      00:07:31: Vi1 IPXCP: Network 0x0000BEEF (0x01060000BEEF)
00:07:31: Vi1 IPXCP: Node 0000.0c47.4e9a (0x020800000C474E9A)      00:07:31: %LINEPROTO-5-
UPDOWN: Line protocol on Interface Serial1, changed state to up      00:07:31: Se0 LCP: I
CONFACK [ACKsent] id 4 len 26      00:07:31: Se0 LCP: MagicNumber 0x6063D8DC (0x05066063D8DC)
00:07:31: Se0 LCP: MRRU 1524 (0x110405F4)      00:07:31: Se0 LCP: EndpointDisc 1 Montecito
(0x130C014D6F6E74656369746F)      00:07:31: Se0 LCP: State is Open      00:07:31: Se0 PPP: Phase
is VIRTUALIZED [0 sess, 2 load]      00:07:31: Vi1 MLP: Added link Se0 to bundle Goleta
00:07:31: Vi1 BNCP: I CONFACK [ACKsent] id 1 len 4      00:07:31: Vi1 BNCP: State is Open
00:07:31: Vi1 IPCP: I CONFACK [ACKsent] id 1 len 10      00:07:31: Vi1 IPCP: Address 10.1.1.1
(0x03060A010101)      00:07:31: Vi1 IPCP: State is Open      00:07:31: Vi1 IPXCP: I CONFACK
[ACKsent] id 1 len 18      00:07:31: Vi1 IPXCP: Network 0x0000BEEF (0x01060000BEEF)
00:07:31: Vi1 IPXCP: Node 0000.0c31.aac2 (0x020800000C31AAC2)      00:07:31: Vi1 IPXCP: State
is Open      00:07:31: Vi1 IPCP: Install route to 192.168.10.2      00:07:32: %LINEPROTO-5-
UPDOWN: Line protocol on Interface Virtual-Access1, changed state to up      00:07:32: %LINEPROTO-5-
UPDOWN: Line protocol on Interface Serial0, changed state to up      Montecito#
```



```
Montecito#ping 192.168.10.2    Type escape sequence to abort.    Sending 5, 100-byte ICMP
Echos to 192.168.10.2, timeout is 2 seconds:    !!!!!    Success rate is 100 percent (5/5),
round-trip min/avg/max = 8/9/12 ms    Montecito#ping ipx    Target IPX address:
BEEF.0000.0c47.4e9a    Repeat count [5]:    Datagram size [100]:    Timeout in seconds [2]:
Verbose [n]:    Type escape sequence to abort.    Sending 5, 100-byte IPX Novell Echoes to
BEEF.0000.0c47.4e9a,    timeout is 2 seconds:    !!!!!    Success rate is 100 percent (5/5), round-
trip min/avg/max = 8/10/12 ms    Montecito#
```

## Goleta 上的 PPP 调试

```
Goleta#debug ppp negotiation    PPP protocol negotiation debugging is on    Goleta#    01:00:26:
Se0 PPP: Treating connection as a dedicated line    01:00:26: Se0 PPP: Phase is ESTABLISHING,
Active Open [0 sess, 0 load]    01:00:26: Se0 LCP: O CONFREQ [Closed] id 101 len 23    01:00:26:
Se0 LCP: MagicNumber 0x60944B81 (0x050660944B81)    01:00:26: Se0 LCP: MRRU 1524 (0x110405F4)
01:00:26: Se0 LCP: EndpointDisc 1 Goleta (0x130901476F6C657461)    01:00:26: Se0 LCP: I CONFREQ
[REQsent] id 4 len 26    01:00:26: Se0 LCP: MagicNumber 0x6063D57E (0x05066063D57E)    01:00:26:
Se0 LCP: MRRU 1524 (0x110405F4)    01:00:26: Se0 LCP: EndpointDisc 1 Montecito
(0x130C014D6F6E74656369746F)    01:00:26: Se0 LCP: O CONFACK [REQsent] id 4 len 26    01:00:26:
Se0 LCP: MagicNumber 0x6063D57E (0x05066063D57E)    01:00:26: Se0 LCP: MRRU 1524 (0x110405F4)
01:00:26: Se0 LCP: EndpointDisc 1 Montecito (0x130C014D6F6E74656369746F)    01:00:26: Se0 LCP: I
CONFACK [ACKsent] id 101 len 23    01:00:26: Se0 LCP: MagicNumber 0x60944B81 (0x050660944B81)
01:00:26: Se0 LCP: MRRU 1524 (0x110405F4)    01:00:26: Se0 LCP: EndpointDisc 1 Goleta
(0x130901476F6C657461)    01:00:26: Se0 LCP: State is Open    01:00:26: Se0 PPP: Phase is
VIRTUALIZED [0 sess, 0 load]    01:00:26: Vi1 PPP: Phase is DOWN, Setup [0 sess, 0 load]
01:00:26: Vi1 PPP: Phase is ESTABLISHING [0 sess, 0 load]    01:00:27: %LINK-3-UPDOWN: Interface
Serial1, changed state to up    01:00:27: Se1 PPP: Treating connection as a dedicated line
01:00:27: Se1 PPP: Phase is ESTABLISHING, Active Open [0 sess, 0 load]    01:00:27: Se1 LCP: O
CONFREQ [Closed] id 101 len 23    01:00:27: Se1 LCP: MagicNumber 0x60944EF7 (0x050660944EF7)
01:00:27: Se1 LCP: MRRU 1524 (0x110405F4)    01:00:27: Se1 LCP: EndpointDisc 1 Goleta
(0x130901476F6C657461)    01:00:27: %LINK-3-UPDOWN: Interface Virtual-Access1, changed state to
up    01:00:27: Vi1 PPP: Treating connection as a dedicated line    01:00:27: Vi1 LCP: O CONFREQ
[Closed] id 1 len 23    01:00:27: Vi1 LCP: MagicNumber 0x60944F10 (0x050660944F10)    01:00:27:
Vi1 LCP: MRRU 1524 (0x110405F4)    01:00:27: Vi1 LCP: EndpointDisc 1 Goleta
(0x130901476F6C657461)    01:00:27: Vi1 PPP: Phase is UP [0 sess, 0 load]    01:00:27: Vi1 BNCP: O
CONFREQ [Closed] id 1 len 4    01:00:27: Vi1 IPCP: O CONFREQ [Closed] id 1 len 10    01:00:27: Vi1
IPCP: Address 192.168.10.2 (0x0306C0A80A02)    01:00:27: Vi1 IPXCP: O CONFREQ [Closed] id 1 len
18    01:00:27: Vi1 IPXCP: Network 0x0000BEEF (0x01060000BEEF)    01:00:27: Vi1 IPXCP: Node
0000.0c47.4e9a (0x020800000C474E9A)    01:00:27: Vi1 MLP: Added first link Se0 to bundle
Montecito    01:00:27: Se1 LCP: I CONFREQ [REQsent] id 4 len 26    01:00:27: Se1 LCP: MagicNumber
0x6063D8DC (0x05066063D8DC)    01:00:27: Se1 LCP: MRRU 1524 (0x110405F4)    01:00:27: Se1 LCP:
EndpointDisc 1 Montecito (0x130C014D6F6E74656369746F)    01:00:27: Se1 LCP: O CONFACK [REQsent]
id 4 len 26    01:00:27: Se1 LCP: MagicNumber 0x6063D8DC (0x05066063D8DC)    01:00:27: Se1 LCP:
MRRU 1524 (0x110405F4)    01:00:27: Se1 LCP: EndpointDisc 1 Montecito
(0x130C014D6F6E74656369746F)    01:00:27: Se0 BNCP: MLP bundle interface is built, process
packets now    01:00:27: Se0 BNCP: Redirect packet to Vi1    01:00:27: Vi1 BNCP: I CONFREQ
[REQsent] id 1 len 4    01:00:27: Vi1 BNCP: O CONFACK [REQsent] id 1 len 4    01:00:27: Se0 IPCP:
MLP bundle interface is built, process packets now    01:00:27: Se0 IPCP: Redirect packet to Vi1
01:00:27: Vi1 IPCP: I CONFREQ [REQsent] id 1 len 10    01:00:27: Vi1 IPCP: Address 10.1.1.1
(0x03060A010101)    01:00:27: Vi1 IPCP: O CONFACK [REQsent] id 1 len 10    01:00:27: Vi1 IPCP:
Address 10.1.1.1 (0x03060A010101)    01:00:27: Se0 IPXCP: MLP bundle interface is built, process
packets now    01:00:27: Se0 IPXCP: Redirect packet to Vi1    01:00:27: Vi1 IPXCP: I CONFREQ
[REQsent] id 1 len 18    01:00:27: Vi1 IPXCP: Network 0x0000BEEF (0x01060000BEEF)    01:00:27: Vi1
IPXCP: Node 0000.0c31.aac2 (0x020800000C31AAC2)    01:00:27: Vi1 IPXCP: O CONFACK [REQsent] id 1
len 18    01:00:27: Vi1 IPXCP: Network 0x0000BEEF (0x01060000BEEF)    01:00:27: Vi1 IPXCP: Node
0000.0c31.aac2 (0x020800000C31AAC2)    01:00:27: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Serial0,    changed state to up    01:00:27: Se1 LCP: I CONFACK [ACKsent] id 101 len 23
01:00:27: Se1 LCP: MagicNumber 0x60944EF7 (0x050660944EF7)    01:00:27: Se1 LCP: MRRU 1524
(0x110405F4)    01:00:27: Se1 LCP: EndpointDisc 1 Goleta (0x130901476F6C657461)    01:00:27: Se1
LCP: State is Open    01:00:27: Se1 PPP: Phase is VIRTUALIZED [0 sess, 4 load]    01:00:27: Vi1
BNCP: I CONFACK [ACKsent] id 1 len 4    01:00:27: Vi1 BNCP: State is Open    01:00:27: Vi1 MLP:
Added link Se1 to bundle Montecito    01:00:27: Vi1 IPCP: I CONFACK [ACKsent] id 1 len 10
01:00:27: Vi1 IPCP: Address 192.168.10.2 (0x0306C0A80A02)    01:00:27: Vi1 IPCP: State is Open
01:00:27: Vi1 IPXCP: I CONFACK [ACKsent] id 1 len 18    01:00:27: Vi1 IPXCP: Network 0x0000BEEF
(0x01060000BEEF)    01:00:27: Vi1 IPXCP: Node 0000.0c47.4e9a (0x020800000C474E9A)    01:00:27: Vi1
```

```
IPXCP: State is Open 01:00:27: Vif IPCP: Install route to 10.1.1.1 01:00:28: %LINEPROTO-5-
UPDOWN: Line protocol on Interface Virtual-Access1, changed state to up 01:00:28:
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial1, changed state to up Goleta#
Goleta#ping 10.1.1.1 Type escape sequence to abort. Sending 5, 100-byte ICMP Echos to
10.1.1.1, timeout is 2 seconds: !!!!! Success rate is 100 percent (5/5), round-trip
min/avg/max = 8/10/12 ms Goleta#ping ipx Target IPX address: BEEF.0000.0c31.aac2 Repeat
count [5]: Datagram size [100]: Timeout in seconds [2]: Verbose [n]: Type escape
sequence to abort. Sending 5, 100-byte IPX Novell Echoes to BEEF.0000.0c31.aac2, timeout is
2 seconds: !!!!! Success rate is 100 percent (5/5), round-trip min/avg/max = 8/10/12 ms
```

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