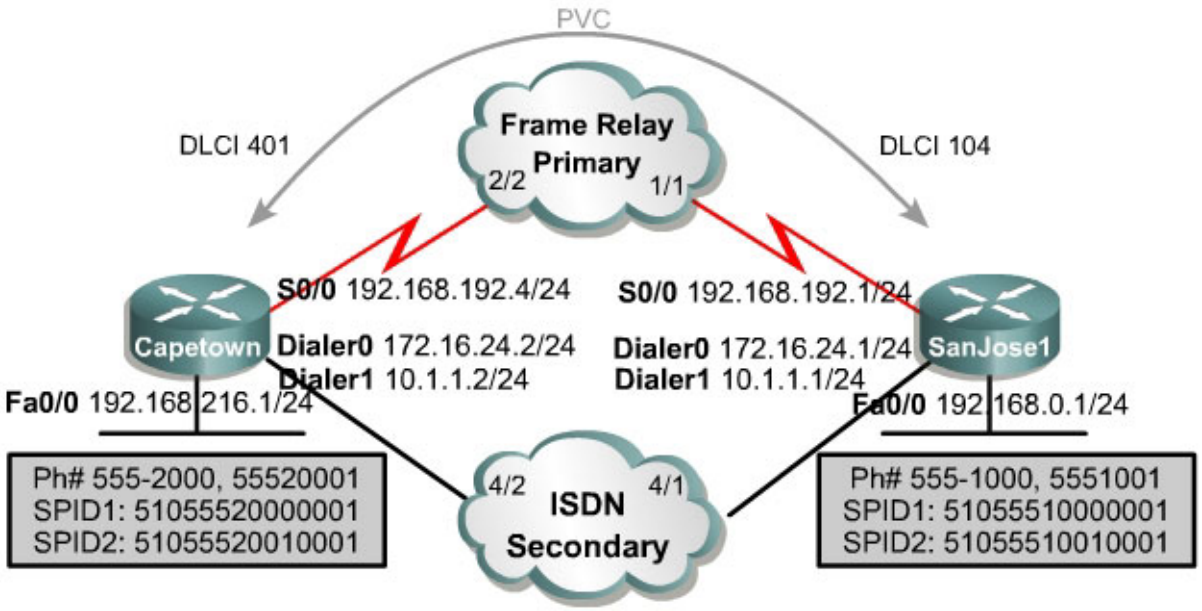
Lab 8.7.3 Configuring Dialer Backup with Dialer Profiles



Objective

In this lab, the student will configure ISDN dial backup with dialer profiles.

Scenario

To ensure full time point-to-point WAN connectivity between SanJose1 and Capetown, configure ISDN dial backup using the physical BRI interface. By configuring the physical BRI interface for dial backup, only dial backup or traffic overload can be enabled, but not both. To overcome this limitation, configure dial backup using dialer profiles. By utilizing dialer profiles for dial backup, an idle ISDN connection can be used for load balancing and dial backup.

Step 1

Build the network as shown in the diagram. If the Atlas 550 is used as a WAN emulator, be sure to use the ports as indicated in the diagram. Before beginning this lab, it is recommended that each router be reloaded after erasing its startup configuration. This will prevent problems that may be caused by residual configurations.

Step 2

Configure SanJose1 and Capetown to use the appropriate ISDN switch type, National ISDN-1. PPP encapsulation and CHAP will be used on the B channels. Therefore, enter the case sensitive username and password information on both routers as shown in the following:

```
SanJose1(config)#isdn switch-type basic-ni
SanJose1(config)#username Capetown password cisco
SanJose1(config)#username jill password cisco
SanJose1(config)#enable password cisco
```



```
Capetown(config)#isdn switch-type basic-ni
Capetown(config)#username SanJose1 password cisco
Capetown(config)#username jack password cisco
Capetown(config)#enable password cisco
```

On both routers, configure **dialer-list 1** to identify all IP traffic as “interesting”. The following configuration will initiate a dialup session:

```
SanJose1(config)#dialer-list 1 protocol ip permit
```

Step 3

Configure the physical BRI interface on SanJose1 and Capetown to use dialer profiles. Be sure to enter encapsulation configuration commands for both the physical interface (BRI 0/0) and the logical interface, such as dialer0 and so on. Also, remember to use the **dialer pool-member** command as follows to bind the physical BRI interface with the logical dialer interfaces:

```
SanJose1(config)#interface bri0/0
SanJose1(config-if)#isdn spid1 51055510000001 5551000
SanJose1(config-if)#isdn spid2 51055510010001 5551001
SanJose1(config-if)#encapsulation ppp
SanJose1(config-if)#ppp authentication chap
SanJose1(config-if)#dialer pool-member 1
SanJose1(config-if)#no shutdown

Capetown(config)#interface bri0/0
Capetown(config-if)#isdn spid1 51055520000001 5552000
Capetown(config-if)#isdn spid2 51055520010001 5552001
Capetown(config-if)#encapsulation ppp
Capetown(config-if)#ppp authentication chap
Capetown(config-if)#dialer pool-member 1
Capetown(config-if)#no shutdown
```

Now the physical BRI interfaces have been configured for ISDN. Next, use the following commands to configure Frame Relay on both routers:

```
SanJose1(config-if)#interface serial 0/0
SanJose1(config-if)#encapsulation frame-relay
SanJose1(config-if)#frame-relay map ip 192.168.192.4 104 broadcast
SanJose1(config-if)#ip address 192.168.192.1 255.255.255.0
```

Step 4

Configure dialer profiles for both routers, starting with SanJose1. Create two dialer interfaces for both routers. Each dialer interface will be configured to support a specific dial backup feature. Interface dialer 0 will be configured for process switching that will enable load balancing. Interface dialer 1 will be used as the backup interface. Configurations are shown as follows:

```
SanJose1(config)#interface dialer 0
SanJose1(config-if)#ip address 172.16.24.1 255.255.255.0
SanJose1(config-if)#dialer pool 1
SanJose1(config-if)#encapsulation ppp
SanJose1(config-if)#ppp authentication chap
SanJose1(config-if)#dialer remote-name Capetown
SanJose1(config-if)#dialer-group 1
SanJose1(config-if)#dialer string 5552000
SanJose1(config)#interface dialer 1
SanJose1(config-if)#ip address 10.1.1.1 255.255.255.0
SanJose1(config-if)#dialer pool 1
SanJose1(config-if)#encapsulation ppp
SanJose1(config-if)#ppp authentication chap
```



```
SanJose1(config-if)#ppp chap hostname jack
SanJose1(config-if)#dialer remote-name jill
SanJose1(config-if)#dialer-group 1
SanJose1(config-if)#dialer string 5552001
```

Now create two dialer profiles on Capetown that will be used to communicate with SanJose1, as shown in the following:

```
Capetown(config)#interface dialer 0
Capetown(config-if)#ip address 172.16.24.2 255.255.255.0
Capetown(config-if)#dialer pool 1
Capetown(config-if)#encapsulation ppp
Capetown(config-if)#ppp authentication chap
Capetown(config-if)#dialer remote-name SanJose1
Capetown(config-if)#dialer-group 1
Capetown(config-if)#dialer string 5551000
Capetown(config)#interface dialer 1
Capetown(config-if)#ip address 10.1.1.2 255.255.255.0
Capetown(config-if)#dialer pool 1
Capetown(config-if)#encapsulation ppp
Capetown(config-if)#ppp authentication chap
Capetown(config-if)#ppp chap hostname jill
Capetown(config-if)#dialer remote-name jack
Capetown(config-if)#dialer-group 1
Capetown(config-if)#dialer string 5551001
```

Step 5

Configure multiple static routes on SanJose1 to use both dialer interfaces and the serial interface as the exit interface to the Capetown LAN as follows:

```
SanJose1(config)#ip route 192.168.216.0 255.255.255.0 192.168.192.4
SanJose1(config)#ip route 192.168.216.0 255.255.255.0 Dialer1
SanJose1(config)#ip route 192.168.216.0 255.255.255.0 Dialer0
```

Static routes must also be configured on Capetown, as follows, so that it has a route to reach the SanJose1 LAN:

```
Capetown(config)#ip route 192.168.0.0 255.255.255.0 192.168.192.1
Capetown(config)#ip route 192.168.0.0 255.255.255.0 Dialer1
Capetown(config)#ip route 192.168.0.0 255.255.255.0 Dialer0
```

View the following routing table on SanJose1 to verify that both dialer interfaces and the serial interface are used as exit interfaces to the Capetown LAN:

```
SanJose1#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
C    192.168.192.0/24 is directly connected, Serial0/0
     172.16.0.0/24 is subnetted, 1 subnets
C       172.16.24.0 is directly connected, Dialer0
S    192.168.216.0/24 is directly connected, Dialer0
                      is directly connected, via 192.168.192.4
                      is directly connected, Dialer1
```



```
     10.0.0.0/24 is subnetted, 1 subnets
C       10.1.1.0 is directly connected, Dialer1
C    192.168.0.0/24 is directly connected, FastEthernet0/0
```

Step 6

Enable process switching on all WAN interfaces on SanJose1. With emerging Layer 3 technologies, process switching will rarely be used on a production network. For the purpose of this lab, enter the following to configure SanJose1 to load-balance on a per-packet basis over the point-to-point and the ISDN connection:

```
SanJose1(config)#interface serial 0/0
SanJose1(config-if)#no ip route-cache
SanJose1(config-if)#interface dialer 0
SanJose1(config-if)#no ip route-cache
SanJose1(config-if)#interface dialer 1
SanJose1(config-if)#no ip route-cache
```

By enabling process switching on both dialer interfaces and on the serial interface, half the packets will be sent out through the serial interface. The other half of the packets will travel over the dialer interfaces. The path selection alternates with each packet received.

Step 7

Make the secondary ISDN link active in the event the primary link fails. Issue the following to configure the physical BRI 0/0 interface as a backup interface to Serial0/0 on SanJose1:

```
SanJose1(config)#interface s0/0
SanJose1(config-if)#backup interface dialer 1
SanJose1(config-if)#backup delay 6 8
```

Use the **show ip route** command as follows to examine SanJose1's routing table:

Note: The static route that utilizes interface dialer 1 has been flushed from the SanJose1 routing table.

```
SanJose1#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
C    192.168.192.0/24 is directly connected, Serial0/0
     172.16.0.0/24 is subnetted, 1 subnets
C       172.16.24.0 is directly connected, Dialer0
S    192.168.216.0/24 is directly connected, Serial0/0
                      is directly connected, Dialer0
C    192.168.0.0/24 is directly connected, FastEthernet0/0
```

Step 8

SanJose1 has two routes to the destination network in the table. Verify that SanJose1 is load balancing incoming traffic over both primary and secondary links. Observe the load balancing process by using the **debug ip packet** command. The following command outputs information about IP packets sent and received by the router:


```
SanJose1#debug ip packet
```

With the **debug** running, send a few packets from SanJose1 to the Capetown 192.168.216.0 network and observe the output. Notice that the **debug** output shows that IP packets are sent out through the serial 0/0 and dialer 0 interface.

```
SanJose1#ping 192.168.216.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.216.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/34/36 ms
SanJose1#
IP: s=192.168.192.1 (local), d=192.168.216.1 (Serial0/0), len 100, sending
IP: s=192.168.216.1 (Serial0/0), d=192.168.192.1 (Serial0/0), len 100, rcvd 3
IP: s=192.168.192.1 (local), d=192.168.216.1 (Dialer0), len 100, sending
IP: s=192.168.216.1 (Serial0/0), d=192.168.192.1 (Serial0/0), len 100, rcvd 3
IP: s=192.168.192.1 (local), d=192.168.216.1 (Serial0/0), len 100, sending
IP: s=192.168.216.1 (Serial0/0), d=192.168.192.1 (Serial0/0), len 100, rcvd 3
IP: s=192.168.192.1 (local), d=192.168.216.1 (Dialer0), len 100, sending
IP: s=192.168.216.1 (Serial0/0), d=192.168.192.1 (Serial0/0), len 100, rcvd 3
IP: s=192.168.192.1 (local), d=192.168.216.1 (Serial0/0), len 100, sending
IP: s=192.168.216.1 (Serial0/0), d=192.168.192.1 (Serial0/0), len 100, rcvd 3
```

Step 9

Prior to testing the backup configuration, use the **debug backup** command as follows to monitor the backup process on SanJose1:

```
SanJose1#debug backup
Backup events debugging is on
```

To test dial backup with dialer profiles, unplug the serial cable on both routers. Notice the **debug** output on SanJose1. The following shows that interface dialer 1 has changed its state from a backup passive mode to an active state: Interface dialer 0

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0,changed state to down
BACKUP(Serial0/0): event = primary went down
BACKUP(Serial0/0): changed state to "waiting to backup"
BACKUP(Serial0/0): event = timer expired
BACKUP(Serial0/0): secondary interface (Dialer1) made active
BACKUP(Serial0/0): changed state to "backup mode"
%LINK-3-UPDOWN: Interface Dialer1, changed state to up
BACKUP(Dialer1): event = primary came up
```

Step 10

Interface dialer 1 has now become the primary link. Verify that SanJose1 is load balancing between the dialer 0 interface and dialer 1 interface. With the **debug ip packet** command still enabled on SanJose1, ping 192.168.216.1 from SanJose1 as follows:

```
SanJose1#ping 192.168.216.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.216.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/33/36 ms
SanJose1#
07:03:27: IP: s=10.1.1.1 (local), d=192.168.216.1 (Dialer1), len 100, sending
07:03:27: IP: s=192.168.216.1 (Dialer1), d=10.1.1.1 (Dialer1), len 100, rcvd 3
07:03:27: IP: s=10.1.1.1 (local), d=192.168.216.1 (Dialer0), len 100, sending
07:03:27: IP: s=192.168.216.1 (Dialer1), d=10.1.1.1 (Dialer1), len 100, rcvd 3
```



```
07:03:27: IP: s=10.1.1.1 (local), d=192.168.216.1 (Dialer1), len 100, sending
07:03:28: IP: s=192.168.216.1 (Dialer1), d=10.1.1.1 (Dialer1), len 100, rcvd 3
07:03:28: IP: s=10.1.1.1 (local), d=192.168.216.1 (Dialer0), len 100, sending
07:03:28: IP: s=192.168.216.1 (Dialer1), d=10.1.1.1 (Dialer1), len 100, rcvd 3
07:03:28: IP: s=10.1.1.1 (local), d=192.168.216.1 (Dialer1), len 100, sending
07:03:28: IP: s=192.168.216.1 (Dialer1), d=10.1.1.1 (Dialer1), len 100, rcvd 3
```

From the **debug** output, packet flow from SanJose1 is sent out the dialer 0 interface and dialer 1 interface.

