实验十五、帧中继交换机的配置

一、 实验目的

1. 掌握 FRAM-RELAY　SWITCH 的配置
2. 理解 DLCI、LMI 等概念

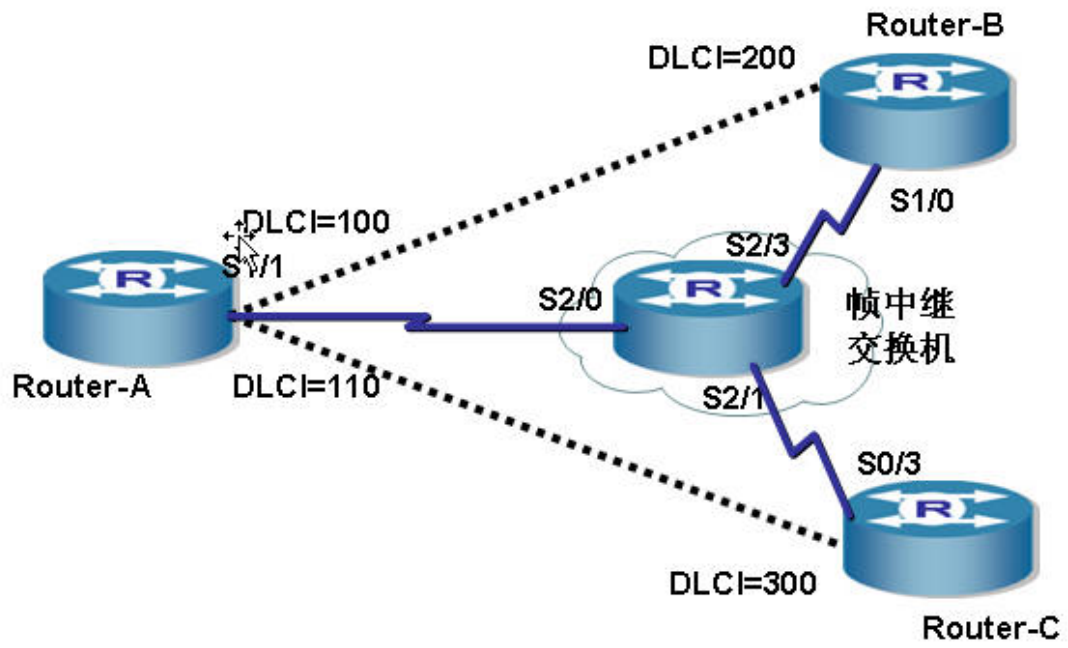
二、 应用环境

假设在银行系统里，总行和各分理处需要进行通讯，而分理处之间不需要通讯，帧中继是最好的选择

三、 实验设备

1.	DCR-1751	三台
2.	DCR-2630（安装相应模块满足三个 serial 接口）	一台
3.	CR-V35FC	三条
4.	CR-V35MT	三条

四、 实验拓扑



五、 实验要求

配置表：

ROUTER-A	ROUTER-B	ROUTER-C

S1/1　192.168.1.1/24　　S1/0　192.168.1.2/24　　S0/3　192.168.1.3/24

PVC　DLCI 如图所示

六、 实验步骤

第一步：配置帧中继交换机（配置前请恢复原厂设置）

Router#conf
Router_config#**hostname frswitch**
frswitch_config# **interface Serial2/0**　　**！进入接口配置模式**
frswitch_config_s2/0# **encapsulation frame-relay**　　**！封装帧中继**
frswitch_config_s2/0#**frame-relay intf-type dce**　　**！配置接口类型**
frswitch_config_s2/0# **physical-layer speed 64000**　　**！配置时钟频率**
frswitch_config# **interface Serial2/1**
frswitch_config_s2/1# **encapsulation frame-relay**
frswitch_config_s2/1#**frame-relay intf-type dce**
frswitch_config_s2/1# **physical-layer speed 64000**
frswitch_config# **interface Serial2/3**
frswitch_config_s2/3# **encapsulation frame-relay**
frswitch_config_s2/3#**frame-relay intf-type dce**
frswitch_config_s2/3# **physical-layer speed 64000**
frswitch_config_s2/3**#exit**
frswitch_config# **frswitch　Serial2/0　100　Serial2/1　200**　　**！配置 PVC 转发表**
frswitch_config#**frswitch　Serial2/0　110　Serial2/3　300**

第二步：配置路由器 A、B、C

Router-A#**conf**
Router-A_config# **interface Serial1/1**
Router-A_config_s1/1# **ip address 192.168.1.1 255.255.255.0**　　**！配置 IP 地址**
Router-A_config_s1/1# **encapsulation frame-relay**　　**！封装帧中继**

Router-B**#conf**
Router-B_config# **interface Serial1/0**
Router-B_config_s1/0# **ip address 192.168.1.2 255.255.255.0**
Router-B_config_s1/0#**encapsulation frame-relay**

_config#int s0/3
Router-C_config_s0/3#
Router-C #**conf**
Router-C _config**#int s0/3**
Router-C _config_s0/3**#ip address 192.168.1.3 255.255.255.0**
Router-C _config_s0/3# **encapsulation frame-relay**

第三步：查看各路由器接口状态

Router-A#**sh int s1/1**

Serial1/1 is **up**, line protocol is **up**
Mode=Sync DTE
DTR=UP,DSR=UP,RTS=UP,CTS=UP,DCD=UP
Interface address is 192.168.1.1/24
MTU 1500 bytes, BW 64 kbit, DLY 2000 usec
Encapsulation Frame-relay, loopback not set
Keepalive set(10 sec)
FrameRelay DTE, LMI type Autosense
LMI DTE Link Errors 1, Protocol Errors 0, Inactives 0
T391 10, N391 6, N392 3, N393 4
Recvd Octets 15177, Recvd Frames 913, Recvd Discards 2
Sent Octets 12767, Sent Frames 912, Sent Discards 0
Recvd Errors 0, Sent Errors 0, Recvd Unknowns 0
60 second input rate 15 bits/sec, 0 packets/sec!
60 second output rate 12 bits/sec, 0 packets/sec!
987 packets input, 18264 bytes, 5 unused_rx, 0 no buffer
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
1043 packets output, 17759 bytes, 8 unused_tx, 0 underruns
error:
0 clock, 0 grace
PowerQUICC SCC specific errors:
0 recv allocb mblk fail 0 recv no buffer
0 transmitter queue full 0 transmitter hwqueue_full

Router-B#**sh int s1/0**
Serial1/0 is **up**, line protocol is **up**
Mode=Sync DTE
DTR=UP,DSR=UP,RTS=UP,CTS=UP,DCD=UP
Interface address is 192.168.1.2/24
MTU 1500 bytes, BW 64 kbit, DLY 2000 usec
Encapsulation Frame-relay, loopback not set
Keepalive set(10 sec)
FrameRelay DTE, LMI type Autosense
LMI DTE Link Errors 1, Protocol Errors 0, Inactives 0
T391 10, N391 6, N392 3, N393 4
Recvd Octets 12867, Recvd Frames 834, Recvd Discards 0
Sent Octets 11779, Sent Frames 836, Sent Discards 3
Recvd Errors 0, Sent Errors 0, Recvd Unknowns 0
60 second input rate 14 bits/sec, 0 packets/sec!
60 second output rate 12 bits/sec, 0 packets/sec!
905 packets input, 15828 bytes, 3 unused_rx, 0 no buffer
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
1036 packets output, 18275 bytes, 8 unused_tx, 0 underruns
error:

0 clock, 0 grace
PowerQUICC SCC specific errors:
0 recv allocb mblk fail 0 recv no buffer
0 transmitter queue full 0 transmitter hwqueue_full

Router-C#**sh int s0/3**
Serial0/3 is up, line protocol is up
Mode=Sync DTE
DTR=UP,DSR=UP,RTS=UP,CTS=UP,DCD=UP
Interface address is 192.168.1.3/24
MTU 1500 bytes, BW 64 kbit, DLY 2000 usec
Encapsulation Frame-relay, loopback not set
Keepalive set(10 sec)
FrameRelay DTE, LMI type Autosense
LMI DTE Link Errors 1, Protocol Errors 0, Inactives 0
T391 10, N391 6, N392 3, N393 4
Recvd Octets 472, Recvd Frames 31, Recvd Discards 0
Sent Octets 464, Sent Frames 33, Sent Discards 0
Recvd Errors 0, Sent Errors 0, Recvd Unknowns 0
60 second input rate 14 bits/sec, 0 packets/sec!
60 second output rate 12 bits/sec, 0 packets/sec!
31 packets input, 534 bytes, 7 unused_rx, 0 no buffer
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
41 packets output, 722 bytes, 8 unused_tx, 0 underruns
error:
0 clock, 0 grace
PowerQUICC SCC specific errors:
0 recv allocb mblk fail 0 recv no buffer
0 transmitter queue full 0 transmitter hwqueue_full

第四步：查看帧中继状态
Router-A#**sh frame-relay**
Frame Relay/IP state
Serial1/1 UP
==========

Port	DLCI	State	remote IP	local IP	Type
Serial1/1	**100**	**ACTIVE**	192.168.1.2	192.168.1.1	I
Serial1/1	**110**	**ACTIVE**	192.168.1.3	192.168.1.1	I

Router-B#**sh frame-relay**
Frame Relay/IP state
Serial1/0 UP
==========

Port	DLCI	State	remote IP	local IP	Type
Serial1/0	**200**	**ACTIVE**	192.168.1.1	192.168.1.2	I

Router-C#**sh frame-relay**

Frame Relay/IP state

Serial0/3 UP

Port	DLCI	State	remote IP	local IP	Type
Serial0/3	**300**	**ACTIVE**	192.168.1.1	192.168.1.3	I

七、 注意事项和排错

1. 帧中继交换机不要配置 IP 地址
2. 配置 PVC 的 DLCI 一定要对应
3. 路由器接口只需要封装帧中继

八、 配置序列

```
frswitch#sh run
正在收集配置...

当前配置:
!
!version 1.3.1S
service timestamps log date
service timestamps debug date
no service password-encryption
!
hostname frswitch
!
!
!
!
!
!
interface FastEthernet0/0
 no ip address
 no ip directed-broadcast
!
interface Ethernet1/0
 no ip address
 no ip directed-broadcast
 duplex half
```

```
!
interface Serial2/0
 no ip address
 no ip directed-broadcast
 encapsulation frame-relay
 frame-relay intf-type dce
 physical-layer speed 64000
!
interface Serial2/1
 no ip address
 no ip directed-broadcast
 encapsulation frame-relay
 frame-relay intf-type dce
 physical-layer speed 64000
!
interface Serial2/2
 no ip address
 no ip directed-broadcast
!
interface Serial2/3
 no ip address
 no ip directed-broadcast
 encapsulation frame-relay
 frame-relay intf-type dce
 physical-layer speed 64000
!
interface Async0/0
 no ip address
 no ip directed-broadcast
!
!
!
!
!
!
!
!
gateway-cfg
 Gateway keepAlive 60
 shutdown
!
frswitch Serial2/0 100 Serial2/1 200
frswitch Serial2/0 110 Serial2/3 300
!
```

!
!
!
!
ivr-cfg
!
!
!

九、 共同思考

1. 路由器的 DLCI 有什么意义？是如何得到的？
2. 为什么帧中继交换机不配置 IP 地址？
3. 帧中继的 MAP 是如何得到的？

十、 课后练习

请重复以上实验

十一、 相关命令详解

frswitch

这个全局配置命令在帧中继的 DCE 或 NNI 上激活 PVC 交换。no 命令取消配置。
frswitch *in-port in-dlci out-port out-dlci*
no frswitch in-port *in-dlci out-port out-dlci*

参数

参数	参数说明
in_port	交换的第一个端口。
in_dlci	第一个端口的DLCI。
out_port	交换的第二个端口。
out_dlci	第二个端口的DLCI。

缺省

无

命令模式

全局配置态

使用指南

配置交换表时，连接的两个端口必须封装成帧中继，而且存在有效的永久虚电路。

示例

下面的例子说明，路由器在接口 s1/1 与接口 s1/2 之间实现 PVC 的交换。在接口 1 上收到的 DLCI 100 的帧将从串口 2 的 DLCI 200 上转发出去。

```
frswitch s1/1 100 s1/2 200
```