Chapter 9: WAN Backup

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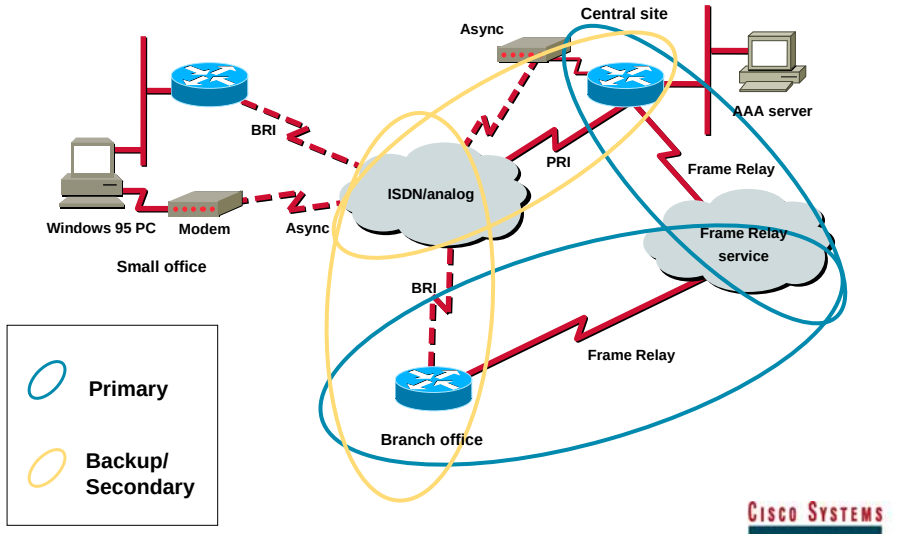
Objectives

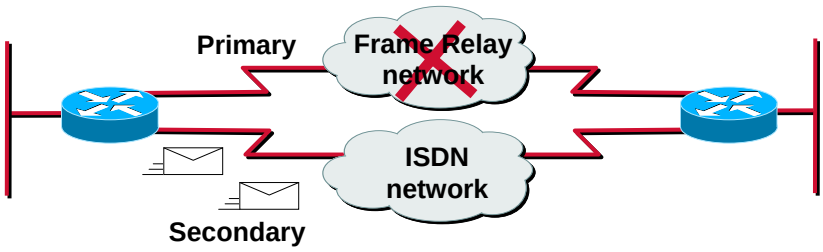
Upon completion of this chapter, you will be able to perform the following tasks:

- **Configure a backup connection that activates upon primary line failures**
- **Configure a backup connection to engage when the primary line reaches a specified threshold**
- **Configure a dialer interface and backup interface to function as backup**

Chapter Activities

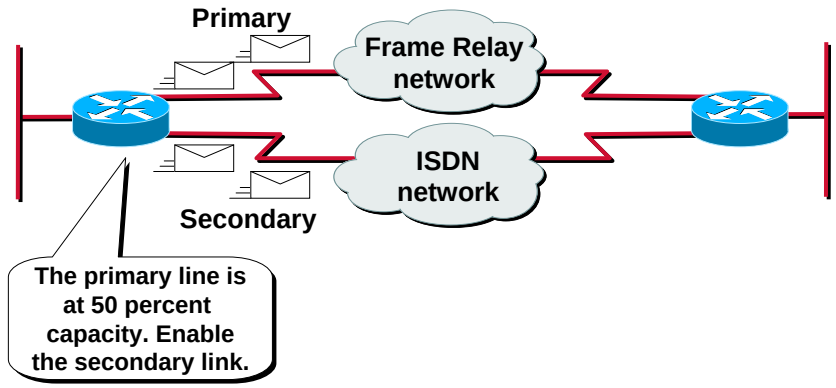


Dial Backup for Primary Line Failures



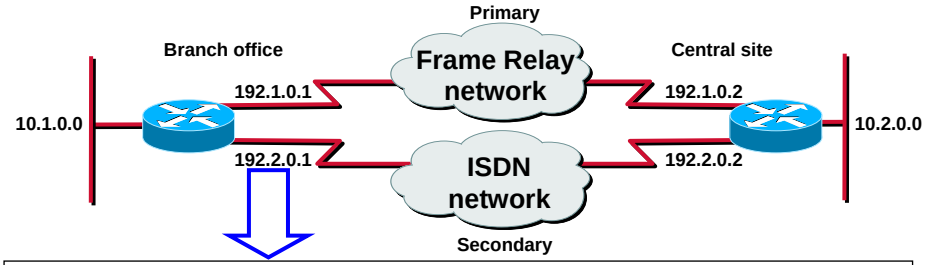
- A backup connection will enable if the primary line fails

Dial Backup for High Primary Line Usage



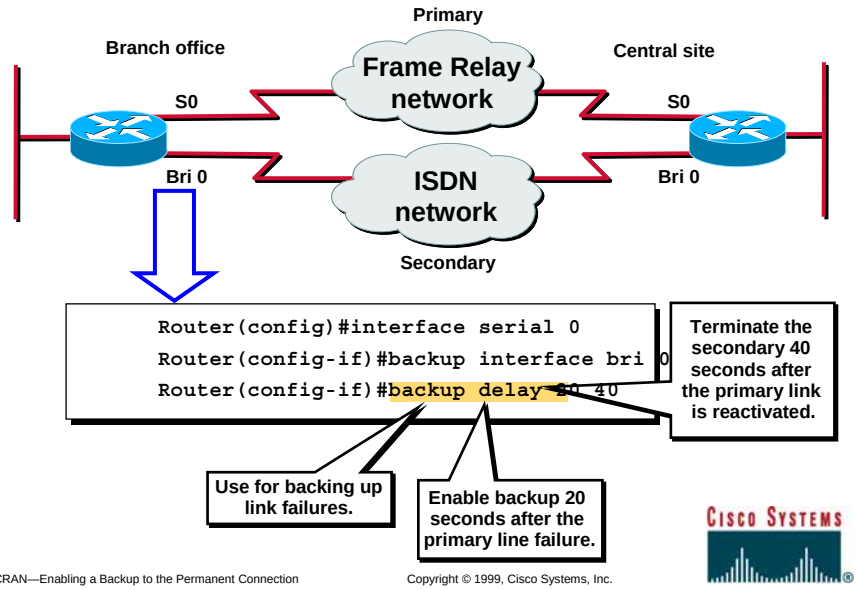
- A backup connection will enable if the primary line reaches a specified threshold

Activating Dial Backup




```
Router#show interface dialer 1
Dialer1 is standby mode, line protocol is down
 Hardware is Unknown
 Internet address is 192.2.0.1/24
 MTU 1500 bytes, BW 56 Kbit, DLY 20000 usec, rely 255/255, load 1/255
 Encapsulation PPP, loopback not set
 DTR is pulsed for 1 seconds on reset
<Output Omitted>
```

Activating Dial Backup Example



Activating Dial Backup for Line Failures

```
Router(config-if)#backup interface interface-type number
```

- Specifies the backup interface

```
Router(config-if)#backup delay {enable-delay | never}
{disable-delay | never}
```

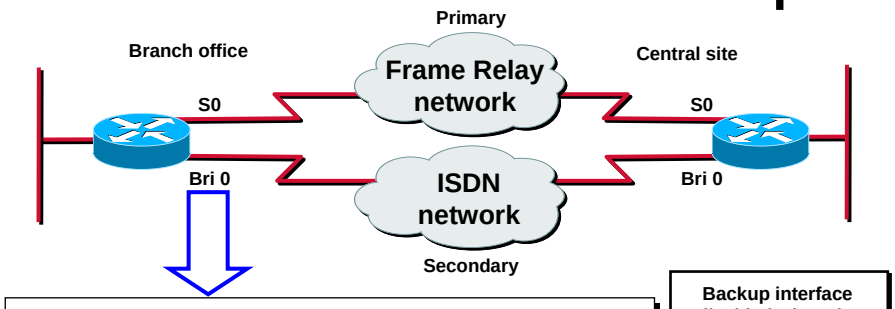
- Designates when to activate the backup line if a primary line fails

Backup Delay Command

```
Router(config-if)#backup delay {enable-delay | never}
{disable-delay | never}
```

backup delay Arguments	Description
enable-delay	Number of seconds that elapse after the primary line goes down before the Cisco IOS® software activates the secondary line
disable-delay	Number of seconds that elapse after the primary line comes up before the Cisco IOS® software deactivates the secondary line
never	Prevents the secondary line from being activated or deactivated

Configuring Dial Backup for Excessive Traffic Load Example



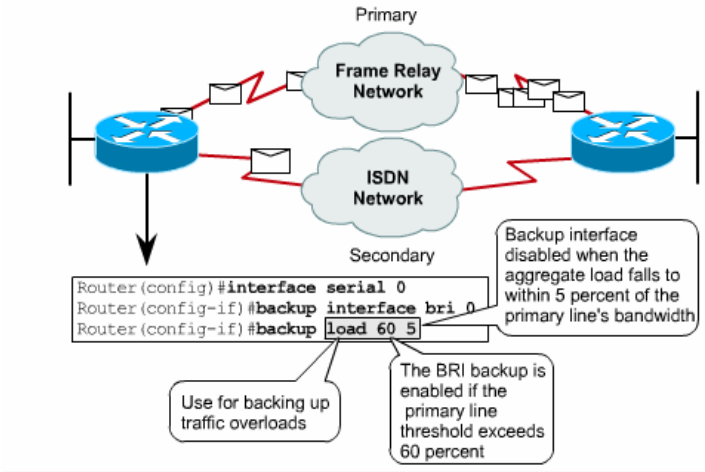

```
Router(config)#interface serial 0
Router(config-if)#backup interface bri 0
Router(config-if)#backup load 60 5
```

Backup interface disabled when the aggregate load falls to within 5 percent of the primary line's bandwidth.

Use for backing up traffic overloads.

The BRI backup is enabled if the primary line threshold exceeds 60 percent.

Dial Backup for Excessive Traffic



In the example, the secondary link is established when the primary load reaches 60 percent capacity. It remains active until the combined traffic load on both lines drops to five percent of the primary link's capacity.

Configuring Dial Backup for Excessive Traffic Load

```
Router(config-if)#backup interface interface-type number
```

- **Specifies the backup interface**

```
Router(config-if)#backup load {enable-threshold | never}
{disable-load | never}
```

- **Specifies when the backup interface should enable or disable**

Backup load Command

```
Router(config-if)#backup load {enable-threshold | never}
{disable-load | never}
```

backup load Arguments	Description
Enable-threshold	Percentage of available bandwidth of the primary line that the traffic load must exceed to enable dial backup.
disable-load	Percentage of available bandwidth of the primary line that the traffic load must be less than to disable dial backup
never	Prevents the secondary line from being activated or deactivated.

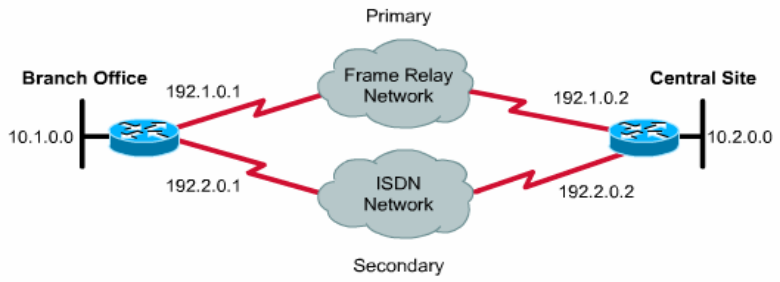
Backup Interfaces Operations

Standby Mode

The Backup Interface is in Standby Mode

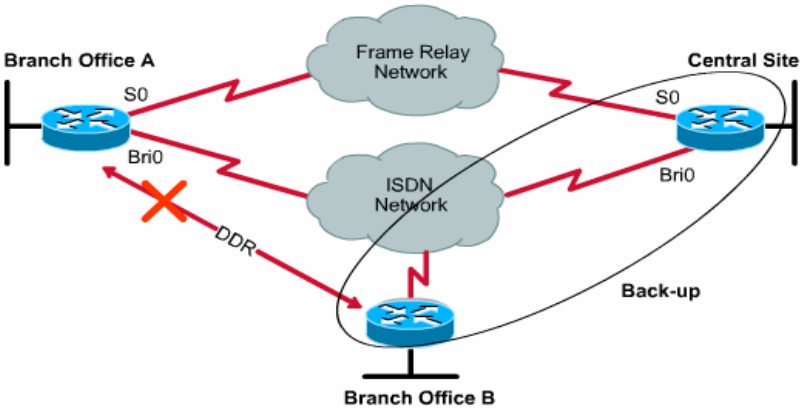
```
RTA#show int bri0/0
BRI0/0 is standby mode, line protocol is down
  Hardware is PQUICC BRI with U interface
  Internet address is 192.168.16.4/24
  MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation PPP, loopback not set
<output ommited>
```

Backup Interface in Standby Mode



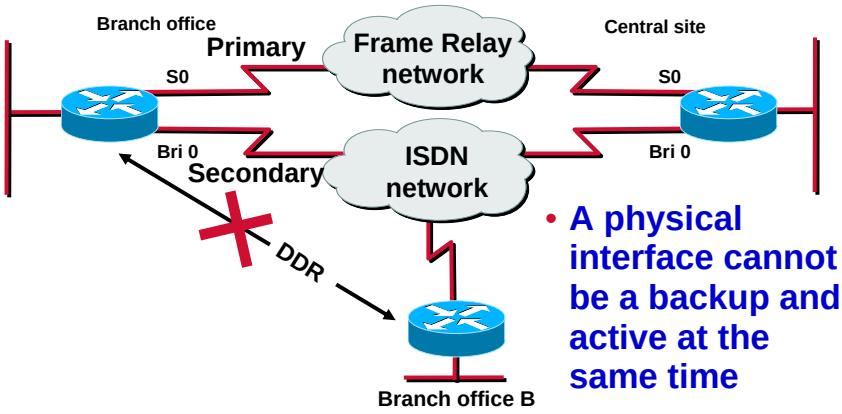
Placing a line in standby mode means putting it in a non-productive state. The line cannot be activated until the primary line fails (or reaches a specified utilization rate). The interface is in standby mode and cannot be used to route other traffic. When in standby mode, the secondary route does not appear in the routing table.

Backup Interface Operations



However, DDR cannot be used as a connection to Branch Office B because the Branch Office A BRI 0 interface is in standby mode. This is a limitation to the dial-backup feature and made dial backup less popular until dialer profiles evolved.

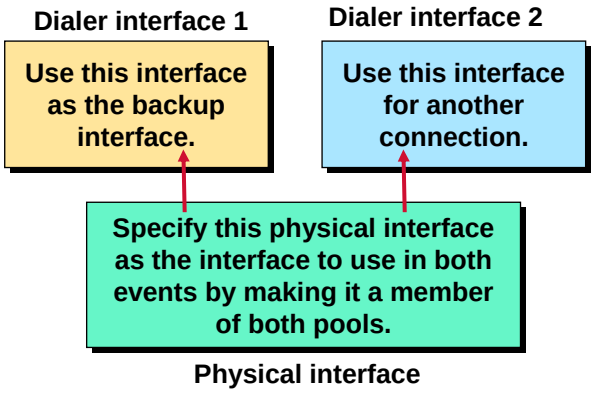
Physical Interfaces as Backup Limitations



- A physical interface cannot be a backup and active at the same time

In the example, the secondary link is established only when the primary line triggers the secondary line. However, DDR cannot be used as a connection to Branch Office B because the Central Site's BRI0 interface is in standby mode. This is a limitation to the dial backup feature and makes dial backup less popular until dialer profiles evolved.

Using Dialer Interfaces as the Backup Interface



- A dialer interface can be used as the backup without deactivating the physical interface

By using a dialer interface as the backup interface, a specific dialer rather than a physical interface can be placed in standby mode. A second dialer interface can be configured to allow a DDR connection to another location. By making a physical interface a member of both dialer pools, the interface can now serve both functions and efficiency is increased.

Configuring a Backup Dialer Profile

Dialer interface

Step 1

```
interface dialer number
ip unnumbered loopback0
encapsulation ppp
dialer remote-name name
dialer string string
dialer pool number
dialer-group number
```

Dialer pool

Configuring a Backup Dialer Profile (cont.)

Dialer interface

Step 1

```
interface dialer number
ip unnumbered loopback0
encapsulation ppp
dialer remote-name name
dialer string string
dialer pool number
dialer-group number
```

Dialer pool

Physical backup interface

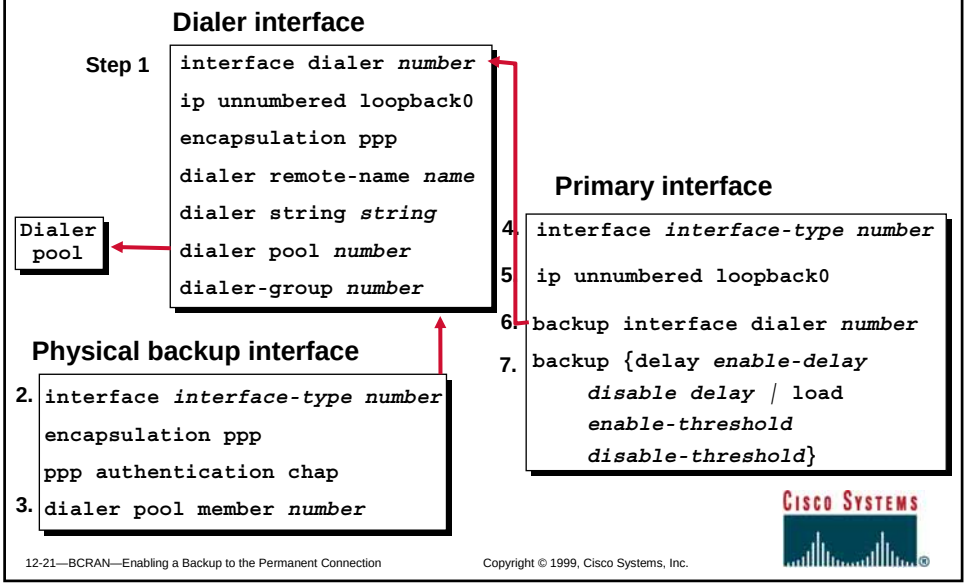
Step 2

```
interface type number
encapsulation ppp
ppp authentication chap
```

Step 3

```
dialer pool member number
```

Configuring a Backup Dialer Profile (cont.)



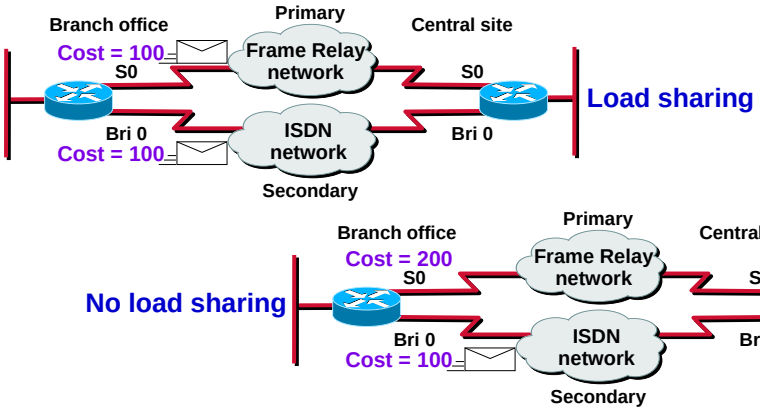
Dialer Profiles Backup Example

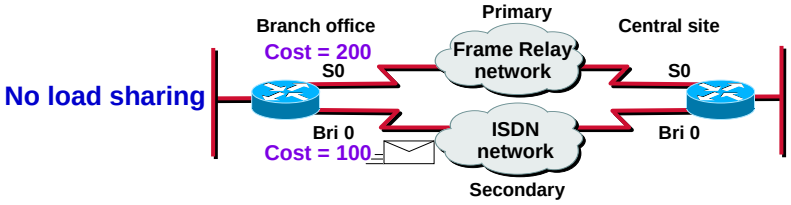
```
interface dialer 0
 ip unnumbered loopback0
 encapsulation ppp
 dialer remote-name Remote0
 dialer pool 1
 dialer string 5551212
 dialer-group 1

interface bri 0
 encapsulation ppp
 dialer pool-member 1
 ppp authentication chap

interface serial 0
 ip unnumbered loopback0
 backup interface dialer 0
 backup delay 5 10
```

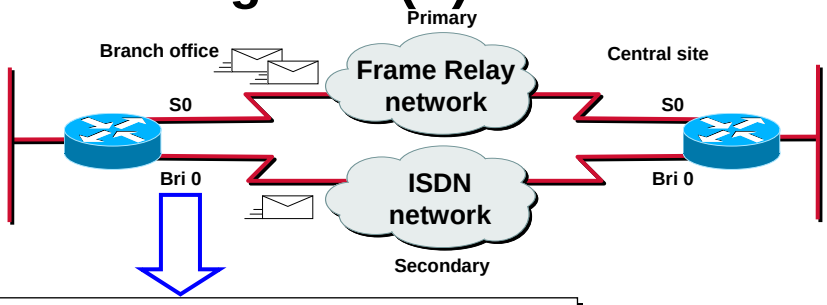
Load Sharing with OSPF





- **Load sharing will occur if the costs are equal.**

Load Sharing and Load Balancing with (E)IGRP




```
<input omitted>
Branch(config)#router igrp 100
Branch(config-router)#variance 8
Branch(config-router)#traffic-share balanced
```

Load share even if the link with the worse metric is 8 times worse.

The best route transports 8 times the traffic of the worst route.

Verifying the Dial Backup Configuration

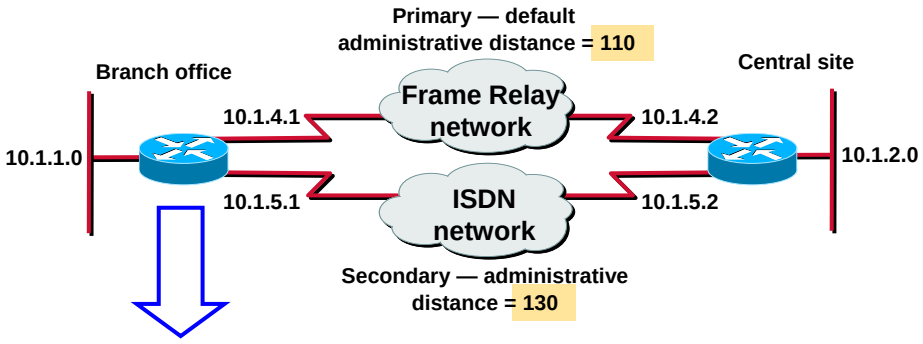
Primary interface

```
Central_A#show interface s 3/1.1
Serial3/1.1 is up, line protocol is up
 Hardware is CD2430 in sync mode
 Internet address is 10.140.1.1/24
 Backup interface Dialer1, failure delay 20 sec, restore delay 40 sec
 MTU 1500 bytes, BW 56 Kbit, DLY 20000 usec, rely 255/255, load 1/255
 Encapsulation FRAME-RELAY
<Output Omitted>
```

Backup interface

```
Router#show interface dialer 1
Dialer1 is standby mode, line protocol is down
 Hardware is Unknown
 Internet address is 192.2.0.1/24
 MTU 1500 bytes, BW 56 Kbit, DLY 20000 usec, rely 255/255, load 1/255
<Output Omitted>
```

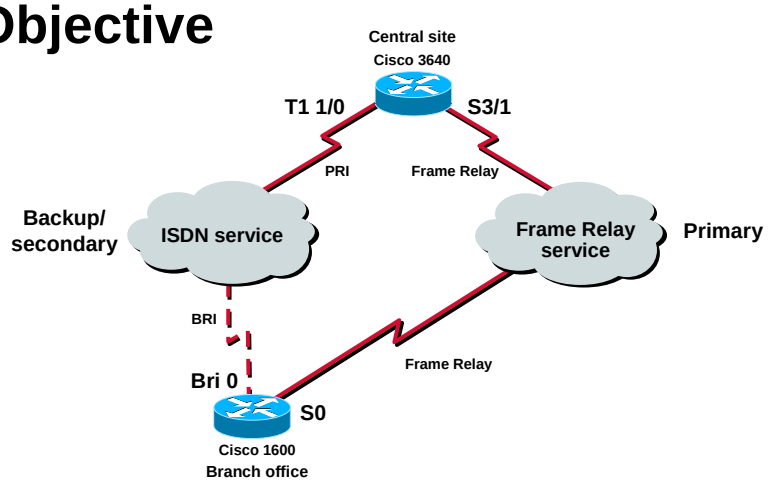

Floating Static Routes as Backup




```
Branch(config)#ip route 10.1.2.0 255.255.255.0 10.1.5.2 130
```

The administrative distance is higher over the ISDN link. It will only engage if the Frame Relay link is down.

Laboratory Exercise: Visual Objective



- Configure an ISDN backup that is enabled if primary Frame Relay connection fails

Summary

After completing this chapter, you should be able to perform the following tasks:

- Configure a backup connection that activates upon primary line failures
- Configure a backup connection to engage when the primary line reaches a specified threshold
- Configure a dialer interface and backup interface to function as backup

Review Question

- **What are two circumstances or scenarios in which a backup interface will be enabled?**