路由器到路由器异步多链路 PPP

目录

简介

本配置描述的是带内置8端口模拟调制解调器卡（NM-8AM）的远端Cisco 3640拨入带主速率接口（PRI）的Cisco AS5300。 该配置描述了由远程站点两条模拟电话线路组成的多链路连接。如果有更多的电话线路，则可为该MP配置更多电话线路。

先决条件

要求

本文档没有任何特定的前提条件。

使用的组件

本文档中的信息基于以下软件和硬件版本。

- 运行Cisco IOS软件版本12.1(3)的Cisco 3640
- 运行Cisco IOS软件版本12.07(T)的Cisco AS5300

注意：MP最初是在Cisco IOS软件版本11.0(3)中引入的。

本文档中的信息都是基于特定实验室环境中的设备创建的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您是在真实网络上操作，请确保您在使用任何命令前已经了解其潜在影响。

规则

有关文档规则的详细信息，请参阅 Cisco 技术提示规则。

背景理论

多链路PPP（MP）允许设备通过实施虚拟连接，从多个点到点的数据链路向同一目的地发送数据。MP连接所需最大带宽等于各链路成员的带宽总和。MP可以在多路复用链路（例如ISDN与帧中继）上配置，也可以在多个异步链路上配置。有关MP的详细信 息，请参阅RFC 1990。

注意：RFC 1990将多链路PPP称为MP。MP的其它已知名称包括MPPP、MLP以及多链路。

异步MP可用于连接远端客户端，其速率比经由单个模拟连接的最高速率要高很多。在异步MP中，远端客户机使用多个调制解调器（因此需要多条电话线）来拨入中央路由器，然后接入网络。因为多条电话线的费用通常比ISDN基本速率接口(BRI)服务费用低廉，异步MP能在控制成本的同时为远程用户提供增加连接速度的有效方式。对于无法得到ISDN服务的远程地区，异步MP也是一个获得更高接入速率的有效途径。

异步MP将数个单独的调制解调器连接捆绑到一个接入服务器。每个对端的PPP软件将数据包进行分段并通过多个模拟连接将分段的数据包发送到另一侧。接收端从各个独立的连接集中这些分段的数据包，并根据它们所嵌入的MP信息重新组合为具有有效数据包，以此来提供一个高带宽的端到端虚拟链路。异步MP可以在两台路由器之间进行配置，也可以在路由器和客户端PC之间进行配置。
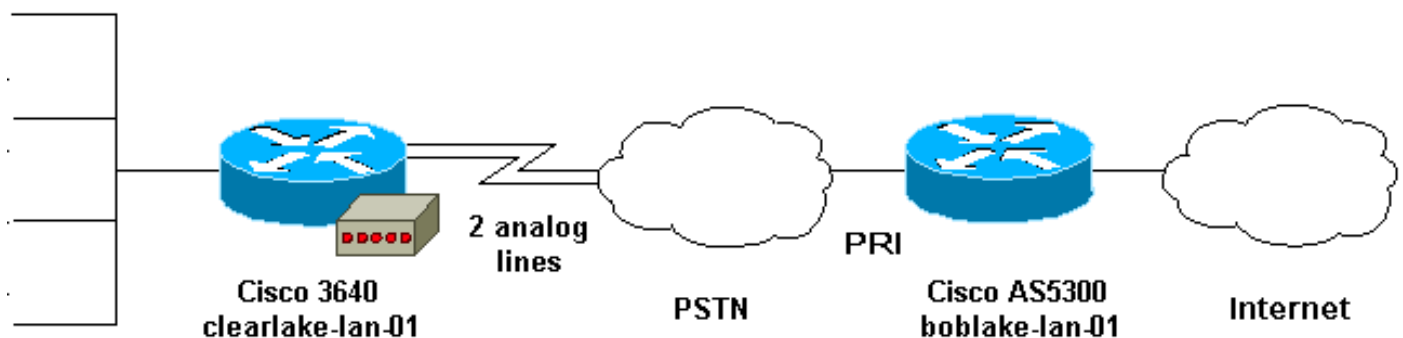
配置

本部分提供有关如何配置本文档所述功能的信息。

注意：要查找有关本文档中使用的命令的其他信息，请使用命令查找工具

网络图

本文档使用下图所示的网络设置。

配置

本文档使用如下所示的配置。

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

Cisco 3640

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

Current configuration:
!
version 12.1
service timestamps debug datetime msec localtime show-
timezone
service timestamps log datetime msec localtime show-
timezone
!
hostname clearlake-lan-01
!
aaa new-model
aaa authentication login default local
aaa authentication ppp default if-needed local
!
username bobslake-nas-01 password <deleted>
 !--- Remote router and password for CHAP
authentication. !--- Dialer interface must also be
configured to use !--- this username and password.
username admin privilege 15 password <deleted> ! no ip
domain-lookup ! chat-script async-mppp ABORT ERROR ABORT
BUSY "" "ATZ" OK "ATDT \T" TIMEOUT 30 CONNECT \c !---
Chat script used for dialing out. ! interface Loopback0
ip address 172.21.126.254 255.255.255.0 ! interface
Ethernet0/0 ip address 172.21.125.1 255.255.255.0 !
interface Group-Async1 !--- Interface to configure
modems used for dialout. no ip address encapsulation ppp
!--- Use PPP encapsulation for members of this !---
group-async interface. dialer in-band !--- Permit DDR on
this interface. dialer pool-member 10 !--- All members
of this group-async interface belong !--- to dialer pool
10. ppp multilink !--- Enable PPP multilink on physical
interface. group-range 33 34 !--- Assign async 33 and 34
to this group-async interface. !--- This can be adjusted
depending on the number of POTS lines available. !
interface Dialer1 !--- Dialer interface to dialout to
bobslake-nas-01. ip address negotiated !--- Obtain an IP
address from central site. encapsulation ppp dialer
remote-name bobslake-nas-01 !--- Identify central site
router for CHAP authentication. !--- Shared secret
password is defined above. dialer pool 10 !--- Defines
the pool of physical resources that the Dialer !---
interface may use. dialer idle-timeout 600 !---
Specifies number of seconds without interesting traffic
that !--- the connection is kept up. dialer string
5551212 !--- Number to be dialed; this number belongs to
the PRI !--- of the central router. dialer load-
threshold 15 either !--- Load level for either inbound
or outbound traffic !--- at which additional lines will
be added to the MP bundle. !--- Load level values range
from 1 (unloaded) to 255 (fully loaded). dialer-group 8
!--- Uses dialer-list 8 to determine interesting
traffic. ppp authentication chap callin !--- Use CHAP
authentication for incoming calls only !--- This router
will not challenge remote routers for outgoing calls.
```

```
ppp multilink !--- Activates the interface for MP
operation. ppp timeout multilink link remove 300 !---
Keeps the multilink connections up for 300 seconds !---
after the load drops below the threshold. !--- This
command should be used to control flapping. ! ip
classless ip route 0.0.0.0 0.0.0.0 Dialer1 !--- Use
Interface Dialer1 for all networks. no ip http server !
access-list 188 remark define interesting traffic
access-list 188 deny udp any any eq ntp access-list 188
permit ip any any dialer-list 8 protocol ip list 188 !--
- Assign access-list 188 to dialer-list 8. ! line con 0
transport input none line 33 34 !--- Async lines to be
used for dialout. !--- This number should match the
group-range in the !--- Group-Async interface. script
dialer async-mppp !--- Use chat script called async-mppp
for dialout. modem InOut modem autoconfigure discovery
transport preferred none transport input all line 35 40
transport preferred none transport input all line aux 0
line vty 0 4 ! ntp clock-period 17179871 ntp server
172.22.255.1 prefer end
```

Cisco AS5300

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

Building configuration...

Current configuration:

version 12.0
service timestamps debug datetime msec localtime show-
timezone
service timestamps log datetime msec localtime show-
timezone
service password-encryption
service tcp-small-servers
!
hostname bobslake-nas-01
!
logging buffered 10000 debugging
aaa new-model
aaa authentication login default local
aaa authentication ppp default if-needed local
!--- Authenticate for PPP if not authenticated during
login. !--- Allows users with Terminal Window after Dial
to initiate PPP. ! username clearlake-lan-01 password
<deleted> !--- Remote router and password for Challenge
Handshake !--- Authentication Protocol (CHAP)
authentication. !--- The password must be identical on
both sides. spe 1/0 1/7 firmware location
system:/ucode/mica_port_firmware ! resource-pool disable
! ip subnet-zero ! multilink virtual-template 1 !--- Use
virtual-template 1 for multilink connections. isdn
switch-type primary-5ess isdn voice-call-failure 0 !
controller T1 0 framing esf clock source line primary
linecode b8zs pri-group timeslots 1-24 ! interface
Loopback0 ip address 172.21.10.10 255.255.255.255 no ip
directed-broadcast ! interface Loopback1 ip address
172.21.104.254 255.255.255.0 !--- Summarizes addresses
in address pool. !--- Loopback 1 is in the same subnet
as the address pool. no ip directed-broadcast !
interface Virtual-Template1 description Template for
Multilink Users ip unnumbered Loopback0 no ip directed-
```

```
broadcast peer default ip address pool addr-pool !---
Use IP pool called addr-pool for incoming calls. ppp
authentication chap !--- Authenticate using CHAP. ppp
multilink !--- Allow multilink sessions. ! !---
Configure D channel on PRI. interface Serial0:23
description Headquarters 555-1212 active PRI line no ip
address no ip directed-broadcast isdn switch-type
primary-5ess isdn incoming-voice mode fair-queue 64 256
0 no cdp enable ! interface FastEthernet0 ip address
172.21.101.23 255.255.255.0 no ip directed-broadcast
duplex auto speed auto ! interface Group-Async1 ip
unnumbered Loopback0 no ip directed-broadcast
encapsulation ppp dialer in-band dialer idle-timeout 600
either !--- Specifies number of seconds without
interesting !--- traffic that the connection is kept up.
!--- Configure the same idle-timeout on both routers.
dialer map ip 172.21.125.1 name clearlake-nas-01 dialer-
group 5 !--- Uses dialer-list 5 to determine interesting
traffic. async mode interactive peer default ip address
pool addr-pool !--- Use IP pool called addr-pool for
incoming calls. ppp authentication chap callin !---
Issue CHAP challenges for dialin users only. ppp
multilink group-range 1 48 !--- Assign modems 1-48 to
the Group-Async 1 configuration template. ! router eigrp
1 passive-interface Group-Async1 !--- To prevent routing
traffic on async lines. network 172.21.0.0 ! ip local
pool addr-pool 172.21.104.1 172.21.104.48 !--- Define IP
address pool range for dialin clients. ip classless no
ip http server ! access-list 105 permit ip any any !---
Define interesting traffic. dialer-list 5 protocol ip
list 105 !--- Assign access list 105 to dialer list 5. !
line con 0 transport input none line 1 48 autoselect
during-login !--- Permits user login prompts after
dialin. autoselect ppp !--- Automatically launches PPP
on the line. modem InOut !--- Modems can be used to
dialin and dialout. transport preferred none transport
output telnet line aux 0 line vty 0 4 ! ntp clock-period
17180374 ntp update-calendar ntp server 172.22.255.1
prefer end
```

调整和可选命令

下面的命令可用于调节MP连接的行为。对此类参数的精细调节将能通过避免对数据链路进行不经济与不必要的使用，而有助于控制成本。

- dialer load-threshold load[outbound |入站 |或]可以配置MP以使建立主要信道之后立即产生附加信道。要建立这种情况，请将拨号器load - threshold load命令中的负载阈值设定为1。此时产生附加信道，并保持状态（也就是说，它们不会摆动）。 如果负载阈值设定为其它值，多信道可能会根据连接上的负载发生翻转。如果要根据需要添加附加信道，请根据流量将负载阈值设置为介于1和255之间的适当值。例如，要使附加信道达到50%，应将阈值设置为128(0.50*255)。判断阈值时，必须对异步呼叫的建立时间进行考虑，因为过长的建立时间可能会使低限阈值成为可能。负载的计算可以根据接口的出口、入口流量进行，或者根据接口上入口与出口之中有较高业务量的情况进行。如果负载基于**入站**或**两者**，请确保中心站点已配置passive-interface Group-Async1，以使来自核心的路由更新不会通过异步线路发送。通过阻止路由流量在链路上的传输，可以为链路上的其它数据提供更多带宽。
- ppp timeout multilink link remove seconds本命令可以用于防止多链路连接在负载发生变化时产生倒换。例如，当负载阈值设定为15时（亦即15/255＝6%），且流量超过阈值，将产生附加

线路。当流量低于阈值时，附加线路取消。在数据速率变化剧烈的情况中，多信道停留一段特定的时间则比较有益，即使负载阈值低于指定值。指定多链路超时低于控制所有链路超时的拨号程序空闲超时。

- **ppp timeout multilink link add seconds**直到高数据流按照指定的时间间隔接收，此命令均可用于防止多条链路添加到MP套件。这样可以防止突发 数据流引发额外的线路。

验证

本部分所提供的信息可用于确认您的配置是否正常工作。

输出解释器工具支持某些 show 命令（只限于注册用户），通过它可以查看 show 命令输出的分析。

- **show ppp multilink - 显示处于启用状态下的多链路捆绑的信息。**应使用本命令来检查多链路连接。
- **show caller - 显示NAS上的个人用户以及所消耗的资源的信息。**本命令显示大量连接池中的的Active的呼叫统计信息，并显示各用户的绝对时间以及空闲时间。如果您的Cisco IOS版本不支持本命令，请使用show user命令。
- **show caller user - 显示特定用户（例如使用TTY线路的用户）的参数、异步接口（机架/插槽/端口）、DS0信道编号、调制解调器编号、所分配的IP地址、PPP与PPP捆绑参数等等。**如果您的Cisco IOS版本不支持本命令，请使用show user命令。

show 输出示例

以下show命令输出来自正在拨入AS5300的Cisco 3640。它显示多链路连接已打开

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


As33 - dialer type = IN-BAND ASYNC NO-PARITY
Dialer pool 10, priority 0
!--- Member of dialer pool 10. Idle timer (120 secs), Fast idle timer (20 secs) Wait for carrier
(30 secs), Re-enable (15 secs) Dialer state is multilink member Dial reason: Multilink bundle
overloaded
!--- Interface was not the first link in the MP bundle. Interface bound to profile Di1 Current
call connected 00:00:54 !--- Current call duration Connected to <deleted>5551212 (bobslake-nas-
01) !--- Phone number that was dialed. As34 - dialer type = IN-BAND ASYNC NO-PARITY
Dialer pool 10, priority 0
!--- Member of dialer pool 10. Idle timer (600 secs), Fast idle timer (20 secs) Wait for carrier
(30 secs), Re-enable (15 secs) Dialer state is multilink member Dial reason: ip (s=172.21.125.1,
d=172.21.104.254) !--- Interface was the first link in the bundle, triggered by !--- interesting
traffic. Interface bound to profile Di1 Current call connected 00:00:54 !--- Current Call
duration. Connected to 5551212 <deleted> (bobslake-nas-01) !--- Phone number that was dialed.
Gr1 - dialer type = IN-BAND ASYNC NO-PARITY Idle timer (120 secs), Fast idle timer (20 secs)
Wait for carrier (30 secs), Re-enable (15 secs) Dialer state is idle Dial String Successes
Failures Last DNIS Last status Di1 - dialer type = DIALER PROFILE Load threshold for dialing
additional calls is 15 !--- Load threshold. Idle timer (600 secs), Fast idle timer (20 secs)
```

```
Wait for carrier (30 secs), Re-enable (15 secs) Dialer state is data link layer up Number of
active calls = 2 Dial String Successes Failures Last DNIS Last status 15 0 00:00:56 successful
Default clearlake-lan-01#show caller
                                           Active    Idle
  Line          User            Service    Time      Time
  con 0         tarpon          TTY        00:09:11  00:00:00
  tty 33        -               Async      -         00:00:01
  TTY 34        -               Async      -         00:00:06
  As33          bobslake-nas-01 PPP        00:00:24  00:00:00
```
!--- Second connection. **As34**   bobslake-nas-01   PPP   00:01:05 00:00:00
!--- First connection. **Vi1**   bobslake-nas-01   PPP Bundle 00:01:05 00:01:04
!--- MP bundle !--- bobslake-nas-01 has two async lines, two TTY, and one virtual !--- interface
bundle. clearlake-lan-01#**show caller user bobslake-nas-01**

  User: bobslake-nas-01, line As33, service PPP
!--- PPP setting for bobslake-nas-01. Active time 00:00:34, Idle time 00:00:00 Timeouts:
Absolute Idle Limits: - - Disconnect in: - - PPP: LCP Open, **multilink Open**, CHAP (-> AAA)
 !--- Multilink is up. Dialer: Connected 00:01:09 to <deleted>, outbound !--- Dialer interface
was used to dialout. Type is IN-BAND ASYNC, group Dialer1 **Cause: Multilink bundle overloaded**
!--- This interface was not the first member of the MP bundle. IP: Local 172.21.104.48/32
Bundle: Member of bobslake-nas-01, last input 00:00:00 Counts: 59 packets input, 3529 bytes, 0
no buffer 0 input errors, 22 CRC, 0 frame, 0 overrun 31 packets output, 1515 bytes, 0 underruns
0 output errors, 0 collisions, 4 interface resets !--- Packets are passing through the
connection. **User: bobslake-nas-01, line As34, service PPP**
!--- PPP setting for user bobslake-nas-01. Active time 00:01:15, Idle time 00:00:00 Timeouts:
Absolute Idle Limits: - - Disconnect in: - - PPP: LCP Open, **multilink Open**, CHAP (-> AAA)
 !--- MP state is open. Dialer: Connected 00:01:10 to <deleted>, outbound Type is IN-BAND ASYNC,
group Dialer1 **Cause: ip (s=172.21.125.1, d=172.21.104.254)**
!--- Dialing cause was interesting traffic; this was the !--- first link in the bundle. IP:
Local 172.21.104.48/32 Bundle: Member of bobslake-nas-01, last input 00:00:00 Counts: 172
packets input, 20699 bytes, 0 no buffer 0 input errors, 81 CRC, 0 frame, 0 overrun 80 packets
output, 14347 bytes, 0 underruns 0 output errors, 0 collisions, 6 interface resets !--- Packets
are passing through the connection. **User: bobslake-nas-01, line Vi1, service PPP Bundle**
!--- Bundle information for user bobslake-nas-01. Active time 00:01:16, Idle time 00:01:15
Timeouts: Absolute Idle Limits: - 00:10:00 Disconnect in: - 00:08:44 !--- Idle-timeout is 600
seconds(10 minutes). PPP: LCP Open, **multilink Open**, IPCP
  Dialer: Connected 00:01:10 to <deleted>, outbound
          Idle timer 600 secs, idle 75 secs
          Type is IN-BAND SYNC, group Dialer1
  IP: Local 172.21.104.48/32, remote 172.21.104.254
!--- IP address assigned to the bundle and loopback address !--- of the remote router. Bundle:
First link of bobslake-nas-01, 2 links, last input 00:01:16 Counts: 23 packets input, 4758
bytes, 0 no buffer 0 input errors, 0 CRC, 0 frame, 0 overrun 7 packets output, 3734 bytes, 0
underruns 0 output errors, 0 collisions, 0 interface resets

AS5300的一些show命令输出结果如下显示。有关更多的输出结果情况，请参阅文档 在Microsoft
Windows客户机中进行异步多链路PPP拨号 。AS5300（中心站点）的show与debug输出结果和
PC-Router Async MP以及Router-Router Async MP类似。


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

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

bobslake-nas-01#show caller
                                           Active    Idle
  Line          User            Service    Time      Time
  TTY 45        clearlake-lan-01 Async     00:01:12  00:01:03
  TTY 47        clearlake-lan-01 Async     00:01:51  00:00:06
```

```
vty 0          admin          VTY                00:11:02  00:00:00
As45           clearlake-lan-01   PPP                00:01:02  00:00:00
As47           clearlake-lan-01   PPP                00:01:49  00:00:00
Vi1            clearlake-lan-01   PPP   Bundle 00:01:43  00:01:10
```

故障排除

本部分提供的信息可用于对配置进行故障排除。

故障排除步骤

当对MP连接进行故障检修时，请按呼叫处理的相同方式进行处理：

下文提供debug输出示例，对于要寻找的内容标有说明。

当测试您的MP配置时，请确保您在链接中生成了足够的业务量以触发负载阈值。您可以在测试期间根据需要来调节负载阈值。

1. 请使用debug dialer以及debug chat命令来检验拨号器是否正确拨号。
2. 请检验PPP协商与认证是否成功。请注意LCP协商情况，它协调了MP参数线路最大接收重建单元（MRRU）和端点鉴别器（EndpointDisc）。
3. 请检验链接的虚拟化是否正确进行。将由Cisco IOS软件创建一虚拟访问接口来表现MP束。
4. 请检验互联网协议控制协议（IPCP）是否成功。请注意是否分配了正确的IP地址，以及是否安装了正确的路由。

故障排除命令

输出解释器工具支持某些 show 命令（只限于注册用户），通过它可以查看 show 命令输出的分析。

注意：在发出debug命令之前，请参阅有关Debug命令的重要信息。

- debug vtemplate - 虚拟访问接口从虚拟模板进行克隆开始，到该接口被关闭为止，将显示该接口的克隆信息。
- debug ppp multilink events - 显示影响多链路捆绑的事件信息。
- debug ppp negotiation - 在协商链路控制协议（LCP）、认证以及网络控制协议（NCP）时，显示关于PPP流量与交换的信息。成功的PPP协商将首先开放LCP状态，然后进行验证，最后进行NCP协商。在 LCP 协商期间建立多链路参数，如最大接收重建单元 (MRRU)。
- debug ppp authentication - 显示PPP验证协议消息，其中包括质询 握手 验证 协议（CHAP）信息包交换以及密码 验证 协议（PAP）交换。
- debug ppp error - 显示和PPP连接协商与操作相关的协议错误以及统计错误。
- debug modem — 显示接入服务器上的调制解调器线路活动。

调试输出示例

从Cisco 3640获得以下输出。它们显示Cisco 3640拨打AS5300的PRI并建立MP连接。有关AS5300的调试输出实例，请参阅文档 在Microsoft Windows客户机中进行异步多链路PPP拨号。

```
clearlake-lan-01#debug dialer
Dial on demand events debugging is on
```

```
clearlake-lan-01#debug ppp negotiation
PPP protocol negotiation debugging is on
clearlake-lan-01#debug ppp authentication
PPP authentication debugging is on
clearlake-lan-01#debug vtemplate
Virtual Template debugging is on
clearlake-lan-01#debug ppp multilink events
clearlake-lan-01#show debug
Dial on demand:
  Dial on demand events debugging is on
PPP:
  PPP authentication debugging is on
  PPP protocol negotiation debugging is on
  Multilink events debugging is on
VTEMPLATE:
  Virtual Template debugging is on
clearlake-lan-01#ping ip
Target IP address: 172.21.104.254
Repeat count [5]: 20
Datagram size [100]: 1200
Timeout in seconds [2]:
Extended commands [n]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 20, 1200-byte ICMP Echos to 172.21.104.254, timeout is 2 seconds:

Jul 25 13:20:29.047 UTC: As34 DDR: rotor dialout [priority]
Jul 25 13:20:29.047 UTC: As34 DDR: Dialing cause ip (s=172.21.125.1,
d=172.21.104.254)
```
!--- Dialing Reason Jul 25 13:20:29.047 UTC: As34 DDR: **Attempting to dial**

!--- Number being dialed Jul 25 13:20:29.047 UTC: CHAT34: Attempting async line dialer script
Jul 25 13:20:29.047 UTC: CHAT34: Dialing using Modem script: async-mppp & System script: none *!--- Using chat script async-mppp for dialout* Jul 25 13:20:29.051 UTC: CHAT34: process started Jul 25 13:20:29.051 UTC: CHAT34: Asserting DTR Jul 25 13:20:29.051 UTC: CHAT34: Chat script async-mppp started *!--- Call is being established; !--- note the time elapsed for call setup* Jul 25 13:20:54.831 UTC: CHAT34: Chat script async-mppp finished, status = Success. Jul 25 13:20:56.831 UTC: **%LINK-3-UPDOWN: Interface Async34, changed state to up**
Jul 25 13:20:56.831 UTC:
Async34 DDR: Dialer statechange to up
Jul 25 13:20:56.831 UTC:
%DIALER-6-BIND: Interface As34 bound to profile Di1
Jul 25 13:20:56.831 UTC:
Async34 DDR: Dialer call has been placed
!--- PPP negotiation begins Jul 25 13:20:56.831 UTC: As34 PPP: Treating connection as a callout Jul 25 13:20:56.831 UTC: As34 PPP: Phase is ESTABLISHING, Active Open Jul 25 13:20:56.831 UTC: As34 PPP: No remote authentication for call-out *!--- CHAP challenge is configured for callin only !--- LCP negotiation begins; Multilink parameters are also negotiated* Jul 25 13:20:56.835 UTC: As34 LCP: O CONFREQ [Closed] id 43 len 43 Jul 25 13:20:56.835 UTC: As34 LCP: ACCM 0x000A0000 (0x0206000A0000) Jul 25 13:20:56.835 UTC: As34 LCP: MagicNumber 0x4395638E (0x05064395638E) Jul 25 13:20:56.835 UTC: As34 LCP: PFC (0x0702) Jul 25 13:20:56.835 UTC: As34 LCP: ACFC (0x0802) Jul 25 13:20:56.835 UTC: As34 LCP: MRRU 1524 (0x110405F4) *!--- Negotiate Maximum Receive Reconstructed Unit (MRRU) !--- MRRU is the maximum packet size this end will reconstruct* Jul 25 13:20:56.835 UTC: As34 LCP: EndpointDisc 1 Local Jul 25 13:20:56.835 UTC: As34 LCP: (0x131301636C6561726C616B652D6C616E) Jul 25 13:20:56.835 UTC: As34 LCP: (0x2D3031). Jul 25 13:20:58.831 UTC: As34 LCP: TIMEout: State REQsent Jul 25 13:20:58.831 UTC: As34 LCP: O CONFREQ [REQsent] id 44 Len 43 Jul 25 13:20:58.831 UTC: As34 LCP: ACCM 0x000A0000 (0x0206000A0000) Jul 25 13:20:58.831 UTC: As34 LCP: MagicNumber 0x4395638E (0x05064395638E) Jul 25 13:20:58.831 UTC: As34 LCP: PFC (0x0702) Jul 25 13:20:58.831 UTC: As34 LCP: ACFC (0x0802) Jul 25 13:20:58.831 UTC: As34 LCP: MRRU 1524 (0x110405F4) Jul 25 13:20:58.831 UTC: As34 LCP:

EndpointDisc 1 Local Jul 25 13:20:58.831 UTC: As34 LCP: (0x131301636C6561726C616B652D6C616E) Jul 25 13:20:58.831 UTC: As34 LCP: (0x2D3031). Jul 25 13:21:00.831 UTC: As34 LCP: TIMEout: State REQsent Jul 25 13:21:00.831 UTC: As34 LCP: O CONFREQ [REQsent] id 45 Len 43 Jul 25 13:21:00.831 UTC: As34 LCP: ACCM 0x000A0000 (0x0206000A0000) Jul 25 13:21:00.831 UTC: As34 LCP: MagicNumber 0x4395638E (0x05064395638E) Jul 25 13:21:00.831 UTC: As34 LCP: PFC (0x0702) Jul 25 13:21:00.831 UTC: As34 LCP: ACFC (0x0802) Jul 25 13:21:00.831 UTC: As34 LCP: MRRU 1524 (0x110405F4) Jul 25 13:21:00.831 UTC: As34 LCP: EndpointDisc 1 Local Jul 25 13:21:00.831 UTC: As34 LCP: (0x131301636C6561726C616B652D6C616E) Jul 25 13:21:00.831 UTC: As34 LCP: (0x2D3031) Jul 25 13:21:01.135 UTC: **As34 LCP: I CONFACK [REQsent] id 45 Len 43**

Jul 25 13:21:01.135 UTC: As34 LCP: ACCM 0x000A0000 (0x0206000A0000)
Jul 25 13:21:01.135 UTC: As34 LCP: MagicNumber 0x4395638E (0x05064395638E)
Jul 25 13:21:01.135 UTC: As34 LCP: PFC (0x0702)
Jul 25 13:21:01.135 UTC: As34 LCP: ACFC (0x0802)
Jul 25 13:21:01.135 UTC: **As34 LCP: MRRU 1524 (0x110405F4)**
Jul 25 13:21:01.135 UTC: As34 LCP: EndpointDisc 1 Local
Jul 25 13:21:01.135 UTC: As34 LCP: (0x131301636C6561726C616B652D6C616E)
Jul 25 13:21:01.135 UTC: As34 LCP: (0x2D3031)
Jul 25 13:21:01.139 UTC: As34 LCP: I CONFREQ [ACKrcvd] id 6 Len 47
Jul 25 13:21:01.139 UTC: As34 LCP: ACCM 0x000A0000 (0x0206000A0000)
Jul 25 13:21:01.143 UTC: As34 LCP: AuthProto CHAP (0x0305C22305)
Jul 25 13:21:01.143 UTC: As34 LCP: MagicNumber 0xE16DFC8D (0x0506E16DFC8D)
Jul 25 13:21:01.143 UTC: As34 LCP: PFC (0x0702)
Jul 25 13:21:01.143 UTC: As34 LCP: ACFC (0x0802)
Jul 25 13:21:01.143 UTC: As34 LCP: MRRU 1524 (0x110405F4)
Jul 25 13:21:01.143 UTC: As34 LCP: EndpointDisc 1 Local
Jul 25 13:21:01.143 UTC: As34 LCP: (0x131201626F62736C616B652D6E61732D)
Jul 25 13:21:01.143 UTC: As34 LCP: (0x3031)
Jul 25 13:21:01.143 UTC: **As34 LCP: O CONFACK [ACKrcvd] id 6 Len 47**
Jul 25 13:21:01.143 UTC: As34 LCP: ACCM 0x000A0000 (0x0206000A0000)
Jul 25 13:21:01.143 UTC: As34 LCP: AuthProto CHAP (0x0305C22305)
Jul 25 13:21:01.143 UTC: As34 LCP: MagicNumber 0xE16DFC8D (0x0506E16DFC8D)
Jul 25 13:21:01.143 UTC: As34 LCP: PFC (0x0702)
Jul 25 13:21:01.143 UTC: As34 LCP: ACFC (0x0802)
Jul 25 13:21:01.143 UTC: **As34 LCP: MRRU 1524 (0x110405F4)**
Jul 25 13:21:01.143 UTC: As34 LCP: EndpointDisc 1 Local
Jul 25 13:21:01.143 UTC: As34 LCP: (0x131201626F62736C616B652D6E61732D)
Jul 25 13:21:01.143 UTC: As34 LCP: (0x3031)

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

IPCP: Address 172.21.104.254 (0x0306AC1568FE) Jul 25 13:21:01.731 UTC: Vi1 IPCP: I CONFNAK
[ACKsent] id 1 Len 10 Jul 25 13:21:01.731 UTC: Vi1 IPCP: Address 172.21.104.48 (0x0306AC156830)
Jul 25 13:21:01.731 UTC: Vi1 IPCP: O CONFREQ [ACKsent] id 2 Len 10 Jul 25 13:21:01.731 UTC: Vi1
IPCP: Address 172.21.104.48 (0x0306AC156830) Jul 25 13:21:01.915 UTC: Vi1 IPCP: I CONFACK
[ACKsent] id 2 Len 10 Jul 25 13:21:01.915 UTC: Vi1 IPCP: Address 172.21.104.48 (0x0306AC156830)
Jul 25 13:21:01.915 UTC: Vi1 IPCP: State is Open Jul 25 13:21:01.915 UTC: Di1 IPCP: Install
negotiated IP interface address 172.21.104.48 *!--- IP address is assigned to virtual-access*
interface Jul 25 13:21:01.919 UTC: Vi1 DDR: dialer protocol up Jul 25 13:21:01.919 UTC: Di1
IPCP: Install route to 172.21.104.254 *!--- Route to loopback address of remote router* Jul 25
13:21:02.539 UTC: **%LINEPROTO-5-UPDOWN: Line protocol on Interface Async34,**
changed state to up
Jul 25 13:21:02.551 UTC:
%LINEPROTO-5-UPDOWN: Line protocol on Interface
Virtual-Access1, changed state to up
!--- Full connectivity with first async connection !--- Begin dialout using second async
interface Jul 25 13:21:08.191 UTC: As33 DDR: rotor dialout [priority] Jul 25 13:21:08.191 UTC:
As33 DDR: Attempting to dial

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

(0x0305C22305) Jul 25 13:21:40.203 UTC: As33 LCP: MagicNumber 0xE16E950F (0x0506E16E950F) Jul 25 13:21:40.203 UTC: As33 LCP: PFC (0x0702) Jul 25 13:21:40.203 UTC: As33 LCP: ACFC (0x0802) Jul 25 13:21:40.203 UTC: **As33 LCP: MRRU 1524 (0x110405F4)**

!--- MRRU of 1524 bytes is accepted Jul 25 13:21:40.203 UTC: As33 LCP: EndpointDisc 1 Local Jul 25 13:21:40.203 UTC: As33 LCP: (0x131201626F62736C616B652D6E61732D) Jul 25 13:21:40.203 UTC: As33 LCP: (0x3031) Jul 25 13:21:40.207 UTC: **As33 LCP: I CONFACK [ACKsent] id 23 Len 43**

!--- PPP parameters are agreed on (CONFACKed) by both sides
Jul 25 13:21:40.207 UTC: As33 LCP: ACCM 0x000A0000 (0x0206000A0000)
Jul 25 13:21:40.207 UTC: As33 LCP: MagicNumber 0x4395FC05 (0x05064395FC05)
Jul 25 13:21:40.207 UTC: As33 LCP: PFC (0x0702)
Jul 25 13:21:40.207 UTC: As33 LCP: ACFC (0x0802)
Jul 25 13:21:40.207 UTC: **As33 LCP: MRRU 1524 (0x110405F4)**

!--- MRRU of 1524 bytes is accepted Jul 25 13:21:40.207 UTC: As33 LCP: EndpointDisc 1 Local Jul 25 13:21:40.207 UTC: As33 LCP: (0x131301636C6561726C616B652D6C616E) Jul 25 13:21:40.207 UTC: As33 LCP: (0x2D3031) *!--- LCP negotiation is complete* Jul 25 13:21:40.207 UTC: As33 LCP: State is Open Jul 25 13:21:40.207 UTC: As33 PPP: Phase is AUTHENTICATING, by the peer *!--- CHAP authentication begins* Jul 25 13:21:40.419 UTC: As33 CHAP: I CHALLENGE id 3 Len 36 from "bobslake-nas-01" *!--- Received challenge from bobslake-nas-01* Jul 25 13:21:40.423 UTC: As33 CHAP: O RESPONSE id 3 Len 37 from "clearlake-lan-01" Jul 25 13:21:42.528 UTC: As33 CHAP: I SUCCESS id 3 Len 4 *!--- CHAP authentication is successful* Jul 25 13:21:42.528 UTC: As33 PPP: Phase is VIRTUALIZED *!--- Async 33 is added to Virtualized MP bundle* Jul 25 13:21:42.528 UTC: **As33 MLP: bobslake-nas-01, multilink up**

!--- Multilink connection is up Jul 25 13:21:43.528 UTC: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async33, changed state to up clearlake-lan-01# Jul 25 13:23:52.028 UTC: Vi1 MLP: Disabling particle-fastswitching in 'bobslake-nas-01' Jul 25 13:23:52.028 UTC: Vi1 MLP: Enabling particle-fastswitching on 'bobslake-nas-01' *!--- Cisco IOS adjusting fast switching strategy to keep in step !--- with delivery of packet fragments* Jul 25 13:23:53.872 UTC: Vi1 MLP: Disabling particle-fastswitching in 'bobslake-nas-01' Jul 25 13:23:53.884 UTC: Vi1 MLP: Enabling particle-fastswitching on 'bobslake-nas-01'

相关信息

- DDR 多链路 PPP - 基本配置和验证
- 在Microsoft Windows® 客户端中进行异步多链路PPP拨号
- 跨越两个串行物理层异步接口的多链路 PPP
- 对基本拨号接入进行NAS配置
- 显示呼叫方统计信息
- 配置虚拟模板接口
- Cisco IOS 的虚拟访问 PPP 功能
- PPP支持页
- 技术支持 - Cisco Systems