CHAPTER 16

Troubleshooting Frame Relay Connections

This chapter discusses troubleshooting procedures for connectivity problems related to Frame Relay links. The sections in this chapter describe specific Frame Relay symptoms, the problems that are likely to cause each symptom, and the solutions to those problems.

- Frame Relay Link Is Down
- Cannot ping Remote Router
- Cannot ping End-to-End

Frame Relay Link Is Down

Symptom: Connections over a Frame Relay link fail. The output of the **show interfaces serial** EXEC command shows that the interface and line protocol are down or that the interface is up and the line protocol is down.

Table 16-1 outlines the problems that might cause this symptom and describes solutions to those problems.

Table 16-1 Frame Relay: Frame Relay Link Is Down

Possible Problem	Solution
Cabling, hardware, or carrier problem	Perform these steps for the local and remote router. **Step 1** Use the **show interfaces serial** command to see if the interface and line protocol are up. **Step 2** If the interface and line protocol are down, check the cable to make sure it is a DTE serial cable. Make sure cables are securely attached. **Step 3** If the cable is correct, try moving it to a different port. If that port works, then the first port is defective. Replace either the card or the router. **Step 4** If the cable doesn't work on the second port, try replacing the cable. If it still doesn't work, there might be a problem with the DCE. Contact your carrier about the problem. For detailed information on troubleshooting serial lines, refer to the "Troubleshooting Serial Line Problems" chapter.
LMI type mismatch	**Step 1** Use the **show interfaces serial** command to check the state of the interface. **Step 2** If the output shows the interface is up but the line protocol is down, use the **show frame-relay lmi** EXEC command to see which LMI type is configured on the Frame Relay interface. **Step 3** Make sure that the LMI type is the same for all devices in the path from source to destination. Use the **frame-relay lmi-type** {**ansi** | **cisco** | **q933a**} interface configuration command to change the LMI type on the router.
Keepalives not being sent	**Step 1** Enter the **show interfaces** command to find out if keepalives are configured. If you see a line that says "keepalives not set," keepalives are not configured. **Step 2** Use the **keepalive** *seconds* interface configuration command to configure keepalives. The default value for this command is 10 seconds.
Encapsulation mismatch	**Step 1** When connecting Cisco devices with non-Cisco devices, you must use IETF encapsulation on both devices. Check the encapsulation type on the Cisco device with the **show frame-relay map** EXEC command. **Step 2** If the Cisco device is not using IETF encapsulation, use the **encapsulation frame-relay ietf** interface configuration command to configure IETF encapsulation on the Cisco Frame Relay interface. For information on viewing or changing the configuration of the non-Cisco device, refer to the vendor documentation.

Possible Problem	Solution
DLCI inactive or deleted	**Step 1** Use the **show frame-relay pvc** EXEC command to view the status of the interface's PVC. **Step 2** If the output shows that the PVC is inactive or deleted, there is a problem along the path to the remote router. Check the remote router or contact your carrier to check the status of the PVC.
DLCI assigned to wrong subinterface	**Step 1** Use the **show frame-relay pvc** privileged EXEC command to check the assigned DLCIs. Make sure that the correct DLCIs are assigned to the correct subinterface. **Step 2** If the DLCIs appear to be correct, shut down the main interface using the **shutdown** interface configuration command, then bring the interface back up using the **no shutdown** command.

Cannot ping Remote Router

Symptom: Attempts to **ping** the remote router across a Frame Relay connection fail.

Table 16-2 outlines the problems that might cause this symptom and describes solutions to those problems.

Table 16-2 Frame Relay: Cannot ping Remote Router

Possible Problem	Solution	
Encapsulation mismatch	**Step 1**	When connecting Cisco devices with non-Cisco devices, you must use IETF encapsulation on both devices. Check the encapsulation type on the Cisco device with the **show frame-relay map** EXEC command.
	Step 2	If the Cisco device is not using IETF encapsulation, use the **encapsulation frame-relay ietf** interface configuration command to configure IETF encapsulation on the Cisco Frame Relay interface. For information on viewing or changing the configuration of the non-Cisco device, refer to the vendor documentation.
DLCI inactive or deleted	**Step 1**	Use the **show frame-relay pvc** EXEC command to view the status of the interface's PVC.
	Step 2	If the output shows that the PVC is inactive or deleted, there is a problem along the path to the remote router. Check the remote router or contact your carrier to check the status of the PVC.
DLCI assigned to wrong subinterface	**Step 1**	Use the **show frame-relay pvc** privileged EXEC command to check the assigned DLCIs. Make sure that the correct DLCIs are assigned to the correct subinterfaces.
	Step 2	If the DLCIs appear to be correct, shut down the main interface using the **shutdown** interface configuration command, then bring the interface back up using the **no shutdown** command.
Misconfigured access list	**Step 1**	Use the **show access-list** privileged EXEC command to see if there are access lists configured on the router.
	Step 2	If there are access lists configured, test connectivity by disabling access lists using the **no access-group** global configuration command. Check to see if connectivity is restored.
	Step 3	If connections work, reenable access lists one at a time, checking connections after enabling each access list.
	Step 4	If enabling an access list blocks connections, make sure that the access list does not deny necessary traffic. Make sure to configure explicit **permit** statements for any traffic you want to pass.
	Step 5	Continue testing access lists until all access lists are restored and connections still work.

Possible Problem	Solution
frame-relay map command missing	**Step 1** Use the **show frame-relay map** privileged EXEC command to see if an address map is configured for the DLCI. **Step 2** If you do not see an address map for the DLCI, enter the **clear frame-relay-inarp** privileged EXEC command and then use the **show frame-relay map** command again to see if there is now a map to DLCI. **Step 3** If there is no map to the DLCI, add a static address map. Use the **frame-relay map** interface configuration command.[1] **Step 4** Make sure that the DLCIs and next-hop addresses specified in **frame-relay map** commands are correct. The specified protocol address should be in the same network as your local Frame Relay interface. For complete information on configuring Frame Relay address maps, refer to the Cisco IOS *Wide-Area Networking Configuration Guide* publication.
No **broadcast** keyword in **frame-relay map** statements	**Step 1** Use the **show running-config** privileged EXEC command on local and remote routers to view the router configuration. Check **frame-relay map** command entries to see if the **broadcast** keyword is specified. **Step 2** If the keyword is not specified, add the **broadcast** keyword to all **frame-relay map** commands. **Note:** By default, the **broadcast** keyword is added to dynamic maps learned via Inverse ARP.

1. You can eliminate the need for static Frame Relay address maps by using Inverse ARP instead. Use the **frame-relay interface-dlci** *dlci* **broadcast** interface configuration command to configure an interface to use Inverse ARP. For more information about the use of this command, refer to the Cisco IOS *Wide-Area Networking Configuration Guide* and *Wide-Area Networking Command Reference*.

Cannot ping End-to-End

Symptom: Attempts to **ping** devices on a remote network across a Frame Relay connection fail.

Table 16-3 outlines the problems that might cause this symptom and describes solutions to those problems.

Table 16-3 Frame Relay: Cannot ping End-to-End

Possible Problem	Solution
Split horizon problem	In a hub-and-spoke Frame Relay environment, you must configure subinterfaces in order to avoid problems with split horizon. For detailed information on configuring subinterfaces, refer to the Cisco IOS *Wide-Area Networking Configuration Guide* and *Wide-Area Networking Command Reference*.
No default gateway on workstation	**Step 1** From the local workstation or server, try to **ping** the remote workstation or server. Make several attempts to ping the remote device if the first ping is unsuccessful. **Step 2** If all your attempts fail, check to see if the local workstation or server can **ping** the local router's Frame Relay interface. **Step 3** If you are unable to **ping** the local interface, check the local workstation or server to see if it is configured with a default gateway specification. **Step 4** If there is no default gateway specified, configure the device with a default gateway. The default gateway should be the address of the local router's LAN interface. For information on viewing or changing the workstation or server's default gateway specification, refer to the vendor documentation.