

FrameRelay (PVC, Private Virtual Circuit) Interface

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General Information

Summary

Frame Relay is a multiplexed interface to packet switched network and is a simplified form of Packet Switching similar in principle to X.25 in which synchronous frames of data are routed to different destinations depending on header information. Frame Relay uses the synchronous HDLC frame format.

Specifications

Packages required: *synchronous*

License required: *level4*

Home menu level: */interface pvc*

Standards and Technologies: [Frame Relay \(RFC1490\)](#)

Hardware usage: *Not significant*

Description

To use Frame Relay interface you must have already working synchronous interface. You can read how to set up synchronous boards supported by MikroTik RouterOS:

- [Cyclades PC300 PCI Adapters](#)
- [Moxa C101 Synchronous interface](#)

- [Moxa C502 Dual Port Synchronous interface](#)

Additional Documents

- [Frame Relay Forum](#)
- http://www2.rad.com/networks/1994/fram_rel/frame.htm

Configuring Frame Relay Interface

Home menu level: */interface pvc*

Description

To configure frame relay, at first you should set up the synchronous interface, and then the PVC interface.

Property Description

name (*name*; default: **pvcN**) - assigned name of the interface

mtu (*integer*; default: **1500**) - Maximum Transmission Unit of an interface

dlci (*integer*; default: **16**) - Data Link Connection Identifier assigned to the PVC interface

interface (*name*) - Frame Relay interface

Notes

A DLCI is a channel number (Data Link Connection Identifier) which is attached to data frames to tell the network how to route the data. Frame Relay is "statistically multiplexed", which means that only one frame can be transmitted at a time but many logical connections can co-exist on a single physical line. The DLCI allows the data to be logically tied to one of the connections so that once it gets to the network, it knows where to send it.

Frame Relay Configuration

Example with Cyclades Interface

Let us consider the following network setup with MikroTik router with Cyclades PC300 interface connected to a leased line with baseband modems and a Cisco router at the other end.

```
[admin@MikroTik] ip address> add interface=pvc1 address=1.1.1.1 netmask=255.255.255.0
[admin@MikroTik] ip address> print
Flags: X - disabled, I - invalid, D - dynamic
#   ADDRESS          NETWORK      BROADCAST   INTERFACE
0   1.1.1.1/24        1.1.1.0     1.1.1.255   pvc1
[admin@MikroTik] ip address>
```

PVC and Cyclades interface configuration

- Cyclades

```
[admin@MikroTik] interface cyclades> print
Flags: X - disabled, R - running
```

```
0 R name="cyclades1" mtu=1500 line-protocol=frame-relay media-type=V35
  clock-rate=64000 clock-source=external line-code=B8ZS framing-mode=ESF
  line-build-out=0dB rx-sensitivity=short-haul frame-relay-lmi-type=ansi
  frame-relay-dce=no chdlc-keepalive=10s
```

```
[admin@MikroTik] interface cyclades>
```

- PVC

```
[admin@MikroTik] interface pvc> print
Flags: X - disabled, R - running
#   NAME           MTU  DLCI  INTERFACE
0  R pvc1          1500 42   cyclades1
[admin@MikroTik] interface pvc>
```

- Cisco router setup

```
CISCO# show running-config

Building configuration...

Current configuration...

...
!
ip subnet-zero
no ip domain-lookup
frame-relay switching
!
interface Ethernet0
  description connected to EthernetLAN
  ip address 10.0.0.254 255.255.255.0
!
interface Serial0
  description connected to Internet
  no ip address
  encapsulation frame-relay IETF
  serial restart-delay 1
  frame-relay lmi-type ansi
  frame-relay intf-type dce
!
interface Serial0.1 point-to-point
  ip address 1.1.1.2 255.255.255.0
  no arp frame-relay
  frame-relay interface-dlci 42
!
...
end.
```

Send ping to MikroTik router

```
CISCO#ping 1.1.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 1.1.1.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 28/31/32 ms
CISCO#
```

Example with MOXA Interface

Let us consider the following network setup with MikroTik router with MOXA C502 synchronous interface connected to a leased line with baseband modems and a Cisco router at the other end.

```
[admin@MikroTik] ip address> add interface=pvc1 address=1.1.1.1 netmask=255.255.255.0
[admin@MikroTik] ip address> print
Flags: X - disabled, I - invalid, D - dynamic
#   ADDRESS          NETWORK          BROADCAST        INTERFACE
0  1.1.1.1/24        1.1.1.0         1.1.1.255        pvc1
```

```
[admin@MikroTik] ip address>
```

PVC and Moxa interface configuration

- Moxa

```
[admin@MikroTik] interface moxa-c502> print
Flags: X - disabled, R - running
 0 R name="moxa1" mtu=1500 line-protocol=frame-relay clock-rate=64000
    clock-source=external frame-relay-lmi-type=ansi frame-relay-dce=no
    cisco-hdlc-keepalive-interval=10s

 1 X name="moxa-c502-2" mtu=1500 line-protocol=sync-ppp clock-rate=64000
    clock-source=external frame-relay-lmi-type=ansi frame-relay-dce=no
    cisco-hdlc-keepalive-interval=10s

[admin@MikroTik] interface moxa-c502>
```

- PVC

```
[admin@MikroTik] interface pvc> print
Flags: X - disabled, R - running
# NAME MTU DLCI INTERFACE
0 R pvcl 1500 42 moxa1
[admin@MikroTik] interface pvc>

CISCO router setup
CISCO# show running-config

Building configuration...

Current configuration...

...
!
ip subnet-zero
no ip domain-lookup
frame-relay switching
!
interface Ethernet0
description connected to EthernetLAN
ip address 10.0.0.254 255.255.255.0
!
interface Serial0
description connected to Internet
no ip address
encapsulation frame-relay IETF
serial restart-delay 1
frame-relay lmi-type ansi
frame-relay intf-type dce
!
interface Serial0.1 point-to-point
ip address 1.1.1.2 255.255.255.0
no arp frame-relay
frame-relay interface-dlci 42
!
...
end.

Send ping to MikroTik router

CISCO#ping 1.1.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 1.1.1.1, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 28/31/32 ms
CISCO#
```

Example with MikroTik Router to MikroTik Router

Let us consider the following example:

In this example we will use two Moxa C101 synchronous cards.

Do not forget to set **line-protocol** for synchronous interfaces to **frame-relay**. To achieve proper result, one of the synchronous interfaces must operate in DCE mode:

```
[admin@r1] interface moxa-c101> set 0 frame-relay-dce=yes
[admin@r1] interface moxa-c101> print
Flags: X - disabled, R - running
 0 R name="moxa-c101-1" mtu=1500 line-protocol=frame-relay clock-rate=64000
    clock-source=external frame-relay-lmi-type=ansi frame-relay-dce=yes
    cisco-hdlc-keepalive-interval=10s ignore-dcd=no

[admin@r1] interface moxa-c101>
```

Then we need to add PVC interfaces and **IP addresses**.

On the **R1**:

```
[admin@r1] interface pvc> add dlci=42 interface=moxa-c101-1
[admin@r1] interface pvc> print
Flags: X - disabled, R - running
#   NAME                               MTU  DLCI  INTERFACE
0 X pvcl                               1500 42   moxa-c101-1

[admin@r1] interface pvc> /ip address add address 4.4.4.1/24 interface pvcl
```

on the **R2**:

```
[admin@r2] interface pvc> add dlci=42 interface=moxa-c101-1
[admin@r2] interface pvc> print
Flags: X - disabled, R - running
#   NAME                               MTU  DLCI  INTERFACE
0 X pvcl                               1500 42   moxa-c101-1

[admin@r2] interface pvc> /ip address add address 4.4.4.2/24 interface pvcl
```

Finally, we must enable PVC interfaces:

```
[admin@r1] interface pvc> enable pvcl
[admin@r1] interface pvc>

[admin@r2] interface pvc> enable pvcl
[admin@r2] interface pvc>
```

Troubleshooting

Description

- **I cannot ping through the synchronous frame relay interface between MikroTik router and a Cisco router**
Frame Relay does not support address resolving and IETF encapsulation should be used. Please check the configuration on the Cisco router