



# CHAPTER 6

## Configuring Backup Data Lines and Remote Management

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

- [Configuring Backup Interfaces, page 6-1](#)
- [Configuring Cellular Dial-on-Demand Routing Backup, page 6-3](#)
- [Configuring Dial Backup and Remote Management Through the Console Port, page 6-8.](#)

The Cisco 819 Integrated Services Router (ISR) supports backup data connectivity with a backup data line that enables them to mitigate WAN downtime.

Cisco 819 ISRs also support remote management functions through the auxiliary port on any Cisco 819 series ISRs.



### Note

On the Cisco 819 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 command-line interface (CLI) to enable the desired function.

## 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 6-1](#) shows the backup interfaces available for each Cisco 819 ISR, along with their port designations. Basic configurations for these interfaces are given in the [“Configuring WAN Interfaces”](#) section on [page 5-9](#).

**Table 6-1 Model Number and Data Line Backup Capabilities**

Router Model Number	3G
819	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	<b>interface</b> <i>type number</i>  <b>Example:</b> Router(config)# interface xxx 0 Router(config-if)#	Enters interface configuration mode for the interface for which you want to configure backup. This can be a serial interface, ISDN interface, or asynchronous interface.
Step 2	<b>backup interface</b> <i>interface-type interface-number</i>  <b>Example:</b> Router(config-if)# backup interface serial 0 Router(config-if)#	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 serial interface configured as the backup interface for the ATM 0 interface.
Step 3	<b>exit</b>  <b>Example:</b> 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**—The 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 6-1.
- **Dialer Watch**—Dialer watch is a backup feature that integrates dial backup with routing capabilities. See the “[Configuring DDR Backup Using Dialer Watch](#)” section on page 6-3.
- **Floating Static Route**—The 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 interface goes down, the floating static route is used. See the “[Configuring DDR Backup Using Floating Static Route](#)” section on page 6-5

**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** *o*
8. **dialer string** *<string>*

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 2	<b>interface</b> <i>type number</i>  <b>Example:</b> Router (config)# interface 0	Specifies the interface.
Step 3	<b>dialer watch-group</b> <i>group-number</i>  <b>Example:</b> Router(config-if)# dialer watch-group 2	Enables dialer watch on the backup interface.
Step 4	<b>dialer watch-list</b> <i>group-number ip ip-address address-mask</i>  <b>Example:</b> 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.
Step 5	<b>dialer-list</b> <i>&lt;dialer-group&gt; protocol &lt;protocol-name&gt; {permit   deny   list &lt;access-list-number&gt;   access-group}</i>  <b>Example:</b> 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	<b>ip access-list</b> <i>&lt;access list number&gt; permit &lt;ip source address&gt;</i>  <b>Example:</b> Router(config)# access list 2 permit 10.4.0.0	Defines traffic of interest.  Do not use the <b>access list permit all</b> command to avoid sending traffic to the IP network. This may result in call termination.
Step 7	<b>interface cellular</b> <i>0</i>  <b>Example:</b> Router (config)# interface cellular 0	Specifies the cellular interface.
Step 8	<b>dialer string</b> <i>&lt;string&gt;</i>  or <b>dialer group</b> <i>&lt;dialer group number&gt;</i>  <b>Example:</b> Router (config-if)# dialer string cdma *** cdma ***  or Router (config-if)# dialer group 2 *** gsm ***	CDMA only. Specifies the dialer script (defined using the <b>chat script</b> 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	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode from the terminal.
Step 2	<b>ip route</b> <i>network-number network-mask</i> {ip-address   interface} [administrative distance] [ <b>name</b> <i>name</i> ]  <b>Example:</b> 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
!
!
crypto ipsec transform-set gsm ah-sha-hmac esp-3des
!
crypto map gsm1 10 ipsec-isakmp
  set peer 128.107.241.234
  set transform-set gsm
  match address 103
!
!
!
no ip dhcp use vrf connected
ip dhcp excluded-address 10.4.0.254
!
ip dhcp pool gsm_pool
  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"
!
!
archive
  log config
  hidekeys
!
!
interface 0
  no ip address
  ip virtual-reassembly
  load-interval 30
  no ilmi-keepalive
!
interface 0.1 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
 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 gsml
!
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 password 0 cisco
 ppp ipcp dns request
 crypto map gsml
!
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 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
!
!

```

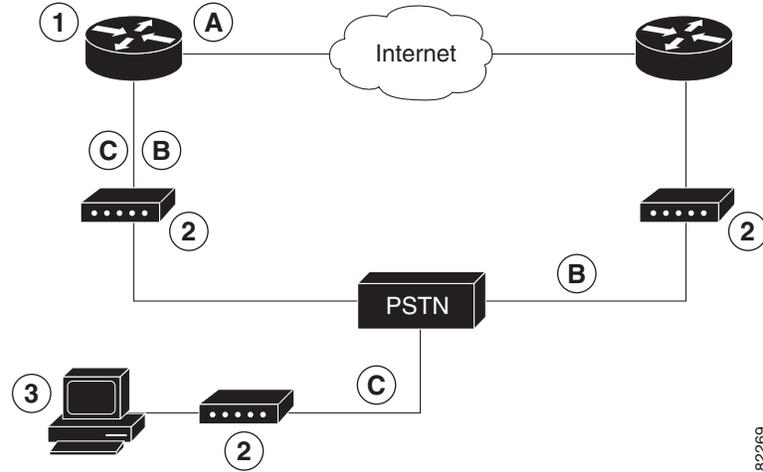
```
!  
route-map track-primary-if permit 10  
  match ip address 102  
  set interface Dialer2  
!  
route-map nat2cell permit 10  
  match ip address 101  
  match interface Cellular0  
!  
!  
control-plane  
!  
!  
line con 0  
  no modem enable  
line aux 0  
line 3  
  exec-timeout 0 0  
  script dialer gsm  
  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 Port

When customer premises equipment, such as a Cisco 819 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 819 ISRs can use the auxiliary port for dial backup and remote management.

Figure 6-1 shows the network configuration used for remote management access and for providing backup to the primary WAN line.

**Figure 6-1** *Dial Backup and Remote Management Through the Auxiliary Port*



<b>1</b>	Cisco 819 router	<b>A</b>	Main WAN link; primary connection to Internet service provider
<b>2</b>	Modem	<b>B</b>	Dial backup; serves as a failover link for Cisco 819 routers when primary line goes down
<b>3</b>	PC	<b>C</b>	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. **dialerwatch-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	<p><b>ip name-server</b> <i>server-address</i></p> <p><b>Example:</b></p> <pre>Router(config)#ip name-server 192.168.28.12 Router(config)#</pre>	<p>Enters your ISP DNS IP address.</p> <p><b>Tip</b> You may add multiple server addresses if available.</p>
Step 2	<p><b>ip dhcp pool</b> <i>name</i></p> <p><b>Example:</b></p> <pre>Router(config)#ip dhcp pool 1 Router(config-dhcp)#</pre>	<p>Creates a DHCP address pool on the router and enters DHCP pool configuration mode. The <i>name</i> argument can be a string or an integer.</p> <ul style="list-style-type: none"> <li>Configure the DHCP address pool. For sample commands that you can use in DHCP pool configuration mode, see the “<a href="#">Example</a>” section on page 6-13.</li> </ul>
Step 3	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Router(config-dhcp)#exit Router(config)#</pre>	<p>Exits config-dhcp mode and enters global configuration mode.</p>
Step 4	<p><b>chat-script</b> <i>script-name expect-send</i></p> <p><b>Example:</b></p> <pre>Router(config)# chat-script Dialout ABORT ERROR ABORT BUSY "" "AT" OK "ATDT 5555102 T" TIMEOUT 45 CONNECT \c Router(config)#</pre>	<p>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.</p>
Step 5	<p><b>interface</b> <i>type number</i></p> <p><b>Example:</b></p> <pre>Router(config)# interface Async 1 Router(config-if)#</pre>	<p>Creates and enters configuration mode for the asynchronous interface.</p> <p>Configure the asynchronous interface. For sample commands that you can use in asynchronous interface configuration mode, see the “<a href="#">Example</a>” section on page 6-13.</p>
Step 6	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Router(config-if)# exit Router(config)#</pre>	<p>Enters global configuration mode.</p>
Step 7	<p><b>interface</b> <i>type number</i></p> <p><b>Example:</b></p> <pre>Router(config)# interface Dialer 3 Router(config-if)#</pre>	<p>Creates and enters configuration mode for the dialer interface.</p>

	Command	Purpose
Step 8	<p><b>dialer watch-group</b> <i>group-number</i></p> <p><b>Example:</b></p> <pre>Router(config-if)# dialer watch-group 1 Router(config-if)#</pre>	Specifies the group number for the watch list.
Step 9	<p><b>exit</b></p> <p><b>Example:</b></p> <pre>Router(config-if)# exit Router(config)#</pre>	Exits the interface configuration mode.
Step 10	<p><b>ip nat inside source</b> {<b>list</b> <i>access-list-number</i>} {<b>interface</b> <i>type number</i>   <b>pool</b> <i>name</i>} [<b>overload</b>]</p> <p><b>Example:</b></p> <pre>Router(config)# ip nat inside source list 101 interface Dialer 3 overload</pre>	Enables dynamic translation of addresses on the inside interface.
Step 11	<p><b>ip route</b> <i>prefix mask</i> {<i>ip-address</i>   <i>interface-type interface-number</i> [<i>ip-address</i>]}</p> <p><b>Example:</b></p> <pre>Router(config)# ip route 0.0.0.0 0.0.0.0 22.0.0.2 Router(config)#</pre>	Sets the IP route to point to the dialer interface as a default gateway.
Step 12	<p><b>access-list</b> <i>access-list-number</i> {<b>deny</b>   <b>permit</b>} <i>source</i> [<i>source-wildcard</i>]</p> <p><b>Example:</b></p> <pre>Router(config)# access-list 1 permit 192.168.0.0 0.0.255.255 any</pre>	Defines an extended access list that indicates which addresses need translation.
Step 13	<p><b>dialerwatch-list</b> <i>group-number</i> {<b>ip</b> <i>ip-address address-mask</i>   <b>delay route-check</b> <b>initial</b> <i>seconds</i>}</p> <p><b>Example:</b></p> <pre>Router(config)# dialer watch-list 1 ip 22.0.0.2 255.255.255.255 Router(config)#</pre>	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	<p><b>line</b> [<b>aux</b>   <b>console</b>   <b>tty</b>   <b>vty</b>] <i>line-number</i> [<i>ending-line-number</i>]</p> <p><b>Example:</b></p> <pre>Router(config)# line console 0 Router(config-line)#</pre>	Enters configuration mode for the line interface.

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

## Example

The following configuration example specifies an IP address for the 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
!
! 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-timeout 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
```

