

Cisco – Configuring Frame Relay Subinterfaces

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Configuring Frame Relay Subinterfaces

Introduction

Before You Begin

- Conventions
- Prerequisites
- Components Used

Configure

- Point-to-Point Subinterfaces
- Hub and Spoke Subinterfaces

Verify

- show Commands for Point-to-Point Subinterfaces
- show Commands for Hub and Spoke Subinterfaces

Troubleshoot

Related Information

Introduction

Frame Relay subinterfaces provide a mechanism for supporting partially meshed Frame Relay networks. Most protocols assume transitivity on a logical network; that is, if station A can talk to station B, and station B can talk to station C, then station A should be able to talk to station C directly. Transitivity is true on LANs, but not on Frame Relay networks unless A is directly connected to C.

Additionally, certain protocols, such as AppleTalk and transparent bridging, cannot be supported on partially meshed networks because they require "split horizon" in which a packet received on an interface cannot be transmitted out the same interface even if the packet is received and transmitted on different virtual circuits.

Configuring Frame Relay subinterfaces ensures that a single physical interface is treated as multiple virtual interfaces. This capability allows us to overcome split horizon rules. Packets received on one virtual interface can now be forwarded out another virtual interface, even if they are configured on the same physical interface.

Subinterfaces address the limitations of Frame Relay networks by providing a way to subdivide a partially meshed Frame Relay network into a number of smaller, fully meshed (or point-to-point) subnetworks. Each subnetwork is assigned its own network number and appears to the protocols as if it is reachable through a separate interface. (Note that point-to-point subinterfaces can be unnumbered for use with IP, reducing the addressing burden that might otherwise result).

Before You Begin

Conventions

For more information on document conventions, see the Cisco Technical Tips Conventions.

Prerequisites

There are no specific prerequisites for this document.

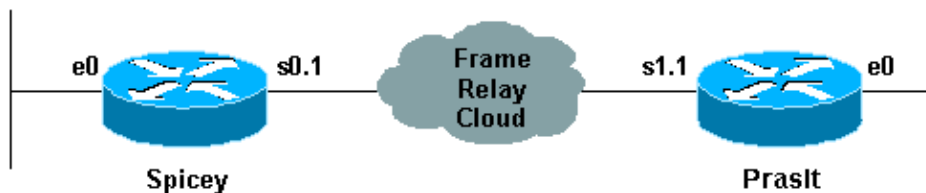
Components Used

This document is not restricted to specific software and hardware versions.

Configure

Point-to-Point Subinterfaces

Network Diagram



Configurations

- Spicey
- Prasit

```
Spicey
Spicey#show running-config
Building configuration...

Current configuration : 1338 bytes
!
version 12.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Spicey
!
enable password ww
!
!
!
!
interface Ethernet0
 ip address 124.124.124.1 255.255.255.0
!
interface Serial0
 no ip address
 encapsulation frame-relay
!
interface Serial0.1 point-to-point
 ip address 3.1.3.1 255.255.255.0
 frame-relay interface-dlci 140
!
!
router igrp 2
 network 3.0.0.0
 network 124.0.0.0
!
!
```

```
line con 0
  exec-timeout 0 0
  transport input none
line aux 0
line vty 0 4
  login
!
end
```

Prasit

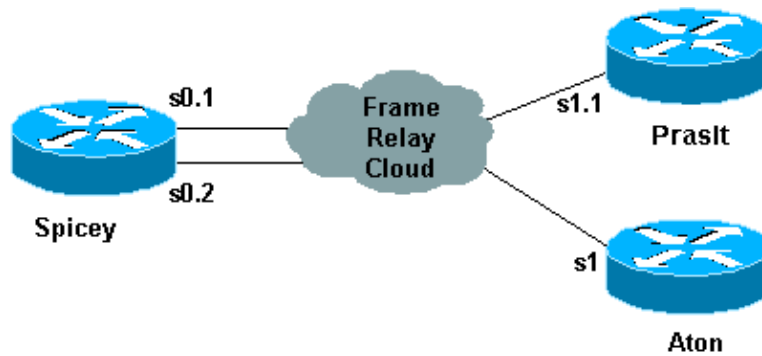
```
Prasit#show running-config
Building configuration...

Current configuration : 1234 bytes
!
version 12.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Prasit
!
!
!
interface Ethernet0
 ip address 123.123.123.1 255.255.255.0
!
 interface Serial1
 no ip address
 encapsulation frame-relay
!
 interface Serial1.1 point-to-point
 ip address 3.1.3.2 255.255.255.0
 frame-relay interface-dlci 150
!
router igrp 2
 network 3.0.0.0
 network 123.0.0.0
!
line con 0
  exec-timeout 0 0
  transport input none
line aux 0
line vty 0 4
  login
!
end
```

Hub and Spoke Subinterfaces

The following hub and spoke sample configuration shows two point-to-point subinterfaces and uses dynamic address resolution on one remote site. Each subinterface is provided with an individual protocol address and subnetmask, and the **interface-dlci** command associates the subinterface with a specified data-link connection identifier (DLCI). Addresses of remote destinations for each point-to-point subinterface are not resolved since they are point-to-point and traffic must be sent to the peer at the other end. The remote end (Aton) uses Inverse ARP for its mapping and the main hub responds accordingly with the IP address of the subinterface. This occurs because Frame Relay Inverse ARP is on by default for multipoint interfaces.

Network Diagram



Configurations

- Spicey
- Prasit
- Aton

```
Spicey
Spicey#show running-config
Building configuration...
!
version 12.1
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Spicey
!
!
!
!
interface Ethernet0
 ip address 124.124.124.1 255.255.255.0
!
interface Serial0
 no ip address
 encapsulation frame-relay
!
interface Serial0.1 point-to-point
 ip address 4.0.1.1 255.255.255.0
 frame-relay interface-dlci 140
!
interface Serial0.2 point-to-point
 ip address 3.1.3.1 255.255.255.0
 frame-relay interface-dlci 130
!
router igrp 2
 network 3.0.0.0
 network 4.0.0.0
 network 124.0.0.0
!
line con 0
 exec-timeout 0 0
 transport input none
line aux 0
line vty 0 4
```

```
login
!  
end
```

Prasit

```
Prasit#show running-config  
Building configuration...  
  
version 12.1  
service timestamps debug datetime msec  
service timestamps log datetime msec  
no service password-encryption  
!  
hostname Prasit  
!  
interface Ethernet0  
 ip address 123.123.123.1 255.255.255.0  
!  
  
interface Serial1  
 no ip address  
 encapsulation frame-relay  
!  
interface Serial1.1 point-to-point  
 ip address 4.0.1.2 255.255.255.0  
 frame-relay interface-dlci 150  
!  
router igrp 2  
 network 4.0.0.0  
 network 123.0.0.0  
!  
!  
line con 0  
 exec-timeout 0 0  
 transport input none  
line aux 0  
line vty 0 4  
 login  
!  
end
```

Aton

```
Aton#show running-config  
Building configuration...  
  
Current configuration:  
!  
version 12.0  
service timestamps debug uptime  
service timestamps log uptime  
!  
hostname Aton  
!  
!  
!  
interface Ethernet0  
 ip address 122.122.122.1 255.255.255.0  
!  
interface Serial1  
 ip address 3.1.3.3 255.255.255.0  
 encapsulation frame-relay
```

```

frame-relay interface-dlci 160
!
router igrp 2
 network 3.0.0.0
 network 122.0.0.0
!
line con 0
 exec-timeout 0 0
 transport input none
line aux 0
line vty 0 4
 login
!
end

```

Verify

This section provides information you can use to confirm your configuration is working properly.

show Commands for Point-to-Point Subinterfaces

- **show frame-relay map**
- **show frame-relay pvc**

Spicey

```

Spicey#show frame-relay map
Serial0.1 (up): point-to-point dlci, dlci 140(0x8C,0x20C0), broadcast
                status defined, active

```

```

Spicey#show frame-relay pvc
PVC Statistics for interface Serial0 (Frame Relay DTE)

```

	Active	Inactive	Deleted	Static
Local	1	0	0	0
Switched	0	0	0	0
Unused	0	0	0	0

```

DLCI = 140, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial0.1

```

```

input pkts 193          output pkts 175          in bytes 20450
out bytes 16340         dropped pkts 0           in FECN pkts 0
in BECN pkts 0         out FECN pkts 0        out BECN pkts 0
in DE pkts 0           out DE pkts 0
out bcast pkts 50      out bcast bytes 3786
pvc create time 01:11:27, last time pvc status changed 00:42:32

```

```

Spicey#ping 123.123.123.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 123.123.123.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/36/36 ms

```

Prasit

```

Prasit#show frame-relay map
Serial1.1 (up): point-to-point dlci, dlci 150(0x96,0x2460), broadcast
                status defined, active

```

```
Prasit#show frame-relay pvc
PVC Statistics for interface Serial1 (Frame Relay DTE)
```

	Active	Inactive	Deleted	Static
Local	1	0	0	0
Switched	0	0	0	0
Unused	0	0	0	0

```
DLCI = 150, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE =
Serial1.1
```

```
input pkts 74          output pkts 89          in bytes 7210
out bytes 10963        dropped pkts 0          in FECN pkts 0
in BECN pkts 0        out FECN pkts 0        out BECN pkts 0
in DE pkts 0          out DE pkts 0
out bcast pkts 24     out bcast bytes 4203
pvc create time 00:12:25, last time pvc status changed 00:12:25
```

```
Prasit#ping 124.124.124.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 124.124.124.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/36/36 ms
```

show Commands for Hub and Spoke Subinterfaces

- show frame-relay map
- show frame-relay pvc

Spicey

```
Spicey#show frame-relay map
Serial0.2 (up): point-to-point dlci, dlci 130(0x82,0x2020), broadcast
status defined, active
Serial0.1 (up): point-to-point dlci, dlci 140(0x8C,0x20C0), broadcast
status defined, active
```

```
Spicey#show frame-relay pvc
PVC Statistics for interface Serial0 (Frame Relay DTE)
```

	Active	Inactive	Deleted	Static
Local	2	0	0	0
Switched	0	0	0	0
Unused	0	0	0	0

```
DLCI = 130, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial0.2
```

```
input pkts 11          output pkts 22          in bytes 1080
out bytes 5128        dropped pkts 0          in FECN pkts 0
in BECN pkts 0        out FECN pkts 0        out BECN pkts 0
in DE pkts 0          out DE pkts 0
out bcast pkts 17     out bcast bytes 4608
pvc create time 00:06:36, last time pvc status changed 00:06:36
```

```
DLCI = 140, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial0.1
```

```
input pkts 33          output pkts 28          in bytes 3967
out bytes 5445        dropped pkts 0          in FECN pkts 0
in BECN pkts 0        out FECN pkts 0        out BECN pkts 0
in DE pkts 0          out DE pkts 0
out bcast pkts 17     out bcast bytes 4608
pvc create time 00:06:38, last time pvc status changed 00:06:38
```

```

Spicey#ping 122.122.122.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 122.122.122.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/35/36 ms

Spicey#ping 123.123.123.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 123.123.123.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/36/36 ms

```

Prasit

```

Prasit#show frame-relay map
Serial1.1 (up): point-to-point dlci, dlci 150(0x96,0x2460), broadcast
        status defined, active

Prasit#show frame-relay pvc
PVC Statistics for interface Serial1 (Frame Relay DTE)

          Active      Inactive      Deleted      Static
Local          1            0            0            0
Switched       0            0            0            0
Unused         0            0            0            0

DLCI = 150, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE =
Serial1.1

input pkts 45          output pkts 48          in bytes 8632
out bytes 6661         dropped pkts 0          in FECN pkts 0
in BECN pkts 0        out FECN pkts 0        out BECN pkts 0
in DE pkts 0           out DE pkts 0
out bcast pkts 31     out bcast bytes 5573
pvc create time 00:12:16, last time pvc status changed 00:06:23

Prasit#ping 124.124.124.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 124.124.124.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/36/36 ms

```

Aton

```

Aton#show frame-relay map
Serial1 (up): ip 3.1.3.1 dlci 160(0xA0,0x2800), dynamic,
        broadcast,, status defined, active

Aton#show frame-relay pvc
PVC Statistics for interface Serial1 (Frame Relay DTE)

          Active      Inactive      Deleted      Static
Local          1            0            0            0
Switched       0            0            0            0
Unused         0            0            0            0

DLCI = 160, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial1
input pkts 699          output pkts 634          in bytes 81290
out bytes 67008        dropped pkts 0          in FECN pkts 0
in BECN pkts 0        out FECN pkts 0        out BECN pkts 0
in DE pkts 0           out DE pkts 0
out bcast pkts 528     out bcast bytes 56074

```

```
pvc create time 05:46:14, last time pvc status changed 00:05:57

Aton#ping 124.124.124.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 124.124.124.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 36/36/36 ms
```

Troubleshoot

There is currently no specific troubleshooting information available for this configuration.

Related Information

- [Comprehensive Guide to Configuring and Troubleshooting Frame Relay](#)
 - [Frame Relay Technology Support Pages](#)
 - [More Information on Frame Relay Commands](#)
 - [More Information on Configuring Frame Relay](#)
 - [Technical Support – Cisco Systems](#)
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