



Frame Relay
Basic Configurations: Point to Point



Frame Relay Basic Point to Point Configuration

While we still have more lessons left to fully cover the major aspects of Frame Relay and its configuration, I wanted to include a couple of short, basic lessons covering Frame Relay configuration to break up the block of theory lectures and to get a look at some of the steps required to configure Frame Relay.

While you may instantly think of PPP or HDLSL as well as leased lines when you hear “point to point”, Frame Relay is a good choice for your point to point connections as it is most likely cheaper to purchase a Frame Relay Virtual Circuit (VC) than it is to pay for a dedicated point to point leased line. Even if you want to implement some of the advanced features of PPP (such as security), it’s still possible to accomplish this in Frame Relay by running PPPoFR (Point to Point Protocol over Frame Relay)...but that’s another lesson. 😊 Let’s take a look at a simple, point to point Frame Relay connection between two routers using physical serial interfaces.



Frame Relay Configuration

- Set the interface encapsulation to 'Frame Relay'

The interface must be configured for Frame Relay encapsulation. By default, Cisco serial interfaces use HDLC encapsulation.

```
r1#show interfaces s0/0
Serial0/0 is administratively down, line protocol is down
  Hardware is M4T
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation HDLC, crc 16, loopback not set
<--output truncated-->
```

I prefer to shutdown the interface when changing encapsulation, and especially when changing to Frame Relay encapsulation (we'll explore the reasons for this in more detail when we look at Frame Relay Inverse-ARP).

```
r1(config)#int s0/0
r1(config-if)#shutdown
r1(config-if)#encapsulation frame-relay
```



Frame Relay Configuration

After you set the encapsulation to Frame Relay, you will see the encapsulation type change as well as see LMI information in the output of the **show interfaces** command:

```
r1(config-if)#do show interfaces s0/0
```

Serial0/0 is administratively down, line protocol is down

Hardware is M4T

MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
reliability 255/255, txload 1/255, rxload 1/255

Encapsulation FRAME-RELAY, crc 16, loopback not set

Keepalive set (10 sec)

Restart-Delay is 0 secs

LMI enq sent 0, LMI stat recvd 0, LMI upd recvd 0, DTE LMI down

LMI enq recvd 0, LMI stat sent 0, LMI upd sent 0

LMI DLCI 1023 LMI type is CISCO frame relay DTE

FR SVC disabled, LAPF state down

<--output truncated-->



Frame Relay Configuration

Once you have set the encapsulation type to Frame Relay, there are a couple of additional options you may need to configure, depending on your network:

- Set the LMI type to match that of the Frame Relay switch

```
r1(config-if) #frame-relay lmi-type ?  
  cisco  
  ansi  
  q933a
```

Most of the time you will not need to set this as Cisco LMI Autosense will dynamically match your LMI type to that of the Frame Relay switch.

- Set the Frame Relay type to IETF from the default of 'cisco'

This will be the case if the DTE device (generally a router) on the far end of the virtual circuit is not a Cisco device or does not support Cisco Frame Relay encapsulation. As we will learn in a future lesson, this can be changed on a DLCI by DLCI basis as well.

```
r1(config-if) #encapsulation frame-relay ?  
  ietf  Use RFC1490/RFC2427 encapsulation  
  <cr>
```



Frame Relay Configuration

- Disable Frame Relay Inverse-ARP

We will devote an entire lesson to the ins and outs of Frame Relay Inverse-ARP, but in this lesson (and most of the time in the field) we will disable this feature.

```
r1(config-if) #no frame-relay inverse-arp
```

That's it for the optional configuration choices for a basic connection.

- Apply the IP address to the interface

```
r1(config-if) #ip address 10.1.12.1 255.255.255.0
```



Frame Relay Configuration

- Map the remote Layer 3 address to the local DLCI (Layer 2)

This is the most foreign concept when it comes to Frame Relay. Because Frame Relay does not have a true Address Resolution Protocol (ARP) (like Ethernet has) and we disabled the pseudo ARP feature of Frame Relay Inverse-ARP, we need to manually map the Layer 3 (IP) address to the Layer 2 (DLCI) address.

Think of this as instructing the router to “send all Frame Relay traffic destined for this remote IP address out this **local** DLCI.”

Again, we will go over Frame Relay map statements in detail in a future lesson.

```
r1(config-if) #frame-relay map ip 10.1.12.2 102 broadcast
```



Frame Relay Map Statement

```
r1(config-if)#frame-relay map ip 10.1.12.2 102 broadcast
```

Layer 3 Protocol

Remote Layer 3
Address

Local DLCI

Allow pseudo broadcast
support



Frame Relay Configuration

That's it. You can use this configuration on the other side of the link by just making sure to change the remote IP address and local DLCI in the Frame Relay map statement. Once both sides of the point to point Frame Relay connection have been configured, you can open the interfaces and watch the Frame Relay magic begin.

```
Interface Serial0/0
ip address 10.1.12.1 255.255.255.0
encapsulation frame-relay
no frame-relay inverse-arp
frame-relay map ip 10.1.12.2 102 broadcast
```

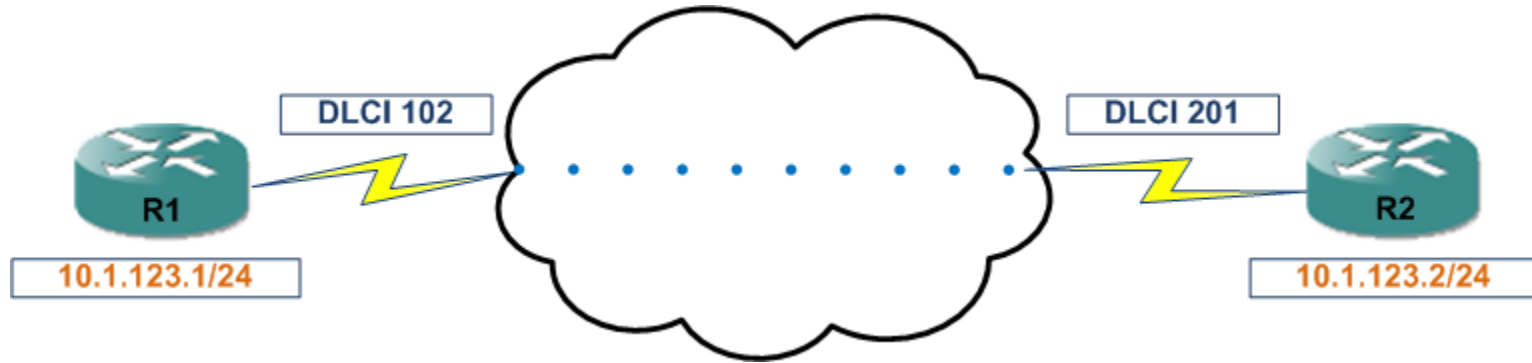
```
Interface Serial0/0
ip address 10.1.12.2 255.255.255.0
encapsulation frame-relay
no frame-relay inverse-arp
frame-relay map ip 10.1.12.1 201 broadcast
```

You're probably sick of hearing me say this, but the following verification commands will be covered in greater depth in a future lesson:

- Verify Frame Relay LMI: [show frame-relay lmi](#)
- Verify Frame Relay local DLCIs: [show frame-relay pvc \[DLCI\]](#) also [[show frame-relay pvc | include DLCI](#)]
- Verify Frame Relay mappings: [show frame relay map](#)



Frame Relay Point to Point





Summary

While you might not associate point to point connections with Frame Relay, you can certainly configure one over a Frame Relay connection. We'll revisit Frame Relay point to point connections in more detail in a future lesson, but the steps for configuring a serial interface for a Frame Relay point to point connection are pretty simple:

- **Set the interface encapsulation to Frame Relay**
- **Set LMI type, if necessary**
- **Disable Frame Relay Inverse-ARP, if necessary**
- **Configure Layer 3 address on interface**
- **Manually configure Frame Relay IP to DLCI mapping**