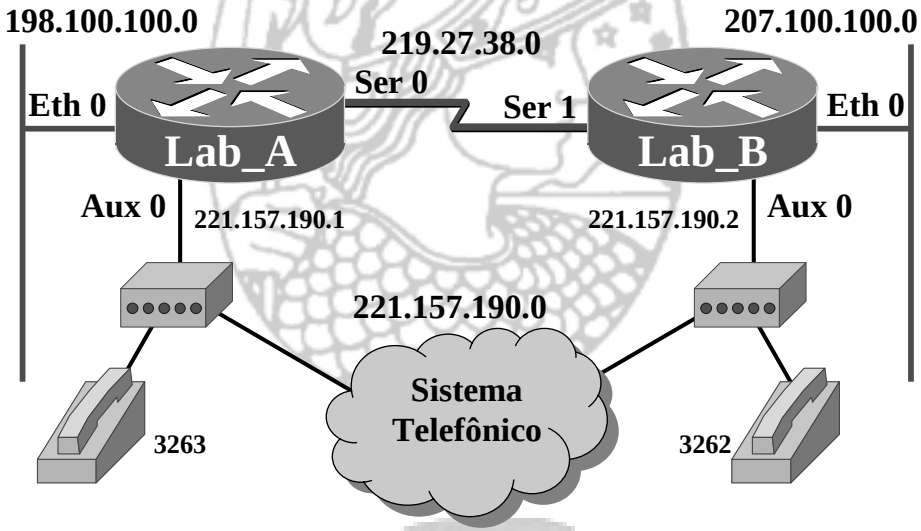
Estabelecimento de Linha Backup por DDR pela Porta Auxiliar

CISCO ACADEMY - NCE/UFRJ

Objetivos

Quando o canal principal cair será usada a porta Auxiliar para fazer a conexão.



Programação do Roteador Lab_A

```
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
! ==================================
!
hostname Lab_A
!
enable secret 5 $1$Q9DE$BxGBTyZ5..Iu6osX7mCXo0
enable password cisco1
!
username Lab_B password cisco
! usuário para a autenticação PPP
ip subnet-zero
!
! ==================================
```



```
!
! Script de discagem para o modem
chat-script DialOut ABORT ERROR ABORT BUSY "" "AT" OK "ATDT \T" TIMEOUT 45 CONNECT \c
! se receber do modem status de ERROR ou BUSY aborta a chamada
! se receber do modem a string null ou "" envia "AT"
! se receber do modem a string OK envia "ATDT \T" onde \T é trocado pelo número a discar
! espera 45 segundos pela string CONNECT (conectado)
! \c indica fim do script
! ramais disponíveis 3262 e 3263
!
! ==================================
!
interface Ethernet0
 ip address 198.100.100.1 255.255.255.0
 no ip directed-broadcast
 no shutdown
!
interface Serial0
 ip address 219.27.38.1 255.255.255.0
 no ip directed-broadcast
 encapsulation ppp
 clock rate 64000
 no shutdown
!
interface Serial1
 no ip address
 no ip directed-broadcast
 shutdown
!
! ==================================
!
! para saber o número da interface async deve ser dado o comando "show line"
! usar o número associado à auxiliar
interface Async1
 ip address 221.157.190.1 255.255.255.0
 no ip directed-broadcast
 encapsulation ppp
 dialer in-band
! libera DDR
dialer enable-timeout 6
! tempo que a interface fica down antes de ficar disponível para discagem (opcional)
 dialer idle-timeout 120 either
! desconecta após 120 segundos sem tráfego interessante nas duas direções
 dialer map ip 221.157.190.2 name Lab_B broadcast 3262
! quando houver acesso ao IP 221.157.190.2 (serial 0 down) disca para o número 3262
! também encaminha broadcasts para esse IP
! o nome do host destino é necessário para a autenticação PPP
 dialer-group 1
```

```
! aplicando o tráfego interessante
 async default routing
! libera roteamento pela porta assíncrona
 async mode interactive
! detecção automática do PPP (necessário ao colocar "autoselect ppp" na auxiliar)
 ppp authentication chap
! o dialer precisa de autenticação para validar a chamada
! basta haver autenticação no roteador central (que recebe a chamada)
!
! ==================================
!
router rip
 network 198.100.100.0
 network 219.27.38.0
 network 221.157.190.0
!
ip nat translation timeout never
ip nat translation tcp-timeout never
ip nat translation udp-timeout never
ip nat translation finrst-timeout never
ip nat translation syn-timeout never
ip nat translation dns-timeout never
ip nat translation icmp-timeout never
ip classless
!
! ==================================
!
ip route 207.100.100.0 255.255.255.0 219.27.38.2
! rota principal para 207.100.100.0
! esta rota não estará na tabela quando serial0 estiver down
ip route 207.100.100.0 255.255.255.0 221.157.190.2 150
! rota alternativa para 207.100.100.0
! normalmente não está na tabela de roteamento
!
! ==================================
!
! definição do tráfego interessante: qualquer IP que não seja ICMP e tabelas RIP
access-list 101 deny   icmp any any
access-list 101 deny   udp any eq rip any
access-list 101 permit ip any any
! associando a lista 101 à interface async 1 através do dialer-group 1
dialer-list 1 protocol ip list 101
!
! ==================================
!
line con 0
 exec-timeout 0 0
 logging synchronous
 transport input none
!
```



```
! ==================================
!
line aux 0
 exec-timeout 0 0
! desabilitando o exec-timeout na porta AUX
 autoselect ppp
! encapsulamento PPP (necessário colocar "async mode interactive" na async 1)
 script dialer DialOut
! script a ser usado ao discar
 modem InOut
! o modem disca e atende chamadas
 modem autoconfigure type usr_sportster
! define o tipo do modem como US Robotic Sportster (usar sh modemcap)
 transport input all
! todos os protocolos podem ser usados pela interface (inclusive telnet)
! permite dar telnet para o roteador na porta 20xx, onde xx é o número da porta async
! (nesse exemplo seria na porta 2001) e se conectar direto com o modem
! permite o envio de comandos AT direto para o modem para testar
 stopbits 1
! 1 stop bit para não sobrecarregar a linha
 speed 38400
! velocidade entre a porta AUX e o modem
 flowcontrol hardware
! controle de fluxo por RTS/CTS
!
! ==================================
!
line vty 0 4
 exec-timeout 0 0
 password cisco
 login
!
end
```

Programação do Roteador Lab_B

```
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
! ==================================
!
hostname Lab_B
!
enable secret cisco
enable password cisco1
!
username Lab_A password cisco
! usuário para a autenticação PPP
```

```
ip subnet-zero
!
! ==================================
!
! Script de discagem para o modem
chat-script DialOut ABORT ERROR ABORT BUSY "" "AT" OK "ATDT \T" TIMEOUT 45 CONNECT \c
! se receber do modem status de ERROR ou BUSY aborta a chamada
! se receber do modem a string null ou "" envia "AT"
! se receber do modem a string OK envia "ATDT \T" onde \T é trocado pelo número a discar
! espera 45 segundos pela string CONNECT (conectado)
! \c indica fim do script
! ramais disponíveis 3262 e 3263
!
! ==================================
!
interface Ethernet0
 ip address 207.100.100.1 255.255.255.0
 no ip directed-broadcast
 no shutdown
!
interface Serial1
 ip address 219.27.38.2 255.255.255.0
 no ip directed-broadcast
 encapsulation ppp
 clock rate 64000
 no shutdown
!
interface Serial0
 no ip address
 no ip directed-broadcast
 shutdown
!
! ==================================
!
! para saber o número da interface async deve ser dado o comando "show line"
! usar o número associado à auxiliar
interface Async1
 ip address 221.157.190.2 255.255.255.0
 no ip directed-broadcast
 encapsulation ppp
 dialer in-band
! libera DDR
dialer enable-timeout 6
! tempo que a interface fica down antes de ficar disponível para discagem (opcional)
 dialer idle-timeout 120 either
! desconecta após 120 segundos sem tráfego interessante nas duas direções
 dialer map ip 221.157.190.1 name Lab_A broadcast 3263
! quando houver acesso ao IP 221.157.190.1 (serial 0 down) disca para o número 3263
```



```
! também encaminha broadcasts para esse IP
! o nome do host destino é necessário para a autenticação PPP
 dialer-group 1
! aplicando o tráfego interessante
 async default routing
! libera roteamento pela porta assíncrona
 async mode interactive
! detecção automática do PPP (necessário ao colocar "autoselect ppp" na auxiliar)
 ppp authentication chap
! o dialer precisa de autenticação para validar a chamada
! basta haver autenticação no roteador central (que recebe a chamada)
!
! ==================================
!
router rip
 network 207.100.100.0
 network 219.27.38.0
 network 221.157.190.0
!
ip nat translation timeout never
ip nat translation tcp-timeout never
ip nat translation udp-timeout never
ip nat translation finrst-timeout never
ip nat translation syn-timeout never
ip nat translation dns-timeout never
ip nat translation icmp-timeout never
ip classless
!
! ==================================
!
ip route 198.100.100.0 255.255.255.0 219.27.38.1
! rota principal para 198.100.100.0
! esta rota não estará na tabela quando serial0 estiver down
ip route 198.100.100.0 255.255.255.0 221.157.190.1 150
! rota alternativa para 198.100.100.0
! normalmente não está na tabela de roteamento
!
! ==================================
!
! definição do tráfego interessante: qualquer IP que não seja ICMP e tabelas RIP
access-list 101 deny   icmp any any
access-list 101 deny   udp any eq rip any
access-list 101 permit ip any any
! associando a lista 101 à interface async 1 através do dialer-group 1
dialer-list 1 protocol ip list 101
!
! ==================================
!
line con 0
 exec-timeout 0 0
```

```
 logging synchronous
 transport input none
!
! ==================================
!
line aux 0
 exec-timeout 0 0
! desabilitando o exec-timeout na porta AUX
 autoselect ppp
! encapsulamento PPP (necessário colocar "async mode interactive" na async 1)
 script dialer DialOut
! script a ser usado ao discar
 modem InOut
! o modem disca e atende chamadas
 modem autoconfigure type usr_sportster
! define o tipo do modem como US Robotic Sportster (usar sh modemcap)
 transport input all
! todos os protocolos podem ser usados pela interface (inclusive telnet)
! permite dar telnet para o roteador na porta 20xx, onde xx é o número da porta async
! (nesse exemplo seria na porta 2001) e se conectar direto com o modem
! permite o envio de comandos AT direto para o modem para testar
 stopbits 1
! 1 stop bit para não sobrecarregar a linha
 speed 38400
! velocidade entre a porta AUX e o modem
 flowcontrol hardware
! controle de fluxo por RTS/CTS
!
! ==================================
!
line vty 0 4
 exec-timeout 0 0
 password cisco
 login
!
end
```

Comandos para Debug

debug dialer ➔ para mostrar as informações sobre pacotes recebidos na interface que está discando. Quando DDR está habilitado na interface, as informações relativas aos motivos que causaram todas as chamadas são mostradas

debug modem ➔ para mostrar as ativações das linhas de controle do modem e o processo de ativação de mensagens no roteador

debug chat ➔ para monitorar a execução do script chat quando a discagem se inicia

debug ppp negociation ➔ mostra as informações do tráfego PPP enquanto os componentes do PPP (LCP, autenticação e NCP) negociam

debug ppp authentication ➔ mostra as mensagens do protocolo de autenticação PPP

Descobrindo a Interface Async

```
Lab_A#sh line

    Tty  Typ     Tx/Rx      A  Modem  Roty  AccO  AccI  Uses  Noise  Overruns  Int
*     0  CTY                -      -     -     -     -     0      0       0/0    -   Ready
I     1  AUX   38400/38400  -  inout     -     -     -     1      0       0/0    -   Idle
      2  VTY                -      -     -     -     -     0      0       0/0    -   Idle
      3  VTY                -      -     -     -     -     0      0       0/0    -   Idle
      4  VTY                -      -     -     -     -     0      0       0/0    -   Idle
      5  VTY                -      -     -     -     -     0      0       0/0    -   Idle
      6  VTY                -      -     -     -     -     0      0       0/0    -   Idle

Lab_A#
```

A interface async deve ser a número 1, isto é, **async1**.

Descobrindo os Tipos de Modems Suportados

```
Lab_A#sh modemcap
default
codex_3260
usr_courier
usr_sportster  ➔ modems U S Robotic modelo Sportster (disponível no laboratório)
hayes_optima
global_village
viva
telebit_t3000
microcom_hdms
microcom_server
nec_v34
nec_v110
nec_piafs
cisco_v110
mica

Lab_A#
```

Para definir um tipo de modem não suportado usar o comando "***modemcap entry***" (veja em http://www.cisco.com/warp/public/471/aux-aux-watch.html)

Tabelas de Roteamento (em Lab_A)

1. Com a Linha Serial Ativa

```
Lab_A#sh 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, * - candidate default
       U - per-user static route, o - ODR

Gateway of last resort is not set

S      207.100.100.0/24 [1/0] via 219.27.38.2
       219.27.38.0/24 is variably subnetted, 2 subnets, 2 masks
C         219.27.38.2/32 is directly connected, Serial0
C         219.27.38.0/24 is directly connected, Serial0
C      221.157.190.0/24 is directly connected, Async1
C      198.100.100.0/24 is directly connected, Ethernet0
```

Observar que a rota para a rede 207.100.100.0 é a estática (S) via 219.27.38.2 que é a serial do próximo roteador (Lab_B).

2. Com a Linha Serial Desativada mas Antes do DDR

```
Lab_A#sh ip route

S      207.100.100.0/24 [150/0] via 221.157.190.2
C      221.157.190.0/24 is directly connected, Async1
C      198.100.100.0/24 is directly connected, Ethernet0
```

Observar que a rota para a rede 207.100.100.0 é a estática (S), com distância administrativa 150, via 221.157.190.2 que é a ASYNC1 do próximo roteador (Lab_B). Como tabelas de roteamento RIP não são tráfego interessante, nenhuma tabela é recebida pelo RIP e a distância administrativa 150 fica em uso (embora a distância administrativa do RIP seja 120).

3. Com a Linha Serial Desativada e DDR Ativo

```
Lab_A#sh ip route

R      207.100.100.0/24 [120/1] via 221.157.190.2, 00:00:03, Async1
       221.157.190.0/24 is variably subnetted, 2 subnets, 2 masks
C         221.157.190.2/32 is directly connected, Async1
C         221.157.190.0/24 is directly connected, Async1
C      198.100.100.0/24 is directly connected, Ethernet0
```


Observar que a rota para a rede 207.100.100.0 é a dinâmica aprendida pelo RIP (R), com distância administrativa 120, via 221.157.190.2 que é a ASYNC1 do próximo roteador (Lab_B). Embora tabelas de roteamento RIP não sejam tráfego interessante, depois que o canal foi estabelecido, não havendo filtros de pacotes que passam pela ASYNC1, as tabela de roteamento são trocadas. Como a distância administrativa do RIP (120) é menor que a da rota estática (150), a rota que aparece na tabela de roteamento é a dinâmica.

4. Com a Linha Serial Ativa e DDR Ativo

Essa situação ocorre depois que a linha serial foi estabelecida e antes de passarem os 120 segundos sem tráfego interessante que desfaz a conexão DDR.

```
Lab_A#sh ip route

S      207.100.100.0/24 [1/0] via 219.27.38.2
       219.27.38.0/24 is variably subnetted, 2 subnets, 2 masks
C         219.27.38.2/32 is directly connected, Serial0
C         219.27.38.0/24 is directly connected, Serial0
C      221.157.190.0/24 is directly connected, Async1
C      198.100.100.0/24 is directly connected, Ethernet0
```

Observar que a rota para a rede 207.100.100.0 é a estática (S) via 219.27.38.2 que é a serial do próximo roteador (Lab_B) pois rotas estáticas são prioritárias.

Tráfego Interessante e Não Interessante

O canal DDR foi configurado para só ser ativado 6 segundos depois que o canal principal cair (comado *dialer enable-timeout 6*), mesmo que haja tráfego interessante. Ele também foi configurado para se manter ativo por 120 segundos depois do término do tráfego interessante (comando *dialer idle-timeout 120*).
Quando não existir tráfego interessante, como em um PING longo (ICMP), o canal DDR irá ser desativado mesmo que haja tráfego não interessante em andamento.

```
Lab_A#ping
Protocol [ip]:
Target IP address: 207.100.100.1
Repeat count [5]: 1000000
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]:
Sweep range of sizes [n]:
Type escape sequence to abort.
Sending 1000000, 100-byte ICMP Echos to 207.100.100.1, timeout is 2 seconds:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!..........
Success rate is 79 percent (39/49), round-trip min/avg/max = 152/160/164 ms
```

Observar que o ping funciona até que o canal DDR é desfeito porque o tráfego gerado pelo PING não zera o contador do *idle-timeout*.

Debug Dialer

Mostra as informações sobre pacotes recebidos na interface que está discando. Quando DDR está habilitado na interface, as informações relativas aos motivos que causaram todas as chamadas são mostradas

1. Na máquina que faz a chamada (Lab_A)

```
Lab_A#debug dialer
Dial on demand events debugging is on
```

a. Quando a Chamada é Feita

00:37:28: As1 DDR: Dialing cause ip (s=221.157.190.1, d=207.100.100.0)
00:37:28: As1 DDR: Attempting to dial 3262
00:37:28: CHAT1: Attempting async line dialer script
00:37:28: CHAT1: Dialing using Modem script: DialOut & System script: none
00:37:28: CHAT1: process started
00:37:28: CHAT1: Asserting DTR
00:37:28: CHAT1: Chat script DialOut started
00:37:39: CHAT1: Chat script DialOut finished, status = Success
00:37:41: %LINK-3-UPDOWN: Interface Async1, changed state to up
00:37:46: As1 DDR: dialer protocol up
00:37:47: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to up

b. Quando a Chamada é Desfeita

00:39:41: As1 DDR: idle timeout
00:39:41: As1 DDR: disconnecting call
00:39:43: %LINK-5-CHANGED: Interface Async1, changed state to reset
00:39:44: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to down
00:39:48: %LINK-3-UPDOWN: Interface Async1, changed state to down
00:39:54: As1 DDR: re-enable timeout

2. Na máquina que recebe a chamada (Lab_B)

```
Lab_B#debug dialer
Dial on demand events debugging is on
```

a. Quando a Chamada é Feita

00:34:17: %LINK-3-UPDOWN: Interface Async1, changed state to up
00:34:17: As1 DDR: Dialer received incoming call from <unknown>
00:34:20: As1 DDR: dialer protocol up

00:34:20: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to up

b. Quando a Chamada é Desfeita

00:36:17: As1 DDR: idle timeout
00:36:17: As1 DDR: disconnecting call
00:36:19: %LINK-5-CHANGED: Interface Async1, changed state to reset
00:36:20: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to down
00:36:24: %LINK-3-UPDOWN: Interface Async1, changed state to down
00:36:30: As1 DDR: re-enable timeout

Debug Modem

Para mostrar as ativações das linhas de controle do modem e o processo de ativação de mensagens no roteador.

1. Na máquina que faz a chamada (Lab_A)

```
Lab_A#debug modem
Modem control/process activation debugging is on
```

a. Quando a Chamada é Feita

00:33:45: CHAT1: Attempting async line dialer script
00:33:45: CHAT1: process started
00:33:45: CHAT1: Asserting DTR
00:33:45: TTY1: Set DTR to 1
00:33:56: TTY1: destroy timer type 1
00:33:56: TTY1: destroy timer type 0
00:33:58: %LINK-3-UPDOWN: Interface Async1, changed state to up
00:34:04: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to up

b. Quando a Chamada é Desfeita

00:35:58: TTY1: Async Int reset: Dropping DTR
00:35:58: TTY1: Set DTR to 0
00:35:59: TTY1: DSR was dropped
00:35:59: tty1: Modem: READY->HANGUP
00:36:00: TTY1: dropping DTR, hanging up
00:36:00: TTY1: Set DTR to 0
00:36:00: tty1: Modem: HANGUP->IDLE
00:36:00: %LINK-5-CHANGED: Interface Async1, changed state to reset
00:36:01: TTY1: cleanup pending. Delaying DTR
00:36:01: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to down
00:36:02: TTY1: cleanup pending. Delaying DTR

00:36:03: TTY1: cleanup pending. Delaying DTR
00:36:03: TTY1: destroy timer type 0
00:36:03: TTY1: destroy timer type 1
00:36:03: TTY1: destroy timer type 3
00:36:03: TTY1: destroy timer type 4
00:36:03: TTY1: destroy timer type 2
00:36:03: Async1: allowing modem_process to continue hangup
00:36:04: TTY1: restoring DTR
00:36:04: TTY1: Set DTR to 1
00:36:05: TTY1: autoconfigure probe started
00:36:05: %LINK-3-UPDOWN: Interface Async1, changed state to down

2. Na máquina que recebe a chamada (Lab_B)

```
Lab_B#debug modem
Modem control/process activation debugging is on
```

a. Quando a Chamada é Feita

00:30:30: TTY1: DSR came up
00:30:30: tty1: Modem: IDLE->READY
00:30:30: TTY1: Autoselect started
00:30:30: TTY1: create timer type 0, 120 seconds
00:30:32: TTY1: Autoselect sample 7E
00:30:32: TTY1: Autoselect sample 7EFF
00:30:32: TTY1: Autoselect sample 7EFF7D
00:30:32: TTY1: Autoselect sample 7EFF7D23
00:30:32: TTY1 Autoselect cmd: ppp negotiate
00:30:32: TTY1: destroy timer type 0 (OK)
00:30:32: TTY1: EXEC creation
00:30:32: TTY1: destroy timer type 1
00:30:32: TTY1: destroy timer type 0
00:30:34: %LINK-3-UPDOWN: Interface Async1, changed state to up
00:30:37: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to up

b. Quando a Chamada é Desfeita

00:32:33: TTY1: DSR was dropped
00:32:33: tty1: Modem: READY->HANGUP
00:32:34: TTY1: Async Int reset: Dropping DTR
00:32:34: TTY1: Set DTR to 0
00:32:34: TTY1: dropping DTR, hanging up
00:32:34: TTY1: Set DTR to 0
00:32:34: tty1: Modem: HANGUP->IDLE
00:32:36: TTY1: cleanup pending. Delaying DTR
00:32:36: %LINK-5-CHANGED: Interface Async1, changed state to reset
00:32:37: TTY1: cleanup pending. Delaying DTR

00:32:37: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to down
00:32:38: TTY1: cleanup pending. Delaying DTR
00:32:39: TTY1: cleanup pending. Delaying DTR
00:32:39: TTY1: destroy timer type 0
00:32:39: TTY1: destroy timer type 1
00:32:39: TTY1: destroy timer type 3
00:32:39: TTY1: destroy timer type 4
00:32:39: TTY1: destroy timer type 2
00:32:39: Async1: allowing modem_process to continue hangup
00:32:40: TTY1: restoring DTR
00:32:40: TTY1: Set DTR to 1
00:32:40: TTY1: autoconfigure probe started
00:32:41: %LINK-3-UPDOWN: Interface Async1, changed state to down

Debug Chat

Para monitorar a execução do script chat quando a discagem se inicia.

1. Na máquina que faz a chamada (Lab_A)

```
Lab_A#debug chat
Chat scripts activity debugging is on
```

a. Quando a Chamada é Feita

00:41:19: CHAT1: Attempting async line dialer script
00:41:19: CHAT1: Dialing using Modem script: DialOut & System script: none
00:41:19: CHAT1: process started
00:41:19: CHAT1: Asserting DTR
00:41:19: CHAT1: Chat script DialOut started
00:41:19: CHAT1: Sending string: AT
00:41:19: CHAT1: Expecting string: OK
00:41:19: CHAT1: Completed match for expect: OK
00:41:19: CHAT1: Sending string: ATDT \T<3262>
00:41:19: CHAT1: Expecting string: CONNECT
00:41:31: CHAT1: Completed match for expect: CONNECT
00:41:31: CHAT1: Sending string: \c
00:41:31: CHAT1: Chat script DialOut finished, status = Success
00:41:33: %LINK-3-UPDOWN: Interface Async1, changed state to up
00:41:38: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to up

b. Quando a Chamada é Desfeita

00:43:35: %LINK-5-CHANGED: Interface Async1, changed state to reset
00:43:36: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to down
00:43:40: %LINK-3-UPDOWN: Interface Async1, changed state to down

2. Na máquina que recebe a chamada (Lab_B)

```
Lab_B#debug chat
Chat scripts activity debugging is on
```

a. Quando a Chamada é Feita

00:38:08: %LINK-3-UPDOWN: Interface Async1, changed state to up
00:38:11: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to up

b. Quando a Chamada é Desfeita

00:40:11: %LINK-5-CHANGED: Interface Async1, changed state to reset
00:40:12: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to down
00:40:16: %LINK-3-UPDOWN: Interface Async1, changed state to down

Debug PPP

O *debug ppp negociation* mostra as informações do tráfego PPP enquanto os componentes do PPP (LCP, autenticação e NCP) negociam. O *debug ppp authentication* mostra as mensagens do protocolo de autenticação PPP.

1. Na máquina que faz a chamada (Lab_A)

```
Lab_A#debug ppp authentication
PPP authentication debugging is on
Lab_A#debug ppp negotiation
PPP protocol negotiation debugging is on
```

a. Quando a Chamada é Feita

00:46:29: As1 IPCP: Install route to 221.157.190.2
00:46:31: %LINK-3-UPDOWN: Interface Async1, changed state to up
00:46:31: As1 PPP: Treating connection as a callout
00:46:31: As1 PPP: Phase is ESTABLISHING, Active Open
00:46:31: As1 LCP: O CONFREQ [Closed] id 21 len 25
00:46:31: As1 LCP: ACCM 0x000A0000 (0x0206000A0000)
00:46:31: As1 LCP: AuthProto CHAP (0x0305C22305)
00:46:31: As1 LCP: MagicNumber 0x10A618EC (0x050610A618EC)
00:46:31: As1 LCP: PFC (0x0702)
00:46:31: As1 LCP: ACFC (0x0802)
00:46:33: As1 LCP: TIMEout: State REQsent
00:46:33: As1 LCP: O CONFREQ [REQsent] id 22 len 25
00:46:33: As1 LCP: ACCM 0x000A0000 (0x0206000A0000)
00:46:33: As1 LCP: AuthProto CHAP (0x0305C22305)

00:46:33: As1 LCP: MagicNumber 0x10A618EC (0x050610A618EC)
00:46:33: As1 LCP: PFC (0x0702)
00:46:33: As1 LCP: ACFC (0x0802)
00:46:35: As1 LCP: TIMEout: State REQsent
00:46:35: As1 LCP: O CONFREQ [REQsent] id 23 len 25
00:46:35: As1 LCP: ACCM 0x000A0000 (0x0206000A0000)
00:46:35: As1 LCP: AuthProto CHAP (0x0305C22305)
00:46:35: As1 LCP: MagicNumber 0x10A618EC (0x050610A618EC)
00:46:35: As1 LCP: PFC (0x0702)
00:46:35: As1 LCP: ACFC (0x0802)
00:46:35: As1 LCP: I CONFACK [REQsent] id 23 len 25
00:46:35: As1 LCP: ACCM 0x000A0000 (0x0206000A0000)
00:46:35: As1 LCP: AuthProto CHAP (0x0305C22305)
00:46:35: As1 LCP: MagicNumber 0x10A618EC (0x050610A618EC)
00:46:35: As1 LCP: PFC (0x0702)
00:46:35: As1 LCP: ACFC (0x0802)
00:46:35: As1 LCP: I CONFREQ [ACKrcvd] id 14 len 25
00:46:35: As1 LCP: ACCM 0x000A0000 (0x0206000A0000)
00:46:35: As1 LCP: AuthProto CHAP (0x0305C22305)
00:46:35: As1 LCP: MagicNumber 0x10A2FBBD (0x050610A2FBBD)
00:46:35: As1 LCP: PFC (0x0702)
00:46:35: As1 LCP: ACFC (0x0802)
00:46:35: As1 LCP: O CONFACK [ACKrcvd] id 14 len 25
00:46:35: As1 LCP: ACCM 0x000A0000 (0x0206000A0000)
00:46:35: As1 LCP: AuthProto CHAP (0x0305C22305)
00:46:36: As1 LCP: MagicNumber 0x10A2FBBD (0x050610A2FBBD)
00:46:36: As1 LCP: PFC (0x0702)
00:46:36: As1 LCP: ACFC (0x0802)
00:46:36: As1 LCP: State is Open
00:46:36: As1 PPP: Phase is AUTHENTICATING, by both
00:46:36: As1 CHAP: O CHALLENGE id 7 len 26 from "Lab_A"
00:46:36: As1 CHAP: I CHALLENGE id 7 len 26 from "Lab_B"
00:46:36: As1 CHAP: O RESPONSE id 7 len 26 from "Lab_A"
00:46:36: As1 CHAP: I SUCCESS id 7 len 4
00:46:36: As1 CHAP: I RESPONSE id 7 len 26 from "Lab_B"
00:46:36: As1 CHAP: O SUCCESS id 7 len 4
00:46:36: As1 PPP: Phase is UP
00:46:36: As1 IPCP: O CONFREQ [Closed] id 5 len 10
00:46:36: As1 IPCP: Address 221.157.190.1 (0x0306DD9DBE01)
00:46:36: As1 CDPCP: O CONFREQ [Closed] id 5 len 4
00:46:36: As1 IPCP: I CONFREQ [REQsent] id 5 len 10
00:46:36: As1 IPCP: Address 221.157.190.2 (0x0306DD9DBE02)
00:46:36: As1 IPCP: O CONFACK [REQsent] id 5 len 10
00:46:36: As1 IPCP: Address 221.157.190.2 (0x0306DD9DBE02)
00:46:36: As1 CDPCP: I CONFREQ [REQsent] id 5 len 4
00:46:36: As1 CDPCP: O CONFACK [REQsent] id 5 len 4
00:46:36: As1 IPCP: I CONFACK [ACKsent] id 5 len 10
00:46:36: As1 IPCP: Address 221.157.190.1 (0x0306DD9DBE01)
00:46:36: As1 IPCP: State is Open
00:46:36: As1 CDPCP: I CONFACK [ACKsent] id 5 len 4

00:46:36: As1 CDPCP: State is Open
00:46:36: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to up

b. Quando a Chamada é Desfeita

00:48:33: %LINK-5-CHANGED: Interface Async1, changed state to reset
00:48:33: As1 IPCP: State is Closed
00:48:33: As1 CDPCP: State is Closed
00:48:33: As1 PPP: Phase is TERMINATING
00:48:33: As1 LCP: State is Closed
00:48:33: As1 PPP: Phase is DOWN
00:48:33: As1 IPCP: Remove route to 221.157.190.2
00:48:34: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to down
00:48:38: %LINK-3-UPDOWN: Interface Async1, changed state to down
00:48:38: As1 LCP: State is Closed
00:48:38: As1 PPP: Phase is DOWN

2. Na máquina que recebe a chamada (Lab_B)

```
Lab_B#debug ppp authentication
PPP authentication debugging is on
Lab_B#debug ppp negotiation
PPP protocol negotiation debugging is on
```

a. Quando a Chamada é Feita

00:43:07: As1 LCP: I CONFREQ [Closed] id 22 len 25
00:43:07: As1 LCP: ACCM 0x000A0000 (0x0206000A0000)
00:43:07: As1 LCP: AuthProto CHAP (0x0305C22305)
00:43:07: As1 LCP: MagicNumber 0x10A618EC (0x050610A618EC)
00:43:07: As1 LCP: PFC (0x0702)
00:43:07: As1 LCP: ACFC (0x0802)
00:43:07: As1 LCP: Lower layer not up, Fast Starting
00:43:07: As1 PPP: Treating connection as a callin
00:43:07: As1 PPP: Phase is ESTABLISHING, Passive Open
00:43:07: As1 LCP: State is Listen
00:43:07: As1 LCP: O CONFREQ [Listen] id 13 len 25
00:43:07: As1 LCP: ACCM 0x000A0000 (0x0206000A0000)
00:43:07: As1 LCP: AuthProto CHAP (0x0305C22305)
00:43:07: As1 LCP: MagicNumber 0x10A2FBBD (0x050610A2FBBD)
00:43:07: As1 LCP: PFC (0x0702)
00:43:07: As1 LCP: ACFC (0x0802)
00:43:07: As1 LCP: O CONFACK [Listen] id 22 len 25
00:43:07: As1 LCP: ACCM 0x000A0000 (0x0206000A0000)
00:43:07: As1 LCP: AuthProto CHAP (0x0305C22305)
00:43:07: As1 LCP: MagicNumber 0x10A618EC (0x050610A618EC)
00:43:07: As1 LCP: PFC (0x0702)

00:43:07: As1 LCP: ACFC (0x0802)
00:43:07: %LINK-3-UPDOWN: Interface Async1, changed state to up
00:43:09: As1 LCP: I CONFREQ [ACKsent] id 23 len 25
00:43:09: As1 LCP: ACCM 0x000A0000 (0x0206000A0000)
00:43:09: As1 LCP: AuthProto CHAP (0x0305C22305)
00:43:09: As1 LCP: MagicNumber 0x10A618EC (0x050610A618EC)
00:43:09: As1 LCP: PFC (0x0702)
00:43:09: As1 LCP: ACFC (0x0802)
00:43:09: As1 LCP: O CONFACK [ACKsent] id 23 len 25
00:43:09: As1 LCP: ACCM 0x000A0000 (0x0206000A0000)
00:43:09: As1 LCP: AuthProto CHAP (0x0305C22305)
00:43:09: As1 LCP: MagicNumber 0x10A618EC (0x050610A618EC)
00:43:09: As1 LCP: PFC (0x0702)
00:43:09: As1 LCP: ACFC (0x0802)
00:43:09: As1 LCP: TIMEout: State ACKsent
00:43:09: As1 LCP: O CONFREQ [ACKsent] id 14 len 25
00:43:09: As1 LCP: ACCM 0x000A0000 (0x0206000A0000)
00:43:09: As1 LCP: AuthProto CHAP (0x0305C22305)
00:43:09: As1 LCP: MagicNumber 0x10A2FBBD (0x050610A2FBBD)
00:43:09: As1 LCP: PFC (0x0702)
00:43:09: As1 LCP: ACFC (0x0802)
00:43:09: As1 LCP: I CONFACK [ACKsent] id 14 len 25
00:43:09: As1 LCP: ACCM 0x000A0000 (0x0206000A0000)
00:43:09: As1 LCP: AuthProto CHAP (0x0305C22305)
00:43:09: As1 LCP: MagicNumber 0x10A2FBBD (0x050610A2FBBD)
00:43:09: As1 LCP: PFC (0x0702)
00:43:09: As1 LCP: ACFC (0x0802)
00:43:09: As1 LCP: State is Open
00:43:09: As1 PPP: Phase is AUTHENTICATING, by both
00:43:09: As1 CHAP: O CHALLENGE id 7 len 26 from "Lab_B"
00:43:09: As1 CHAP: I CHALLENGE id 7 len 26 from "Lab_A"
00:43:09: As1 CHAP: Waiting for peer to authenticate first
00:43:09: As1 CHAP: I RESPONSE id 7 len 26 from "Lab_A"
00:43:09: As1 CHAP: O SUCCESS id 7 len 4
00:43:09: As1 CHAP: Processing saved Challenge, id 7
00:43:09: As1 CHAP: O RESPONSE id 7 len 26 from "Lab_B"
00:43:10: As1 CHAP: I SUCCESS id 7 len 4
00:43:10: As1 PPP: Phase is UP
00:43:10: As1 IPCP: O CONFREQ [Closed] id 5 len 10
00:43:10: As1 IPCP: Address 221.157.190.2 (0x0306DD9DBE02)
00:43:10: As1 CDPCP: O CONFREQ [Closed] id 5 len 4
00:43:10: As1 IPCP: I CONFREQ [REQsent] id 5 len 10
00:43:10: As1 IPCP: Address 221.157.190.1 (0x0306DD9DBE01)
00:43:10: As1 IPCP: O CONFACK [REQsent] id 5 len 10
00:43:10: As1 IPCP: Address 221.157.190.1 (0x0306DD9DBE01)
00:43:10: As1 CDPCP: I CONFREQ [REQsent] id 5 len 4
00:43:10: As1 CDPCP: O CONFACK [REQsent] id 5 len 4
00:43:10: As1 IPCP: I CONFACK [ACKsent] id 5 len 10
00:43:10: As1 IPCP: Address 221.157.190.2 (0x0306DD9DBE02)
00:43:10: As1 IPCP: State is Open

00:43:10: As1 IPCP: Install route to 221.157.190.1
00:43:10: As1 CDPCP: I CONFACK [ACKsent] id 5 len 4
00:43:10: As1 CDPCP: State is Open
00:43:10: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to up

b. Quando a Chamada é Desfeita

00:45:09: %LINK-5-CHANGED: Interface Async1, changed state to reset
00:45:09: As1 IPCP: State is Closed
00:45:09: As1 CDPCP: State is Closed
00:45:09: As1 PPP: Phase is TERMINATING
00:45:09: As1 LCP: State is Closed
00:45:09: As1 PPP: Phase is DOWN
00:45:09: As1 IPCP: Remove route to 221.157.190.1
00:45:10: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async1, changed state to down
00:45:14: %LINK-3-UPDOWN: Interface Async1, changed state to down
00:45:14: As1 LCP: State is Closed
00:45:14: As1 PPP: Phase is DOWN

Telnet na Porta 20xx

No roteador Lab_A a interface async em uso é a número 1, assim, será dado telnet na porta 2001. Precisa ser usado o IP de uma interface que esteja operacional, sendo escolhida a interface ethernet0 (IP=198.100.100.1).

```
Lab_A#sh ip int br
Interface      IP-Address      OK?  Method  Status                  Protocol
Async1         221.157.190.1   YES  manual  up                      up
Ethernet0      198.100.100.1   YES  manual  up                      up
Serial0        219.27.38.1     YES  manual  up                      up
Serial1        unassigned      YES  unset   administratively down   down

Lab_A#telnet 198.100.100.1 2001     ← porta 2001
Trying 198.100.100.1, 2001 ... Open ← a conexão com o modem foi estabelecida
at                                  ← comando digitado
OK                                  ← resposta do modem
at                                  ← comando digitado
OK                                  ← resposta do modem
at dt 3262                          ← comando digitado
CONNECT 14400/ARQ                   ← resposta do modem

Lab_B>                              ← telnet conectado no Lab_B
```

Para que os comandos digitados apareçam na tela é necessário que o modem esteja configurado para ecoar os comandos recebidos.

Configuring AUX−to−AUX Port Async Backup with Dialer Watch

Introduction

This document provides information about configuring dial−on−demand routing (DDR) backup for a serial, WAN, or leased line link using the dialer watch feature. The backup link uses modems on the AUX ports of both routers. When the primary link goes down, dialer watch initiates the backup dialout using the modem on the AUX Port.

Before You Begin

Conventions

For more information on document conventions, see the Cisco Technical Tips Conventions.

Prerequisites

This document assumes you have a good understanding of the various issues associated with modems on AUX ports. If you need more information on these issues, please refer to the documents Modem−Router Connection Guide and Configuring Dialout using a Modem on the AUX Port before continuing on with this document.

Components Used

The information in this document is based on the software and hardware versions below.

- Two Cisco 2600s with US Robotics Modems connected to the AUX Ports. Both routers are running Cisco IOS® Software Release 12.1(2)

It is recommended that you use Cisco IOS version 12.1(7) or higher, which includes fixes for IOS bugs that affect dialer watch.

The information presented in this document was created from devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If you are working in a live network, ensure that you understand the potential impact of any command before using it.

Background Theory

This scenario involves configuring dialin and dialout using modems on the AUX ports, and configuring DDR backup with dialer watch. For more information on the dialer watch feature, refer to Evaluating Backup Interfaces, Floating Static Routes, and Dialer Watch for DDR Backup.

Please refer to the document Configuring DDR Backup using BRIs and Dialer Watch for information on configuring and troubleshooting dialer watch. The concepts involved for dialer watch are independent of the media used, hence that document will be useful for dialer watch related issues.

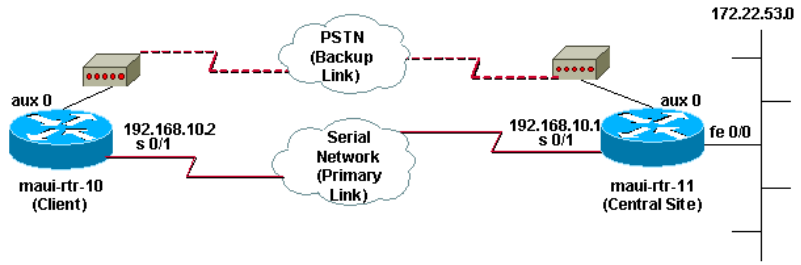
Configure

In this section, you are presented with the information to configure the features described in this document.

Note: To find additional information on the commands used in this document, use the IOS Command Lookup tool

Network Diagram

This document uses the network setup shown in the diagram below.



Configurations

In this configuration, maui−rtr−10 (Client) is connected via a serial link to maui−rtr−11 (Central Site). Both routers also have external US Robotics modems connected to the AUX Ports which will be used as backup. When the primary link goes down, dialer watch initiates the backup link, and maui−rtr−10 dials the central site router, connects, negotiates PPP and exchanges Open Shortest Path First (OSPF) routing information. All traffic between the routers will now use the backup connection. When the primary link is reestablished, the routing table will be updated and all traffic will once again use the primary link. Since no traffic will flow on the backup link, the idle timeout will expire and dialer watch will tear down the backup link.

maui−rtr−10 (Client)

```
maui-rtr-10#show running-config
Building configuration...
```

```
Current configuration:
!
version 12.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname maui-rtr-10
!
aaa new-model
aaa authentication login default local
aaa authentication login NO_AUTHEN none
aaa authentication ppp default local

!--- This is the basic AAA configuration for ppp calls

enable secret 5 <deleted>
!
username admin password 0 <deleted>
username maui-rtr-11 password 0 cisco

!--- Username for remote router (maui-rtr-11) and shared secret password Shared
!--- secret (used for CHAP authentication)must be the same on both sides

!
ip subnet-zero
!
chat-script Dialout ABORT ERROR ABORT BUSY "" "AT" OK "ATDT \T" TIMEOUT 45 CONNECT \c

!--- chat script named "Dialout" is used for the backup dialout.

modemcap entry MY_USR_MODEM:MSC=&F1S0;=1

!--- Modemcap named "MY_USR_MODEM" will be applied to the AUX port line interface.
!--- This modemcap was created using the command:
!--- modemcap edit MY_USR_MODEM miscellaneous &F1S0;=1
!--- Refer to the Modem-Router Connection Guide for more information

!
interface Loopback0
 ip address 172.17.1.1 255.255.255.0
!
interface Ethernet0/0
 ip address 172.16.1.1 255.255.255.0
 no keepalive
!
interface Serial0/0
 no ip address
 shutdown
 no fair-queue
!
interface Serial0/1

!--- Primary Link

 ip address 192.168.10.2 255.255.255.252
 encapsulation ppp
 clockrate 64000
 ppp authentication chap
!
interface Async65

!--- Async interface corresponding to the AUX Port(backup link)
```



```
!--- This was determined using the show line command

 ip unnumbered Loopback0

!--- This assigns the loopback 0 ip address to this interface.
!--- The central router will have a dialer map to this loopback address

 encapsulation ppp
 dialer in-band

!--- Allow DDR on this interface

 dialer idle-timeout 30

!--- idle timeout(in seconds)for this link
!--- dialer watch checks the status of the primary link
!--- every time the idle-timeout expires

 dialer watch-disable 15

!--- delays disconnecting the backup interface (for 15 seconds)after
!--- the primary interface is found to be up

 dialer map ip 172.22.1.1 name maui-rtr-11 broadcast 84007

!--- dialer map for the AUX Port interface of the central router
!--- Remember that the central router's AUX port is unnumbered to its Loopback 0

 dialer map ip 172.22.53.0 name maui-rtr-11 broadcast 84007

!--- map statement for the route/network being watched
!--- address must exactly match the network configured with
!--- the dialer watch-list command
!--- dials the phone number specified when the watched route disappears

 dialer watch-group 8

!--- Enable dialer watch on this backup interface
!--- Watch the route specified with dialer watch-list 8


 dialer-group 1

!--- apply interesting traffic defined in dialer-list 1

 async default routing

!--- permit routing over the async interface
!--- this is required for a routing protocol to run across the async link

 async mode interactive
 ppp authentication chap
!
router ospf 5
 network 172.16.1.0 0.0.0.255 area 0
 network 172.17.1.0 0.0.0.255 area 0
 network 192.168.10.0 0.0.0.3 area 0
!
ip classless
no ip http server
!
access-list 101 remark Define Interesting Traffic
access-list 101 deny   ospf any any
```

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```
!--- Mark OSPF as uninteresting
!--- This will prevent OSPF hellos from keeping the link up

access-list 101 permit ip any any
!
dialer watch-list 8 ip 172.22.53.0 255.255.255.0

!--- define the route to be watched
!--- this exact route(including subnet mask) must exist in the routing table

dialer-list 1 protocol ip list 101

!--- interesting traffic is defined by access-list 101
!--- This is applied to BRI0 using dialer-group 1


!
line con 0
 login authentication NO_AUTHEN
 transport input none
line Aux 0

!--- line configuration for the AUX port

 exec-timeout 0 0

!--- disable exec timeout on the interface

 autoselect ppp
 script dialer Dialout

!--- Use the chat script named "Dialout" for outgoing calls.

 modem InOut

!--- enable incoming and outgoing calls

 modem autoconfigure type MY_USR_MODEM

!--- Apply the modemcap MY_USR_MODEM (configured previously) to initalize the modem.

 transport input all
 stopbits 1

!--- Improve throughput by reducing async framing overhead.

 speed 115200

!--- AUX port on the 2600 supports a speed of 115200.
!--- Note: If you are routing through the AUX port, each character generates a
!--- processor interrupt. This is an abnormally high load on the CPU, which can be
!--- resolved by using a lower AUX port speed.

 flowcontrol hardware

!--- This configures RTS/CTS flow control.

line vty 0 4
!
no scheduler allocate
end
```

maui-rtr-11 (Central Site)


```
maui-rtr-11#show running-config
Building configuration...

Current configuration:
!
version 12.1
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname maui-rtr-11
!
aaa new-model
aaa authentication login default local
aaa authentication login NO_AUTHEN none
aaa authentication ppp default local

!--- This is the basic AAA configuration for ppp calls

enable secret 5 <deleted>
!
username admin password 0 <deleted>
username maui-rtr-10 password 0 cisco

!--- Username for remote router (maui-rtr-10) and shared secret
!--- Shared secret(used for CHAP authentication) must be the same on both sides

!
memory-size iomem 30
!
ip subnet-zero
!
modemcap entry MY_USR_MODEM:MSC=&F1S0;=1

!--- Modemcap (MY_USR_MODEM) will be applied to the AUX port line interface
!--- This modemcap was created using the command:
!--- modemcap edit MY_USR_MODEM miscellaneous &F1S0;=1
!--- Refer to the Modem-Router Connection Guide for more information

!
interface Loopback0
 ip address 172.22.1.1 255.255.255.0
!
interface FastEthernet0/0

!--- Interface to corporate network

 ip address 172.22.53.105 255.255.255.0
 no keepalive
 duplex auto
 speed auto
!

! <<-- irrelevant output removed

!
interface Serial0/1

!--- Primary Link

 ip address 192.168.10.1 255.255.255.252
 encapsulation ppp
 ppp authentication chap
!
```

Cisco - Configuring AUX-to-AUX Port Async Backup with Dialer Watch

```
interface Serial0/2
 no ip address
 shutdown
!
interface Async65

!--- Async interface corresponding to the AUX Port(backup link)
!--- This was determined using the show line command

 ip unnumbered Loopback0

!--- Use Loopback 0 address for this interface
!--- The remote router will have a dialer map to this loopback address

 encapsulation ppp
 dialer in-band
 dialer idle-timeout 900
 dialer map ip 172.17.1.1 name maui-rtr-10 broadcast

!--- dialer map for the AUX Port interface of the remote router
!--- Remember that the remote router AUX port is unnumbered to its Loopback 0

 dialer-group 1

!--- apply interesting traffic defined in dialer-list 1

 async default routing

!--- permit routing over the async interface
!--- this is required for a routing protocol to run across the async link

 async mode interactive

!--- requires autoselect ppp under the line configuration ppp to be negotiated
!--- This command may be replaced with async mode dedicated


 no peer default ip address

!--- Do not assign the peer an ip address

 ppp authentication chap
!
router ospf 5
 network 172.22.1.0 0.0.0.255 area 0
 network 172.22.53.0 0.0.0.255 area 0
 network 192.168.10.0 0.0.0.3 area 0
!
ip classless
no ip http server
!
dialer-list 1 protocol ip permit

!--- Mark all IP traffic as interesting
!--- This interesting traffic definition is applied to BRI0 using dialer-group 1


!
!
line con 0
 login authentication NO_AUTHEN
 transport input none
line aux 0
```



```
!--- AUX Port line configuration

 autoselect ppp

!--- launch PPP negotiation when PPP packets are received
!--- if the Async Interface has async mode dedicated, this command is not needed

 modem InOut

!---enable incoming and outgoing calls

 modem autoconfigure type MY_USR_MODEM

!--- apply the modemcap MY_USR_MODEM that was configured previously

 transport input all
 stopbits 1

!--- Improve throughput by reducing async framing overhead

 speed 115200

!--- AUX port on the 2600 supports a speed of 115200

 flowcontrol hardware

!--- configures RTS/CTS flow control

line vty 0 4
!
no scheduler allocate
end
```

Verify

This section provides information you can use to confirm your configuration is working properly.

Certain **show** commands are supported by the Output Interpreter tool, which allows you to view an analysis of **show** command output.

Sample show Output

The routing table of the client (maui-rtr-10) with the primary link functioning is shown below:

```
maui-rtr-10#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

     192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.10.0/30 is directly connected, Serial0/1
C       192.168.10.1/32 is directly connected, Serial0/1
     172.17.0.0/24 is subnetted, 1 subnets
C       172.17.1.0 is directly connected, Loopback0
```

```
     172.16.0.0/24 is subnetted, 1 subnets
C       172.16.1.0 is directly connected, Ethernet0/0
     172.22.0.0/16 is variably subnetted, 2 subnets, 2 masks
O       172.22.53.0/24 [110/65] via 192.168.10.1, 00:00:57, Serial0/1
O       172.22.1.1/32 [110/65] via 192.168.10.1, 00:00:59, Serial0/1
```

The output of **show ip route** shown above, displays the OSPF routes learned from the peers using the primary link (serial 0/1). Notice that the route being watched (172.22.53.0 with mask 255.255.255.0) exists in the routing table. This must be verified for dialer watch to function correctly.

Now, we bring down the primary link and dialer watch will activate the backup link.

After the backup link is activated, the OSPF table is exchanged and the new route using the backup link is installed. Traffic now passes across the backup link. An example of this is shown below:

```
maui-rtr-10#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

     172.17.0.0/24 is subnetted, 1 subnets
C       172.17.1.0 is directly connected, Loopback0
     172.16.0.0/24 is subnetted, 1 subnets
C       172.16.1.0 is directly connected, Ethernet0/0
     172.22.0.0/16 is variably subnetted, 2 subnets, 2 masks
O       172.22.53.0/24 [110/870] via 172.22.1.1, 00:00:11, Async65
C       172.22.1.1/32 is directly connected, Async65
```

The output above shows that the routing table has been updated and all traffic for the watched network will use the backup link (Async 65)

Troubleshoot

This section provides information you can use to troubleshoot your configuration.

Troubleshooting Commands

Certain **show** commands are supported by the Output Interpreter tool, which allows you to view an analysis of **show** command output.

Note: Before issuing **debug** commands, please see Important Information on Debug Commands.

- **debug dialer** − To display debugging information about the packets received on a dialer interface. When DDR is enabled on the interface, information concerning the cause of any call (called the Dialing cause) is also displayed. For more information, see the **debug dialer** information in the Debug Commands documentation.

- **debug modem** − To display the modem line activity, modem control and process activation messages on the router.

- **debug chat** − To monitor the execution of the chat script when async/POTS dialing is initiated. Refer to Dialup Technology: Troubleshooting Techniques for more information.

- **debug ppp negotiation** − Displays information on PPP traffic and exchanges while negotiating the PPP components including Link Control Protocol (LCP), Authentication, and Network Control Protocol (NCP). A successful PPP negotiation will first open the LCP state, then Authenticate, and finally negotiate NCP.

- **debug ppp authentication** − Displays the PPP authentication protocol messages, including Challenge Authentication Protocol (CHAP) packet exchanges and Password Authentication Protocol (PAP) exchanges

Sample Debug Output

The debug output below shows the primary link failing and dialer watch recognizing the lost route. The router then initiates the backup link. After the dialer idle−timeout expires, the router checks whether the primary link is down. When the primary link is reestablished, dialer watch disconnects the backup link after the disable timer expires. When looking at the debugs, pay attention to the timestamp in each message as they can provide information on the various timers and idle timeouts that are active.

```
maui-rtr-10#debug dialer
Dial on demand events debugging is on
maui-rtr-10#debug chat
Chat scripts activity debugging is on
maui-rtr-10#debug modem
Modem control/process activation debugging is on
maui-rtr-10#debug ppp negotiation
PPP protocol negotiation debugging is on
maui-rtr-10#debug ppp authentication
PPP authentication debugging is on
maui-rtr-10#
maui-rtr-10#
maui-rtr-10#
maui-rtr-10#
maui-rtr-10#
*Mar  3 17:00:28.136: %LINK-3-UPDOWN: Interface Serial0/1, changed state to down

!--- Primary Link is brought down

*Mar  3 17:00:28.140: Se0/1 IPCP: State is Closed
*Mar  3 17:00:28.140: Se0/1 CDPCP: State is Closed
*Mar  3 17:00:28.140: Se0/1 PPP: Phase is TERMINATING
*Mar  3 17:00:28.140: Se0/1 LCP: State is Closed
*Mar  3 17:00:28.140: Se0/1 PPP: Phase is DOWN
*Mar  3 17:00:28.144: Se0/1 IPCP: Remove route to 192.168.10.1
*Mar  3 17:00:28.252: DDR: Dialer Watch: watch-group = 8

!--- Use dialer watch-group 8

*Mar  3 17:00:28.252: DDR:        network 172.22.53.0/255.255.255.0 DOWN,
*Mar  3 17:00:28.252: DDR:        primary DOWN
```

```
!--- the primary network is down

*Mar  3 17:00:28.252: DDR: Dialer Watch: Dial Reason: Primary of group 8 DOWN

!--- Dialing Reason is that the primary route is down

*Mar  3 17:00:28.252: DDR: Dialer Watch: watch-group = 8,
*Mar  3 17:00:28.252: DDR:        dialing secondary by dialer map 172.22.53.0 on As65

!--- Indicates which dialer map statement is used for the dialout
!--- Dialout will occur on AS 65 (the AUX Port)

*Mar  3 17:00:28.252: As65 DDR: Attempting to dial 84007

!--- Number being dialed for the backup link

*Mar  3 17:00:28.252: CHAT65: Attempting async line dialer script
*Mar  3 17:00:28.256: CHAT65: Dialing using Modem script: Dialout
 & System script: none

!--- Using chat script "Dialout"

*Mar  3 17:00:28.268: CHAT65: process started
*Mar  3 17:00:28.273: CHAT65: Asserting DTR
*Mar  3 17:00:28.273: TTY65: Set DTR to 1
*Mar  3 17:00:28.273: CHAT65: Chat script Dialout started

!--- Chat Script "Dialout" starts

*Mar  3 17:00:28.273: CHAT65: Sending string: AT
*Mar  3 17:00:28.273: CHAT65: Expecting string: OK
*Mar  3 17:00:28.433: CHAT65: Completed match for expect: OK
*Mar  3 17:00:28.433: CHAT65: Sending string: ATDT \T<84007>
*Mar  3 17:00:28.433: CHAT65: Expecting string: CONNECT
*Mar  3 17:00:29.138: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1,
 changed state to down
*Mar  3 17:00:42.560: CHAT65: Completed match for expect: CONNECT
*Mar  3 17:00:42.560: CHAT65: Sending string: \c
*Mar  3 17:00:42.560: CHAT65: Chat script Dialout finished, status = Success

!--- Chat script is successful
!--- Notice the Expect/Send Attributes and the time elapsed

*Mar  3 17:00:42.564: TTY65: destroy timer type 1
*Mar  3 17:00:42.564: TTY65: destroy timer type 0
*Mar  3 17:00:42.568: As65 IPCP: Install route to 172.22.53.0
*Mar  3 17:00:44.567: %LINK-3-UPDOWN: Interface Async65, changed state to up
 Dialer statechange to up Async65
*Mar  3 17:00:44.571: As65 DDR: Dialer Watch: resetting call in progress
 Dialer call has been placed Async65
*Mar  3 17:00:44.571: As65 PPP: Treating connection as a callout

!--- PPP negotiation begins

*Mar  3 17:00:44.571: As65 PPP: Phase is ESTABLISHING, Active Open
*Mar  3 17:00:44.571: As65 LCP: O CONFREQ [Closed] id 11 len 25
*Mar  3 17:00:44.571: As65 LCP:    ACCM 0x000A0000 (0x0206000A0000)
*Mar  3 17:00:44.575: As65 LCP:    AuthProto CHAP (0x0305C22305)
*Mar  3 17:00:44.575: As65 LCP:    MagicNumber 0x103EC1ED (0x0506103EC1ED)
*Mar  3 17:00:44.575: As65 LCP:    PFC (0x0702)
*Mar  3 17:00:44.575: As65 LCP:    ACFC (0x0802)
*Mar  3 17:00:46.575: As65 LCP: TIMEout: State REQsent
*Mar  3 17:00:46.575: As65 LCP: O CONFREQ [REQsent] id 12 Len 25
*Mar  3 17:00:46.575: As65 LCP:    ACCM 0x000A0000 (0x0206000A0000)
```



```
*Mar  3 17:00:46.575: As65 LCP:    AuthProto CHAP (0x0305C22305)
*Mar  3 17:00:46.575: As65 LCP:    MagicNumber 0x103EC1ED (0x0506103EC1ED)
*Mar  3 17:00:46.575: As65 LCP:    PFC (0x0702)
*Mar  3 17:00:46.575: As65 LCP:    ACFC (0x0802)
*Mar  3 17:00:46.703: As65 LCP: I CONFACK [REQsent] id 12 Len 25
*Mar  3 17:00:46.707: As65 LCP:    ACCM 0x000A0000 (0x0206000A0000)
*Mar  3 17:00:46.707: As65 LCP:    AuthProto CHAP (0x0305C22305)
*Mar  3 17:00:46.707: As65 LCP:    MagicNumber 0x103EC1ED (0x0506103EC1ED)
*Mar  3 17:00:46.707: As65 LCP:    PFC (0x0702)
*Mar  3 17:00:46.707: As65 LCP:    ACFC (0x0802)
*Mar  3 17:00:46.715: As65 LCP: I CONFREQ [ACKrcvd] id 21 Len 25
*Mar  3 17:00:46.715: As65 LCP:    ACCM 0x000A0000 (0x0206000A0000)
*Mar  3 17:00:46.715: As65 LCP:    AuthProto CHAP (0x0305C22305)
*Mar  3 17:00:46.719: As65 LCP:    MagicNumber 0x30CB092E (0x050630CB092E)
*Mar  3 17:00:46.719: As65 LCP:    PFC (0x0702)
*Mar  3 17:00:46.719: As65 LCP:    ACFC (0x0802)
*Mar  3 17:00:46.719: As65 LCP: O CONFACK [ACKrcvd] id 21 Len 25
*Mar  3 17:00:46.719: As65 LCP:    ACCM 0x000A0000 (0x0206000A0000)
*Mar  3 17:00:46.719: As65 LCP:    AuthProto CHAP (0x0305C22305)
*Mar  3 17:00:46.723: As65 LCP:    MagicNumber 0x30CB092E (0x050630CB092E)
*Mar  3 17:00:46.723: As65 LCP:    PFC (0x0702)
*Mar  3 17:00:46.723: As65 LCP:    ACFC (0x0802)
*Mar  3 17:00:46.723: As65 LCP: State is Open
*Mar  3 17:00:46.723: As65 PPP: Phase is AUTHENTICATING, by both

!--- Two-way PPP CHAP authentication begins

*Mar  3 17:00:46.723: As65 CHAP: O CHALLENGE id 7 Len 32 from "maui-rtr-10"
*Mar  3 17:00:46.847: As65 CHAP: I CHALLENGE id 7 Len 32 from "maui-rtr-11"
*Mar  3 17:00:46.851: As65 CHAP: O RESPONSE id 7 Len 32 from "maui-rtr-10"
*Mar  3 17:00:46.967: As65 CHAP: I SUCCESS id 7 Len 4
*Mar  3 17:00:46.971: As65 CHAP: I RESPONSE id 7 Len 32 from "maui-rtr-11"
*Mar  3 17:00:46.975: As65 CHAP: O SUCCESS id 7 Len 4

!--- Incoming and Outgoing CHAP authentication are successful

*Mar  3 17:00:46.975: As65 PPP: Phase is UP
*Mar  3 17:00:46.979: As65 IPCP: O CONFREQ [Closed] id 8 Len 10

!--- IPCP negotiation begins

*Mar  3 17:00:46.979: As65 IPCP:    Address 172.17.1.1 (0x0306AC110101)
*Mar  3 17:00:46.979: As65 CDPCP: O CONFREQ [Closed] id 7 Len 4
*Mar  3 17:00:47.087: As65 IPCP: I CONFREQ [REQsent] id 7 Len 10
*Mar  3 17:00:47.091: As65 IPCP:    Address 172.22.1.1 (0x0306AC160101)
*Mar  3 17:00:47.091: As65 IPCP: O CONFACK [REQsent] id 7 Len 10
*Mar  3 17:00:47.091: As65 IPCP:    Address 172.22.1.1 (0x0306AC160101)
*Mar  3 17:00:47.095: As65 CDPCP: I CONFREQ [REQsent] id 7 Len 4
*Mar  3 17:00:47.095: As65 CDPCP: O CONFACK [REQsent] id 7 Len 4
*Mar  3 17:00:47.099: As65 IPCP: I CONFACK [ACKsent] id 8 Len 10
*Mar  3 17:00:47.099: As65 IPCP:    Address 172.17.1.1 (0x0306AC110101)
*Mar  3 17:00:47.099: As65 IPCP: State is Open
*Mar  3 17:00:47.103: As65 DDR: dialer protocol up
*Mar  3 17:00:47.103: As65 IPCP: Remove route to 172.22.53.0
*Mar  3 17:00:47.103: As65 CDPCP: I CONFACK [ACKsent] id 7 Len 4
*Mar  3 17:00:47.107: As65 CDPCP: State is Open
*Mar  3 17:00:47.107: As65 IPCP: Install route to 172.22.1.1
*Mar  3 17:00:47.708: %LINEPROTO-5-UPDOWN: Line protocol on Interface Async65,
 changed state to up

!--- Async 65 (AUX Port) is UP

*Mar  3 17:01:14.572: As65 DDR: idle timeout
```

Cisco − Configuring AUX−to−AUX Port Async Backup with Dialer Watch

```
! -- Idle Timeout expires
! -- The router will check to see if the primary link has come up

*Mar  3 17:01:14.572: DDR: Dialer Watch: watch-group = 8
*Mar  3 17:01:14.572: DDR:        network 172.22.53.0/255.255.255.0 UP,

! -- A route for the watched network exists (due to the active backup link)

*Mar  3 17:01:14.572: DDR:        primary DOWN

! -- the primary network is down

*Mar  3 17:02:05.191: As65 DDR: idle timeout

! -- Idle Timeout expires
! -- The router will check to see if the primary link has come up

*Mar  3 17:02:05.191: DDR: Dialer Watch: watch-group = 8
*Mar  3 17:02:05.191: DDR:        network 172.22.53.0/255.255.255.0 UP,
*Mar  3 17:02:05.191: DDR:        primary DOWN

! -- the primary network is still down

*Mar  3 17:02:50.982: %LINK-3-UPDOWN: Interface Serial0/1, changed state to up

! -- primary link is reestablished

*Mar  3 17:02:50.986: Se0/1 PPP: Treating connection as a dedicated line
*Mar  3 17:02:50.986: Se0/1 PPP: Phase is ESTABLISHING, Active Open
...
...
<<--- Primary link PPP negotiation output omitted

...
*Mar  3 17:02:51.039: Se0/1 IPCP: Install route to 192.168.10.1
*Mar  3 17:02:52.020: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1,
 changed state to up
*Mar  3 17:03:05.194: As65 DDR: idle timeout

! -- next Idle Timeout expires
! -- The router will check to see if the primary link has come up

*Mar  3 17:03:05.194: DDR: Dialer Watch: watch-group = 8
*Mar  3 17:03:05.194: DDR:        network 172.22.53.0/255.255.255.0 UP,
*Mar  3 17:03:05.194: DDR:        primary DOWN

!--- Dialer watch considers the primary network still down
!--- Even though the primary link is "up", the OSPF table has not yet been exchanged
!--- The primary link is not considered up until the route is installed

*Mar  3 17:03:35.195: As65 DDR: idle timeout

! -- next Idle Timeout (30 seconds) expires
! -- The router will check to see if the primary link has come up

*Mar  3 17:03:35.195: DDR: Dialer Watch: watch-group = 8
*Mar  3 17:03:35.195: DDR:        network 172.22.53.0/255.255.255.0 UP,

! -- A route for the watched network exists

*Mar  3 17:03:35.195: DDR:        primary UP

! -- the primary network is UP.
!--- Dialer watch will initiate a disconnect of the backup link.
```



```
*Mar  3 17:03:35.195: As65 DDR: starting watch disable timer

! -- delays disconnecting the backup interface  after the primary interface recovers
! -- This timer is 15 seconds as configured with the command dialer watch-disable 15


*Mar  3 17:03:50.196: As65 DDR: watch disable timeout

! -- 15 second disconnect delay expires. The link will be immediately brought down

*Mar  3 17:03:50.196: As65 DDR: disconnecting call

!--- Call on Async 65 (AUX Port) is disconnected

*Mar  3 17:03:50.196: TTY65: Async Int reset: Dropping DTR
...
...
<<--- Link tear down Messages omitted

...
*Mar  3 17:03:57.203: %LINK-3-UPDOWN: Interface Async65, changed state to down
```

Related Information

- **Modem−Router Connection Guide**
- **Access Technology Support Page**
- **Technical Support − Cisco Systems**

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Cisco − Configuring AUX−to−AUX Port Async Backup with Dialer Watch