CHAPTER 5

Configuring Backup Data Lines and Remote Management

This chapter describes configuring backup data lines and remote management in the following sections:

The Cisco 880 Series Integrated Services Routers (ISRs) support backup data connectivity with a backup data line that enables them to mitigate WAN downtime.

Note Voice backup is available on router models C881SRST and C888SRST. For information on configuring voice backup, see Chapter 7, "Configuring Voice Functionality."

Cisco 880 ISRs also support remote management functions as follows:

- Through the auxiliary port on any Cisco 880 series ISRs
- Through the ISDN S/T port on the Cisco 880 series ISRs

Note On the Cisco 880 series ISRs, the console port and the auxiliary port are on the same physical RJ-45 port; therefore, the two ports cannot be activated simultaneously. You must use the CLI to enable the desired function.

Cisco 892F ISRs have a Gigabit Ethernet (GE) port that supports copper connections or a small-form-factor pluggable (SFP) port that supports fiber connections and can be configured for failover redundancy when the network goes down.

Configuring Backup Interfaces

When the router receives an indication that the primary interface is down, the backup interface becomes enabled. After the primary connection has been restored for a specified period, the backup interface is disabled.

Even if the backup interface comes out of standby mode, the router does not enable the backup interface unless the router receives the traffic specified for that backup interface.

Table 5-1 shows the backup interfaces for Cisco 880 and Cisco 890 series ISRs, along with their port designations. Basic configurations for these interfaces are given in the "Configuring WAN Interfaces" section on page 3-8 of Chapter 3, "Basic Router Configuration."

Table 5-1 Model Numbers and Data Line Backup Capabilities

Router Model Number	ISDN	3G	V.92
881G, 886G, 887G, 887VG, 888G	—	Yes	—
886, 886VA, 887, 887V, 888, 888E	Yes	—	—
891	—	—	Yes
892, 892F	Yes	—	—

To configure your router with a backup interface, perform these steps, beginning in global configuration mode:

SUMMARY STEPS

1. **interface** *type number*
2. **backup interface** *interface-type interface-number*
3. **exit**

DETAILED STEPS

	Command	Purpose
Step 1	**interface** *type number* **Example:** `Router(config)# interface atm 0`	Enters interface configuration mode for the interface for which you want to configure the backup. This interface can be a serial, ISDN, or asynchronous. The example shows the configuration of a backup interface for an ATM WAN connection.

	Command	Purpose
Step 2	**backup interface** *interface-type interface-number* **Example:** `Router(config-if)# backup interface bri 0`	Assigns an interface as the secondary, or backup interface. This can be a serial interface or asynchronous interface. For example, a serial 1 interface could be configured to back up a serial 0 interface. The example shows a BRI interface configured as the backup interface for the ATM 0 interface.
Step 3	**exit** **Example:** `Router(config-if)# exit` `Router(config)#`	Exits the configuration interface mode.

Configuring Cellular Dial-on-Demand Routing Backup

To monitor the primary connection and initiate the backup connection over the cellular interface when needed, the router can use one of the following methods:

- Backup Interface—Backup interface that stays in standby mode until the primary interface line protocol is detected as down and then is brought up. See the "Configuring Backup Interfaces" section on page 5-2.
- Dialer Watch—Backup feature that integrates dial backup with routing capabilities. See the "Configuring DDR Backup Using Dialer Watch" section on page 5-4.
- Floating Static Route—Route through the backup interface has an administrative distance that is greater than the administrative distance of the primary connection route and therefore would not be in the routing table until the primary interface goes down. When the primary interaface goes down, the floating static route is used. See the "Configuring DDR Backup Using Floating Static Route" section on page 5-5

Note You cannot configure a backup interface for the cellular interface and any other asynchronous serial interface.

Configuring DDR Backup Using Dialer Watch

To initiate dialer watch, you must configure the interface to perform dial-on-demand routing (DDR) and backup. Use traditional DDR configuration commands, such as dialer maps, for DDR capabilities. To enable dialer watch on the backup interface and create a dialer list, use the following commands in interface configuration mode.

SUMMARY STEPS

1. **configure terminal**
2. **interface** *type number*
3. **dialer watch group** *group-number*
4. **dialer watch-list** *group-number* **ip** *ip-address address-mask*
5. **dialer-list** *dialer-group* **protocol** *protocol-name* {**permit** | **deny** | **list** *access-list-number* | **access-group**}
6. **ip access-list** *access-list-number* **permit** *ip source address*
7. **interface cellular** *0*
8. **dialer string** *string*

   or

   dialer group *dialer group number*

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 2	**interface** *type number* **Example:** `Router (config)# interface ATM0`	Specifies the interface.
Step 3	**dialer watch-group** *group-number* **Example:** `Router(config-if)# dialer watch-group 2`	Enables dialer watch on the backup interface.
Step 4	**dialer watch-list** *group-number* **ip** *ip-address address-mask* **Example:** `Router(config-if)# dialer watch-list 2 ip 10.4.0.254 255.255.0.0`	Defines a list of all IP addresses to be watched.

	Command or Action	Purpose
Step 5	**dialer-list** *dialer-group* **protocol** *protocol-name* {**permit** | **deny** | **list** *access-list-number* | **access-group**} **Example:** `Router(config)# dialer-list 2 protocol ip permit`	Creates a dialer list for traffic of interest and permits access to an entire protocol.
Step 6	**ip access-list** *access-list-number* **permit** *ip source address* **Example:** `Router(config)# access list 2 permit 10.4.0.0`	Defines traffic of interest. Do not use the **access list permit all** command to avoid sending traffic to the IP network. This may result in call termination.
Step 7	**interface cellular** *0* **Example:** `Router (config)# interface cellular 0`	Specifies the cellular interface.
Step 8	**dialer string** *string* or **dialer group** *dialer group number* **Example:** `Router (config-if)# dialer string cdma  *** cdma ***` or `Router (config-if)# dialer group 2  *** gsm ***`	CDMA only. Specifies the dialer script (defined using the **chat script** command). GSM only. Maps a dialer list to the dialer interface.

Configuring DDR Backup Using Floating Static Route

To configure a floating static default route on the secondary interface, use the following commands, beginning in the global configuration mode.

Note Make sure you have ip classless enabled on your router.

SUMMARY STEPS

1. **configure terminal**
2. **ip route** *network-number network-mask* {*ip address* | *interface*} [*administrative distance*] [**name** *name*]

DETAILED STEPS

	Command or Action	Purpose
Step 1	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode from the terminal.
Step 2	**ip route** *network-number network-mask* {*ip address* | *interface*} [*administrative distance*] [**name** *name*] **Example:** `Router (config)# ip route 0.0.0.0 Dialer 2 track 234`	Establishes a floating static route with the configured administrative distance through the specified interface. A higher administrative distance should be configured for the route through the backup interface, so that the backup interface is used only when the primary interface is down.

Cellular Wireless Modem as Backup with NAT and IPsec Configuration

The following example shows how to configure the 3G wireless modem as backup with NAT and IPsec on either GSM or CDMA networks.

Note The receive and transmit speeds cannot be configured. The actual throughput depends on the cellular network service.

```
Current configuration : 3433 bytes
!
version 12.4
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router
!
boot-start-marker
boot-end-marker
!
!
no aaa new-model
!
!
!
!
crypto isakmp policy 1
 encr 3des
 authentication pre-share
crypto isakmp key gsm address 128.107.241.234              *** or cdma ***
!
!
crypto ipsec transform-set gsm ah-sha-hmac esp-3des        *** or cdma ***
!
crypto map gsm1 10 ipsec-isakmp                            *** or cdma1 ***
 set peer 128.107.241.234
 set transform-set gsm                                     *** or cdma ***
```

```
 match address 103
!
!
!
no ip dhcp use vrf connected
ip dhcp excluded-address 10.4.0.254
!
ip dhcp pool gsmpool                                        *** or cdmapool ***
   network 10.4.0.0 255.255.0.0
   dns-server 66.209.10.201 66.102.163.231
   default-router 10.4.0.254
!
!
ip cef
!
no ipv6 cef
multilink bundle-name authenticated
chat-script gsm "" "atdt*98*1#" TIMEOUT 30 "CONNECT"        *** or cdma ***
!
!
archive
 log config
  hidekeys
!
!
controller DSL 0
 mode atm
 line-term cpe
 line-mode 4-wire standard
 line-rate 4608
!
!
!
!
interface ATM0
 no ip address
 ip virtual-reassembly
 load-interval 30
 no atm ilmi-keepalive
!
interface ATM0.1 point-to-point
 backup interface Cellular0
 ip nat outside
 ip virtual-reassembly
 pvc 0/35
  pppoe-client dial-pool-number 2
 !
!
interface FastEthernet0
!
interface FastEthernet1
!
interface FastEthernet2
!
interface FastEthernet3
!
interface Cellular0
 ip address negotiated
 ip nat outside
 ip virtual-reassembly
 encapsulation ppp
 no ip mroute-cache
 dialer in-band
 dialer idle-timeout 0
```

```
 dialer string gsm                                          *** or cdma ***
 dialer-group 1
 async mode interactive
 no ppp lcp fast-start
 ppp chap hostname chunahayev@wwan.ccs
 ppp chap password 0 B7uhestacr
 ppp ipcp dns request
 crypto map gsm1                                           *** or cdma1 ***
!
interface Vlan1
 description used as default gateway address for DHCP clients
 ip address 10.4.0.254 255.255.0.0
 ip nat inside
 ip virtual-reassembly
!
interface Dialer2
 ip address negotiated
 ip mtu 1492
 ip nat outside
 ip virtual-reassembly
 encapsulation ppp
 load-interval 30
 dialer pool 2
 dialer-group 2
 ppp authentication chap callin
 ppp chap hostname cisco@dsl.com
 ppp chap password 0 cisco
 ppp ipcp dns request
 crypto map gsm1                                           *** or cdma1 ***
!
ip local policy route-map track-primary-if
ip forward-protocol nd
ip route 0.0.0.0 0.0.0.0 Dialer2 track 234
ip route 0.0.0.0 0.0.0.0 Cellular0 254
no ip http server
no ip http secure-server
!
!
ip nat inside source route-map nat2cell interface Cellular0 overload
ip nat inside source route-map nat2dsl interface Dialer2 overload
!
ip sla 1
 icmp-echo 209.131.36.158 source-interface Dialer2
 timeout 1000
 frequency 2
ip sla schedule 1 life forever start-time now
access-list 1 permit any
access-list 2 permit 10.4.0.0 0.0.255.255
access-list 3 permit any
access-list 101 permit ip 10.4.0.0 0.0.255.255 any
access-list 102 permit icmp any host 209.131.36.158
access-list 103 permit ip host 166.136.225.89 128.107.0.0 0.0.255.255
access-list 103 permit ip host 75.40.113.246 128.107.0.0 0.0.255.255
dialer-list 1 protocol ip list 1
dialer-list 2 protocol ip permit
!
!
!
route-map track-primary-if permit 10
 match ip address 102
 set interface Dialer2
!
route-map nat2dsl permit 10
 match ip address 101
```

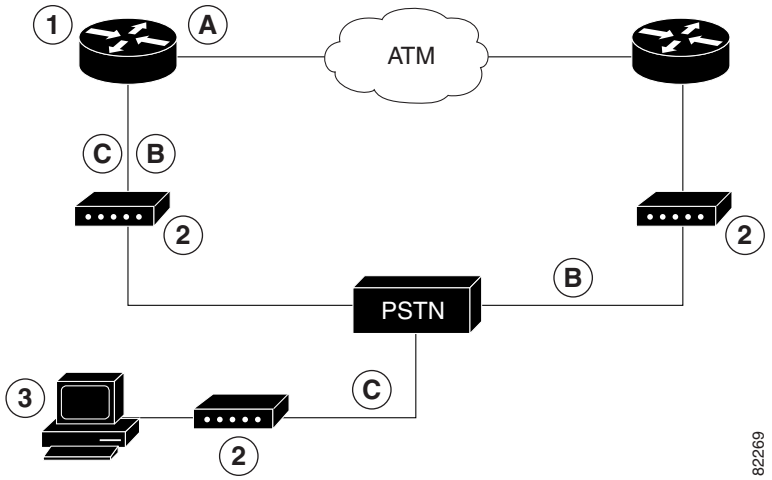
```
 match interface Dialer2
!
route-map nat2cell permit 10
 match ip address 101
 match interface Cellular0
!
!
control-plane
!
!
line con 0
 no modem enable
line aux 0
line 3
 exec-timeout 0 0
 script dialer gsm                                    *** or cdma ***
 login
 modem InOut
 no exec
line vty 0 4
 login
!
scheduler max-task-time 5000

!
webvpn cef
end
```

Configuring Dial Backup and Remote Management Through the Console or Auxiliary Port

When customer premises equipment, such as a Cisco 880 series ISR, is connected to an ISP, an IP address is dynamically assigned to the router, or the IP address may be assigned by the router peer through the centrally managed function. The dial backup feature can be added to provide a failover route in case the primary line fails. The Cisco 880 series ISRs can use the auxiliary port for dial backup and remote management.

Figure 5-1 shows the network configuration used for remote management access and for providing backup to the primary WAN line.

Figure 5-1 Dial Backup and Remote Management Through the Auxiliary Port



1	Cisco 880 series router	**A**	Main WAN link; primary connection to Internet service provider
2	Modem	**B**	Dial backup; serves as a failover link for Cisco 880 routers when the primary line goes down
3	PC	**C**	Remote management; serves as dial-in access to allow changes or updates to Cisco IOS configurations

To configure dial backup and remote management for these routers, perform these steps, beginning in global configuration mode:

SUMMARY STEPS

1. **ip name-server** *server-address*
2. **ip dhcp pool** *name*
3. **exit**
4. **chat-script** *script-name expect-send*
5. **interface** *type number*
6. **exit**

7. **interface** *type number*
8. **dialer watch-group** *group-number*
9. **exit**
10. **ip nat inside source {list** *access-list-number*} **{interface** *type number* | **pool** *name*} **[overload]**
11. **ip route** *prefix mask* {***ip-address*** | ***interface-type interface-number*** [***ip-address***]}
12. **access-list** *access-list-number* **{deny | permit}** *source* [*source-wildcard*]
13. **dialer watch-list** *group-number* {**ip** *ip-address address-mask* | **delay route-check initial** *seconds*}
14. **line** [**aux** | **console** | **tty** | **vty**] *line-number* [*ending-line-number*]
15. **modem enable**
16. **exit**
17. **line** [**aux** | **console** | **tty** | **vty**] *line-number* [*ending-line-number*]
18. **flowcontrol** {**none** | **software** [**lock**] [**in** | **out**] | **hardware** [**in** | **out**]}

DETAILED STEPS

	Command	Purpose
Step 1	**ip name-server** *server-address* **Example:** `Router(config)# ip name-server 192.168.28.12`	Enters your ISP DNS IP address. **Tip** You may add multiple server addresses if available.
Step 2	**ip dhcp pool** *name* **Example:** `Router(config)# ip dhcp pool 1`	Creates a DHCP address pool on the router and enters DHCP pool configuration mode. The *name* argument can be a string or an integer. Configure the DHCP address pool. For sample commands that you can use in DHCP pool configuration mode, see the "Example" section on page 5-13.
Step 3	**exit** **Example:** `Router(config-dhcp)#exit`	Exits config-dhcp mode and enters global configuration mode.
Step 4	**chat-script** *script-name expect-send* **Example:** `Router(config)# chat-script Dialout ABORT ERROR ABORT BUSY "" "AT" OK "ATDT 5555102 T" TIMEOUT 45 CONNECT \c`	Configures a chat script used in dial-on-demand routing (DDR) to give commands for dialing a modem and for logging in to remote systems. The defined script is used to place a call over a modem connected to the PSTN.
Step 5	**interface** *type number* **Example:** `Router(config)# interface Async 1`	Creates and enters configuration mode for the asynchronous interface. Configure the asynchronous interface. For sample commands that you can use in asynchronous interface configuration mode, see the "Example" section on page 5-13.

	Command	Purpose
Step 6	**exit** **Example:** `Router(config-if)# exit`	Enters global configuration mode.
Step 7	**interface** *type number* **Example:** `Router(config)# interface Dialer 3`	Creates and enters configuration mode for the dilaer interface.
Step 8	**dialer watch-group** *group-number* **Example:** `Router(config-if)# dialer watch-group 1`	Specifies the group number for the watch list.
Step 9	**exit** **Example:** `Router(config-if)# exit`	Exits the interface configuration mode.
Step 10	**ip nat inside source** {**list** *access-list-number*} {**interface** *type number* | **pool** *name*} [**overload**] **Example:** `Router(config)# ip nat inside source list 101 interface Dialer 3 overload`	Enables dynamic translation of addresses on the inside interface.
Step 11	**ip route** *prefix mask* {*ip-address* | *interface-type interface-number* [*ip-address*]} **Example:** `Router(config)# ip route 0.0.0.0 0.0.0.0 22.0.0.2`	Sets the IP route to point to the dialer interface as a default gateway.
Step 12	**access-list** *access-list-number* {**deny** | **permit**} *source* [*source-wildcard*] **Example:** `Router(config)# access-list 1 permit 192.168.0.0 0.0.255.255 any`	Defines an extended access list that indicates which addresses need translation.
Step 13	**dialerwatch-list** *group-number* {**ip** *ip-address address-mask* | **delay route-check initial** *seconds*} **Example:** `Router(config)# dialer watch-list 1 ip 22.0.0.2 255.255.255.255`	Evaluates the status of the primary link, based on the existence of routes to the peer. The address 22.0.0.2 is the peer IP address of the ISP.
Step 14	**line** [**aux** | **console** | **tty** | **vty**] *line-number* [*ending-line-number*] **Example:** `Router(config)# line console 0`	Enters configuration mode for the line interface.

	Command	Purpose
Step 15	**modem enable** **Example:** `Router(config-line)# modem enable`	Switches the port from console to auxiliary port function.
Step 16	**exit** **Example:** `Router(config-line)# exit`	Exits the configure interface mode.
Step 17	**line** [**aux** | **console** | **tty** | **vty**] *line-number* [*ending-line-number*] **Example:** `Router(config)# line aux 0`	Enters configuration mode for the auxiliary interface.
Step 18	**flowcontrol** {**none** | **software** [**lock**] [**in** | **out**] | **hardware** [**in** | **out**]} **Example:** `Router(config)# flowcontrol hardware`	Enables hardware signal flow control.

Example

The following configuration example specifies an IP address for the ATM interface through PPP and IPCP address negotiation and dial backup over the console port.

```
!
ip name-server 192.168.28.12
ip dhcp excluded-address 192.168.1.1
!
ip dhcp pool 1
 import all
 network 192.168.1.0 255.255.255.0
 default-router 192.168.1.1
!
! Need to use your own correct ISP phone number.
modemcap entry MY-USER_MODEM:MSC=&F1S0=1
chat-script Dialout ABORT ERROR ABORT BUSY "" "AT" OK "ATDT 5555102\T"
TIMEOUT 45 CONNECT \c
!
!
!
!
interface vlan 1
 ip address 192.168.1.1 255.255.255.0
 ip nat inside
 ip tcp adjust-mss 1452
 hold-queue 100 out
!
! Dial backup and remote management physical interface.
interface Async1
 no ip address
 encapsulation ppp
 dialer in-band
 dialer pool-member 3
 async default routing
```

```
 async dynamic routing
 async mode dedicated
 ppp authentication pap callin
!
interface ATM0
 mtu 1492
 no ip address
 no atm ilmi-keepalive
 pvc 0/35
 pppoe-client dial-pool-number 1
!
dsl operating-mode auto
!
! Primary WAN link.
interface Dialer1
 ip address negotiated
 ip nat outside
 encapsulation ppp
 dialer pool 1
 ppp authentication pap callin
 ppp pap sent-username account password 7 pass
 ppp ipcp dns request
 ppp ipcp wins request
 ppp ipcp mask request
!
! Dialer backup logical interface.
interface Dialer3
 ip address negotiated
 ip nat outside
 encapsulation ppp
 no ip route-cache
 no ip mroute-cache
 dialer pool 3
 dialer idle-timeout 60
 dialer string 5555102 modem-script Dialout
 dialer watch-group 1
!
! Remote management PC IP address.
peer default ip address 192.168.2.2
no cdp enable
!
! Need to use your own ISP account and password.
ppp pap sent-username account password 7 pass
ppp ipcp dns request
ppp ipcp wins request
ppp ipcp mask request
!
! IP NAT over Dialer interface using route-map.
ip nat inside source route-map main interface Dialer1 overload
ip nat inside source route-map secondary interface Dialer3 overload
ip classless
!
! When primary link is up again, distance 50 will override 80 if dial backup
! has not timed out. Use multiple routes because peer IP addresses are alternated
! among them when the CPE is connected.
ip route 0.0.0.0 0.0.0.0 64.161.31.254 50
ip route 0.0.0.0 0.0.0.0 66.125.91.254 50
ip route 0.0.0.0 0.0.0.0 64.174.91.254 50
ip route 0.0.0.0 0.0.0.0 63.203.35.136 80
ip route 0.0.0.0 0.0.0.0 63.203.35.137 80
ip route 0.0.0.0 0.0.0.0 63.203.35.138 80
ip route 0.0.0.0 0.0.0.0 63.203.35.139 80
ip route 0.0.0.0 0.0.0.0 63.203.35.140 80
ip route 0.0.0.0 0.0.0.0 63.203.35.141 80
```

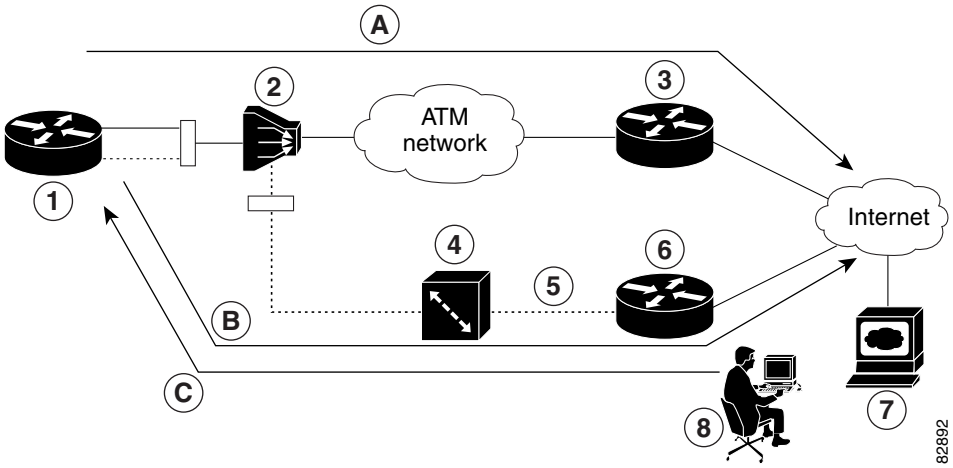
```
ip route 0.0.0.0 0.0.0.0 Dialer1 150
no ip http server
ip pim bidir-enable
!
! PC IP address behind CPE.
access-list 101 permit ip 192.168.0.0 0.0.255.255 any
access-list 103 permit ip 192.168.0.0 0.0.255.255 any
!
! Watch multiple IP addresses because peers are alternated
! among them when the CPE is connected.
dialer watch-list 1 ip 64.161.31.254 255.255.255.255
dialer watch-list 1 ip 64.174.91.254 255.255.255.255
dialer watch-list 1 ip 64.125.91.254 255.255.255.255
!
! Dial backup will kick in if primary link is not available
! 5 minutes after CPE starts up.
dialer watch-list 1 delay route-check initial 300
dialer-list 1 protocol ip permit
!
! Direct traffic to an interface only if the dialer is assigned an IP address.
route-map main permit 10
 match ip address 101
 match interface Dialer1
!
route-map secondary permit 10
 match ip address 103
 match interface Dialer3
!
! Change console to aux function.
line con 0
 exec-timedout 0 0
 modem enable
 stopbits 1
line aux 0
 exec-timeout 0 0
 ! To enable and communicate with the external modem properly.
 script dialer Dialout
 modem InOut
 modem autoconfigure discovery
 transport input all
 stopbits 1
 speed 115200
 flowcontrol hardware
line vty 0 4
 exec-timeout 0 0
 password cisco
 login
!
scheduler max-task-time 5000
end
```

Configuring Data Line Backup and Remote Management Through the ISDN S/T Port

Cisco 880 series routers can use the ISDN S/T port for remote management. Figure 5-2 and Figure 5-3 show two typical network configurations that provide remote management access and backup for the primary WAN line. In Figure 5-2, the dial backup link goes through a customer premises equipment

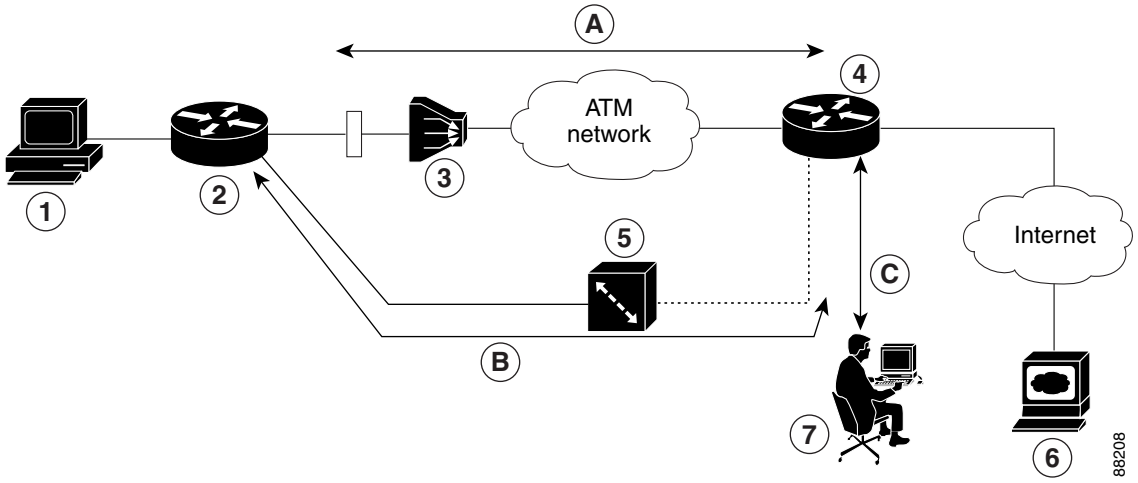
(CPE) splitter, a digital subscriber line access multiplexer (DSLAM), and a central office (CO) splitter before connecting to the ISDN switch. In Figure 5-3, the dial backup link goes directly from the router to the ISDN switch.

Figure 5-2 Data Line Backup Through CPE Splitter, DSLAM, and CO Splitter



1	Cisco 880 series router	**A**	Primary DSL interface, FE interface (Cisco 881 router)
2	DSLAM	**B**	Dial backup and remote management through the ISDN interface (ISDN S/T port); serves as a failover link when the primary line goes down
3	ATM aggregator		
4	ISDN switch		
5	ISDN	**C**	Provides administrator with remote management capability through the ISDN interface when the primary DSL link is down; serves as dial-in access to allow changes or updates to Cisco IOS configuration
6	ISDN peer router		
7	Web server		
8	Administrator	—	—

Figure 5-3 Data Line Backup Directly from Router to ISDN Switch



1	PC	**A**	Primary DSL interface
2	Cisco 880 series ISR	**B**	Dial backup and remote management through the ISDN interface (ISDN S/T port); serves as a failover link when the primary line goes down
3	DSLAM		
4	Aggregator		
5	ISDN switch	**C**	Provides administrator with remote management capability through the ISDN interface when the primary DSL link is down; serves as dial-in access to allow changes or updates to Cisco IOS configuration
6	Web server		
7	Administrator		

To configure dial backup and remote management through the ISDN S/T port of your router, perform the following procedures:

- Configuring ISDN Settings
- Configuring Aggregator and ISDN Peer Router

Configuring ISDN Settings

Note Traffic of interest must be present to activate the backup ISDN line by means of the backup interface and floating static routes methods. Traffic of interest is not needed for the dialer watch to activate the backup ISDN line.

To configure your router ISDN interface for use as a backup interface, perform these steps, beginning in global configuration mode:

SUMMARY STEPS

1. **isdn switch-type** *switch-type*
2. **interface** *type number*
3. **encapsulation** *encapsulation-type*

4. **dialer pool-member** *number*
5. **isdn switch-type** *switch-type*
6. **exit**
7. **interface dialer** *dialer-rotary-group-number*
8. **ip address negotiated**
9. **encapsulation** *encapsulation-type*
10. **dialer pool** *number*
11. **dialer string** *dial-string#*[**:***isdn-subaddress*]
12. **dialer-group** *group-number*
13. **exit**
14. **dialer-list** *dialer-group* **protocol** *protocol-name* {**permit** | **deny** | **list** *access-list-number* | *access-group*}

DETAILED STEPS

	Command	Purpose
Step 1	**isdn switch-type** *switch-type* **Example:** `Router(config)# isdn switch-type basic-net3`	Specifies the ISDN switch type. The example specifies a switch type used in Australia, Europe, and the United Kingdom. For details on other supported switch types, see the *Cisco IOS Dial Technologies Command Reference*.
Step 2	**interface** *type number* **Example:** `Router(config)# interface bri 0`	Enters configuration mode for the ISDN BRI.
Step 3	**encapsulation** *encapsulation-type* **Example:** `Router(config-if)# encapsulation ppp`	Sets the BRI0 interface encapsulation type.
Step 4	**dialer pool-member** *number* **Example:** `Router(config-if)# dialer pool-member 1`	Specifies the dialer pool membership.
Step 5	**isdn switch-type** *switch-type* **Example:** `Router(config-if)# isdn switch-type basic-net3`	Specifies the ISDN switch type.
Step 6	**exit** **Example:** `Router(config-if)# exit`	Exits configuration interface mode and enters global configuration mode.

	Command	Purpose
Step 7	**interface dialer** *dialer-rotary-group-number* **Example:** `Router(config)# interface dialer 0`	Creates a dialer interface (numbered 0 to 255) and enters interface configuration mode.
Step 8	**ip address negotiated** **Example:** `Router(config-if)# ip address negotiated`	Specifies that the IP address for the interface is obtained through PPP/IPCP (IP Control Protocol) address negotiation. The IP address is obtained from the peer.
Step 9	**encapsulation** *encapsulation-type* **Example:** `Router(config-if)# encapsulation ppp`	Sets the encapsulation type to PPP for the interface.
Step 10	**dialer pool** *number* **Example:** `Router(config-if)# dialer pool 1`	Specifies the dialer pool to be used. In the example, the dialer pool 1 setting associates the dialer 0 interface with the BRI0 interface because the BRI0 dialer pool-member value is 1.
Step 11	**dialer string** *dial-string#*[**:***isdn-subaddress*] **Example:** `Router(config-if)# dialer string 384040`	Specifies the telephone number to be dialed.
Step 12	**dialer-group** *group-number* **Example:** `Router(config-if)# dialer group 1`	Assigns the dialer interface to a dialer group (1–10).
Step 13	**exit** **Example:** `Router(config-if)# exit`	Exits dialer 0 interface configuration mode, and enters global configuration mode.
Step 14	**dialer-list** *dialer-group* **protocol** *protocol-name* {**permit** | **deny** | **list** *access-list-number* | *access-group*} **Example:** `Router(config)# dialer-list 1 protocol ip permit`	Creates a dialer list for packets of interest to be forwarded through the specified interface dialer group. In the example, dialer-list 1 corresponds to dialer-group 1. For details about this command and additional parameters that can be set, see *Cisco IOS Dial Technologies Command Reference*.

Configuring Aggregator and ISDN Peer Router

The ISDN peer router is any router that has an ISDN interface and can communicate through a public ISDN network to reach your Cisco router ISDN interface. The ISDN peer router provides Internet access for your Cisco router during the ATM network downtime.

The aggregator is typically a concentrator router where your Cisco router ATM PVC terminates. In the following configuration example, the aggregator is configured as a PPPoE server.

```
! This portion of the example configures the aggregator.
vpdn enable
no vpdn logging
!
vpdn-group 1
 accept-dialin
 protocol pppoe
 virtual-template 1
!
interface Ethernet3
 description "4700ref-1"
 ip address 40.1.1.1 255.255.255.0
 media-type 10BaseT
!
interface Ethernet4
 ip address 30.1.1.1 255.255.255.0
 media-type 10BaseT
!
interface Virtual-Template1
 ip address 22.0.0.2 255.255.255.0
 ip mtu 1492
 peer default ip address pool adsl
!
interface ATM0
 no ip address
 pvc 1/40
 encapsulation aal5snap
 protocol pppoe
!
no atm limi-keepalive
!
ip local pool adsl 22.0.0.1
ip classless
ip route 0.0.0.0 0.0.0.0 22.0.0.1 50
ip route 0.0.0.0 0.0.0.0 30.1.1.2.80

! This portion of the example configures the ISDN peer.
isdn switch-type basic-net3
!
interface Ethernet0
 ip address 30.1.1.2 255.0.0.0
!
interface BRI0
 description "to 836-dialbackup"
 no ip address
 encapsulation ppp
 dialer pool-member 1
 isdn switch-type basic-net3
!
interface Dialer0
 ip address 192.168.2.2 255.255.255.0
 encapsulation ppp
 dialer pool 1
 dialer string 384020
 dialer-group 1
 peer default ip address pool isdn
!
ip local pool isdn 192.168.2.1
ip http server
ip classless
```

```
ip route 0.0.0.0 0.0.0.0 192.168.2.1
ip route 40.0.0.0 255.0.0.0 30.1.1.1
!
dialer-list 1 protocol ip permit!
```

Configuring Gigabit Ethernet Failover Media

Cisco 892F routers have a Gigabit Ethernet (GE) port that supports copper connections or a small-form-factor pluggable (SFP) port that supports fiber connections. Media can be configured for failover redundancy when the network goes down.

To assign primary and secondary failover media on the GE-SFP port, perform these steps, beginning in global configuration mode.

SUMMARY STEPS

1. **hostname** *name*
2. **enable secret** *password*
3. **interface gigabitethernet** *slot/port*
4. **media-type** {**sfp** | **rj45**} **auto-failover**
5. **exit**

DETAILED STEPS

	Command	Purpose
Step 1	**hostname** *name* **Example:** `Router(config)# hostname Router`	Specifies the name for the router.
Step 2	**enable secret** *password* **Example:** `Router(config)# enable secret cr1ny5ho`	Specifies an encrypted password to prevent unauthorized access to the router.
Step 3	**interface gigabitethernet** *slot/port* **Example:** `Router(config)# interface gigabitethernet 0/1`	Enters interface configuration mode.
Step 4	**media-type {sfp | rj45} auto-failover** **Example:** `Router(config-if)# media-type sfp auto-failover` `OR` `Router(config-if)# media-type rj45 auto-failover`	Configures the port with SFP as the primary media for automatic failover from SFP to RJ-45. Or Configures the port with RJ-45 as the primary media for automatic failover from RJ-45 to SFP.

	Command	Purpose
Step 5	**exit** **Example:** `Router(config-if)# exit` `Router(config)#`	Exits interface configuration mode and returns to global configuration mode.

Auto-Detect

The Auto-Detect feature is enabled if media-type is not configured. This feature automatically detects which media is connected and links up. If both media are connected, whichever media comes up first is linked up.

Note The Auto-Detect feature only works with 1000 Base SFPs. This feature does not detect 100 Base SFPs.

To configure the Auto-Detect feature, perform the following steps, starting in global configuration mode:

SUMMARY STEPS

1. **interface gigabitethernet** *slot/port*
2. **no media-type**
3. **exit**

DETAILED STEPS

	Command	Purpose
Step 1	**interface gigabitethernet** *slot/port* **Example:** `Router(config)# interface gigabitethernet 0/1`	Enters interface configuration mode.
Step 2	**no media-type** **Example:** `Router(config-if)# no media-type` `GigabitEthernet0/1: Changing media to UNKNOWN.` `You may need to update the speed and duplex settings for this interface.`	Enables Auto-Detect. If a 1000Base SFP is plugged in, the speed and duplex are set automatically to 1000 and full. Speed and duplex options are not available. An RJ45 connection will only work with speed as 1000 and duplex as full. If an SFP is not plugged in, all speeds and duplexes are available for the RJ45 media. **Note** The Auto-Detect feature only works with 1000Base SFPs. This feature does not detect 100Base SFPs.
Step 3	**exit** **Example:** `Router(config-if)# exit` `Router(config)#`	Exits interface configuration mode and returns to global configuration mode.