FrameRelay (PVC, Private Virtual Circuit) Interface

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This document applies to V3.0

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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. Please read how to set up your synchronous boards with MikroTik RouterOS first.

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

dlci (*integer*; default: **16**) - Data Link Connection Identifier assigned to the PVC interface
interface (*name*) - Frame Relay interface
mtu (*integer*; default: **1500**) - Maximum Transmission Unit of an interface
name (*name*; default: **pvcN**) - assigned name of the 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=1.1.1.1/24
[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=1.1.1.1/24
[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

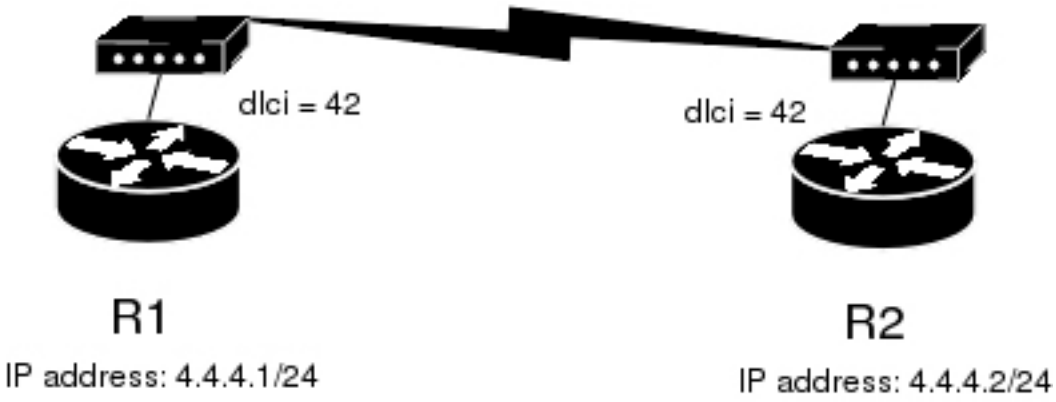
```
[admin@MikroTik] interface moxa-c502> print
Flags: X - disabled, R - running
  0  R name="moxa1" mtu=1500 line-protocol=frame-relay clock-rate=64000
       clock-source=external frame-relay-lmi-type=ansi frame-relay-dce=no
       cisco-hdlc-keepalive-interval=10s

  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 pvc1                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  pvc1                                                1500 42   moxa-c101-1
[admin@r1] interface pvc> /ip address add address=4.4.4.1/24 interface=pvc1
```

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  pvc1                                                1500 42   moxa-c101-1
[admin@r2] interface pvc> /ip address add address 4.4.4.2/24 interface=pvc1
```

Finally, we must enable PVC interfaces:

```
[admin@r1] interface pvc> enable pvc1
[admin@r1] interface pvc>

[admin@r2] interface pvc> enable pvc1
[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