



Frame Relay Switching Diagnostics and Troubleshooting

This feature module describes the Frame Relay Switching Diagnostics and Troubleshooting feature. It includes information on the benefits of the new feature, supported platforms, related documents, and more.

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Feature Overview

The Frame Relay Switching Diagnostics and Troubleshooting feature enhances Frame Relay switching functionality by providing tools for diagnosing problems in switched Frame Relay networks.

Before this feature was introduced, the **show frame-relay pvc** command displayed the number of packets dropped from switched permanent virtual circuits (PVCs). With the Frame Relay Switching Diagnostics and Troubleshooting feature, the **show frame-relay pvc** command has been enhanced so that in addition to displaying the number of packets dropped, it now displays detailed reasons why packets were dropped. The command has also been enhanced to display the local status, the Network-to-Network Interface (NNI) status, and the overall status of NNI PVCs.

If a problem is observed, the new **debug frame-relay switching** command can be used to display the status of packets on switched PVCs at regular intervals. This new debug command displays information such as the number of packets that were switched, why packets were dropped, and changes in status of physical links and PVCs. Debug information is displayed only when there has been a change from one configured interval to the next.

Benefits

The Frame Relay Switching Diagnostics and Troubleshooting feature provides tools for diagnosing problems in switched Frame Relay networks. If packets are being dropped from switched PVCs, network administrators can use these tools to quickly find out why. In addition, the NNI status display has been enhanced to give a more accurate picture of overall NNI PVC health.

Restrictions

The Frame Relay Switching Diagnostics and Troubleshooting feature is not supported on terminated PVCs.

Related Documents

Cisco IOS Wide-Area Networking Configuration Guide, Release 12.1

Cisco IOS Wide-Area Networking Command Reference, Release 12.1

Supported Platforms

- Cisco 1600
- Cisco 2500 series
- Cisco 2600
- Cisco 3600 series
- Cisco 3800
- Cisco 4000 series (Cisco 4000, 4000-M, 4500, 4500-M, 4700, 4700-M)
- Cisco 7200 series
- Cisco 7500 (non-distributed mode)

Supported Standards, MIBs, and RFCs

Standards

No new or modified standards are supported by this feature.

MIBs

No new or modified MIBs are supported by this feature.

For descriptions of supported MIBs and how to use MIBs, see the Cisco MIB web site on Cisco Connection Online (CCO) at <http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml>.

RFCs

No new or modified RFCs are supported by this feature.

Configuration Tasks

None.

Monitoring and Maintaining Frame Relay Switching

To diagnose problems in switched Frame Relay networks, use one or both of the following privileged EXEC commands:

Command	Purpose
Router# <code>show frame-relay pvc</code>	Displays statistics about PVCs for Frame Relay interfaces.
Router# <code>debug frame-relay switching</code>	Displays debug messages for switched Frame Relay PVCs.

Configuration Examples

None.

Command Reference

This section documents the modified command to be used with the Frame Relay Switching Diagnostics and Troubleshooting feature. All other commands used with this feature are documented in the Cisco IOS Release 12.1 command reference publications.

show frame-relay pvc

To display statistics about permanent virtual circuits (PVCs) for Frame Relay interfaces, use the **show frame-relay pvc** privileged EXEC command.

```
show frame-relay pvc [interface interface][dldci]
```

Syntax Description	Parameter	Description
	interface	(Optional) Indicates a specific interface for which PVC information will be displayed.
	<i>interface</i>	(Optional) Interface number containing the data-link connection identifiers (DLCIs) for which you wish to display PVC information.
	<i>dldci</i>	(Optional) A specific DLCI number used on the interface. Statistics for the specified PVC are displayed when a DLCI is also specified.

Defaults No default behavior or values.

Command Modes Privileged EXEC

Command History	Release	Modification
	10.0	This command was introduced.
	12.0(1)T	This command was modified to display statistics about virtual access interfaces used for PPP connections over Frame Relay.
	12.0(3)XG	This command was modified to include the fragmentation type and size associated with a particular PVC when fragmentation is enabled on the PVC.
	12.0(4)T	This command was modified to include the fragmentation type and size associated with a particular PVC when fragmentation is enabled on the PVC.
	12.0(5)T	This command was modified to include information on the special voice queue that is created using the queue keyword of the frame-relay voice bandwidth command.
	12.1(2)T	This command was modified to include information about the policy map attached to a specific PVC. The command was also modified to include information about the priority configured for a PVC within FR PIPQ.
	12.0(12)S	This command was modified to display the number of packets in the post-hardware-compression queue. This command was also modified to display reasons for packet drops and complete status information for switched NNI PVCs.
	12.1(5)T	This command was modified to display the number of packets in the post-hardware-compression queue. This command was also modified to display reasons for packet drops and complete status information for switched NNI PVCs.

Usage Guidelines

Use this command to monitor the PPP link control protocol (LCP) state as being open with an “up” state, or closed with a “down” state.

When “vofr” or “vofr cisco” has been configured on the PVC, and a voice bandwidth has been allocated to the class associated with this PVC, configured voice bandwidth and used voice bandwidth are also displayed.

Statistics Reporting

To obtain statistics about PVCs on all Frame Relay interfaces, use this command with no arguments.

To obtain statistics about a PVC that include policy-map configuration or the priority configured for that PVC, use this command with the *dldci* argument.

Per-VC counters are not incremented at all when either autonomous or silicon switching engine (SSE) switching is configured; therefore, PVC values will be inaccurate if either switching method is used.

Traffic Shaping

Congestion control mechanisms are currently not supported, but the switch passes forward explicit congestion notification (FECN) bits, backward explicit congestion notification (BECN) bits, and discard eligible (DE) bits unchanged from entry to exit points in the network.

If a Local Management Interface (LMI) status report indicates that a PVC is not active, then it is marked as inactive. A PVC is marked as deleted if it is not listed in a periodic LMI status message.

Examples

The various displays in this section show sample output for a variety of PVCs. Some of the PVCs carry data only; some carry a combination of voice and data.

Switched PVC Example

The following is sample output from the **show frame-relay pvc** command for a switched Frame Relay PVC. This output displays detailed information about NNI status and why packets were dropped from switched PVCs.

```
Router# show frame-relay pvc

PVC Statistics for interface Serial2/2 (Frame Relay NNI)

DLCI = 16, DLCI USAGE = SWITCHED, PVC STATUS = INACTIVE, INTERFACE = Serial2/2
LOCAL PVC STATUS = INACTIVE, NNI PVC STATUS = INACTIVE

input pkts 0          output pkts 0          in bytes 0
out bytes 0           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 bytes 0
out bcast pkts 0     out bcast bytes 0
switched pkts0
Detailed packet drop counters:
no out intf 0        out intf down 0       no out PVC 0
in PVC down 0       out PVC down 0        pkt too big 0
shaping Q full 0    pkt above DE 0        policing drop 0
pvc create time 00:00:07, last time pvc status changed 00:00:07
```

Frame Relay Fragmentation and Hardware Compression Example

The following is sample output for the **show frame-relay pvc** command for a PVC configured with Cisco-proprietary fragmentation and hardware compression:

```
ed2-26a# show frame-relay pvc 110

PVC Statistics for interface Serial0/0 (Frame Relay DTE)

DLCI = 110, DLCI USAGE = LOCAL, PVC STATUS = STATIC, INTERFACE = Serial0/0

input pkts 409          output pkts 409          in bytes 3752
out bytes 4560         dropped pkts 1          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 0      out bcast bytes 0
pvc create time 3d00h, last time pvc status changed 2d22h
Service type VoFR-cisco
Voice Queueing Stats: 0/100/0 (size/max/dropped)
Post h/w compression queue: 0
Current fair queue configuration:
  Discard   Dynamic   Reserved
threshold  queue count queue count
  64        16          2
Output queue size 0/max total 600/drops 0
configured voice bandwidth 16000, used voice bandwidth 0
fragment type VoFR-cisco      fragment size 100
cir 64000   bc 640   be 0   limit 80   interval 10
mincir 32000   byte increment 80   BECN response no
frags 428     bytes 4810   frags delayed 24     bytes delayed 770
shaping inactive
traffic shaping drops 0
ip rtp priority parameters 16000 32000 20000
```

Frame Relay PVC Priority Queueing Example

The following is sample output for a PVC that has been assigned high priority:

```
ed2-36b# show frame-relay pvc 100

PVC Statistics for interface Serial0 (Frame Relay DTE)

DLCI = 100, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial0

input pkts 0          output pkts 0          in bytes 0
out bytes 0          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 0      out bcast bytes 0
pvc create time 00:00:59, last time pvc status changed 00:00:33
priority high
```

Low Latency Queueing for Frame Relay Example

The following is sample output from the **show frame-relay pvc** command for a PVC shaped to a 64K committed information rate (CIR) with fragmentation. A policy map is attached to the PVC and is configured with a priority class for voice, two data classes for IP precedence traffic, and a default class for best-effort traffic. Weighted Random Early Detection (WRED) is used as the drop policy on one of the data classes.

```
ed2-36b# show frame-relay pvc 100
```

```

PVC Statistics for interface Serial1/0 (Frame Relay DTE)

DLCI = 100, DLCI USAGE = LOCAL, PVC STATUS = INACTIVE, INTERFACE = Serial1/0.1

input pkts 0          output pkts 0          in bytes 0
out bytes 0          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 0      out bcast bytes 0
pvc create time 00:00:42, last time pvc status changed 00:00:42
service policy mypolicy
Class voice
  Weighted Fair Queueing
    Strict Priority
    Output Queue: Conversation 72
      Bandwidth 16 (kbps) Packets Matched 0
      (pkts discards/bytes discards) 0/0
Class immediate-data
  Weighted Fair Queueing
    Output Queue: Conversation 73
      Bandwidth 60 (%) Packets Matched 0
      (pkts discards/bytes discards/tail drops) 0/0/0
      mean queue depth: 0
      drops: class random tail min-th max-th mark-prob
              0 0 0 64 128 1/10
              1 0 0 71 128 1/10
              2 0 0 78 128 1/10
              3 0 0 85 128 1/10
              4 0 0 92 128 1/10
              5 0 0 99 128 1/10
              6 0 0 106 128 1/10
              7 0 0 113 128 1/10
              rsvp 0 0 120 128 1/10
Class priority-data
  Weighted Fair Queueing
    Output Queue: Conversation 74
      Bandwidth 40 (%) Packets Matched 0 Max Threshold 64 (packets)
      (pkts discards/bytes discards/tail drops) 0/0/0
Class class-default
  Weighted Fair Queueing
    Flow Based Fair Queueing
      Maximum Number of Hashed Queues 64 Max Threshold 20 (packets)
    Output queue size 0/max total 600/drops 0
    fragment type end-to-end fragment size 50
    cir 64000 bc 640 be 0 limit 80 interval 10
    mincir 64000 byte increment 80 BECN response no
    frags 0 bytes 0 frags delayed 0 bytes delayed 0
    shaping inactive
    traffic shaping drops 0

```

PPP over Frame Relay Example

The following is sample output from the **show frame-relay pvc** command that shows the PVC statistics for serial interface 5 (slot 1 and DLCI 55 are up) during a PPP session over Frame Relay:

```
Router# show frame-relay pvc 55
```

```
PVC Statistics for interface Serial5/1 (Frame Relay DTE)
DLCI = 55, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial5/1.1
  input pkts 9          output pkts 16          in bytes 154
  out bytes 338        dropped pkts 6          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 0     out bcast bytes 0
  pvc create time 00:35:11, last time pvc status changed 00:00:22
  Bound to Virtual-Access1 (up, cloned from Virtual-Template5)
```

Voice over Frame Relay Example

The following is sample output from the **show frame-relay pvc** command for a PVC carrying Voice over Frame Relay (VoFR) traffic configured via the **vofr cisco** command. The **frame-relay voice bandwidth** command has been configured on the class associated with this PVC, as has fragmentation. The fragmentation employed is proprietary to Cisco.

A sample configuration for this scenario is shown first, followed by the output for the **show frame-relay pvc** command.

```
interface serial 0
  encapsulation frame-relay
  frame-relay traffic-shaping
  frame-relay interface-dlci 108
  vofr cisco
  class vofr-class
map-class frame-relay vofr-class
  frame-relay fragment 100
  frame-relay fair-queue
  frame-relay cir 64000
  frame-relay voice bandwidth 25000
```

```
Router# show frame-relay pvc 108
```

```
PVC Statistics for interface Serial0 (Frame Relay DTE)
DLCI = 108, DLCI USAGE = LOCAL, PVC STATUS = STATIC, INTERFACE = Serial0
  input pkts 1260       output pkts 1271       in bytes 95671
  out bytes 98604      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 1271  out bcast bytes 98604
  pvc create time 09:43:17, last time pvc status changed 09:43:17
  Service type VoFR-cisco
  configured voice bandwidth 25000, used voice bandwidth 0
  voice reserved queues 24, 25
  fragment type VoFR-cisco      fragment size 100
  cir 64000      bc 64000      be 0      limit 1000  interval 125
  mincir 32000   byte increment 1000  BECN response no
  pkts 2592      bytes 205140  pkts delayed 1296      bytes delayed 102570
  shaping inactive
  shaping drops 0
  Current fair queue configuration:
  Discard      Dynamic      Reserved
  threshold    queue count  queue count
  64           16           2
  Output queue size 0/max total 600/drops 0
```

FRF.12 Fragmentation Example

The following is sample output from the **show frame-relay pvc** command for an application employing pure FRF.12 fragmentation. A sample configuration for this scenario is shown first, followed by the output for the **show frame-relay pvc** command.

```
interface serial 0
  encapsulation frame-relay
  frame-relay traffic-shaping
  frame-relay interface-dlci 110
  class frag
  map-class frame-relay frag
  frame-relay fragment 100
  frame-relay fair-queue
  frame-relay cir 64000
```

Router# **show frame-relay pvc 110**

```
PVC Statistics for interface Serial0 (Frame Relay DTE)
DLCI = 110, DLCI USAGE = LOCAL, PVC STATUS = STATIC, INTERFACE = Serial0
input pkts 0          output pkts 243      in bytes 0
out bytes 7290        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 243   out bcast bytes 7290
pvc create time 04:03:17, last time pvc status changed 04:03:18
fragment type end-to-end      fragment size 100
cir 64000   bc 64000   be 0   limit 1000   interval 125
mincir 32000   byte increment 1000   BECN response no
pkts 486      bytes 14580   pkts delayed 243   bytes delayed 7290
shaping inactive
shaping drops 0
Current fair queue configuration:
Discard      Dynamic      Reserved
threshold    queue count  queue count
64           16           2
Output queue size 0/max total 600/drops 0
```

Note that when voice is not configured, voice bandwidth output is not displayed.

Multipoint Subinterfaces Transporting Data

The following is sample output from the **show frame-relay pvc** command for multipoint subinterfaces carrying data only. The output displays both the subinterface number and the DLCI. This display is the same whether the PVC is configured for static or dynamic addressing. Note that neither fragmentation nor voice is configured on this PVC.

Router# **show frame-relay pvc**

```
DLCI = 300, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial0.103
input pkts 10  output pkts 7  in bytes 6222
out bytes 6034  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
outbcast pkts 0  outbcast bytes 0
pvc create time 0:13:11  last time pvc status changed 0:11:46
DLCI = 400, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial0.104
input pkts 20  output pkts 8  in bytes 5624
out bytes 5222  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
outbcast pkts 0  outbcast bytes 0
pvc create time 0:03:57  last time pvc status changed 0:03:48
```

```
show frame-relay pvc
```

PVC Transporting Voice and Data

The following is sample output from the **show frame-relay pvc** command for a PVC carrying voice and data traffic, with a special queue specifically for voice traffic created using the **frame-relay voice bandwidth** command **queue** keyword:

```
Router# show frame-relay pvc interface serial 1 45

PVC Statistics for interface Serial11 (Frame Relay DTE)

DLCI = 45, DLCI USAGE = LOCAL, PVC STATUS = STATIC, INTERFACE = Serial11

input pkts 85          output pkts 289          in bytes 1730
out bytes 6580        dropped pkts 11          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 0      out bcast bytes 0
pvc create time 00:02:09, last time pvc status changed 00:02:09
Service type VoFR
configured voice bandwidth 25000, used voice bandwidth 22000
fragment type VoFR      fragment size 100
cir 20000    bc 1000    be 0    limit 125    interval 50
mincir 20000    byte increment 125    BECN response no
fragments 290    bytes 6613    fragments delayed 1    bytes delayed 33
shaping inactive
traffic shaping drops 0
Voice Queueing Stats: 0/100/0 (size/max/dropped)
~~~~~
Current fair queue configuration:
Discard    Dynamic    Reserved
threshold  queue count  queue count
64         16         2
Output queue size 0/max total 600/drops 0
```

Table 1 provides a listing of the fields in these displays and a description of each field.

Table 1 *show frame-relay pvc Field Descriptions*

Field	Description
DLCI	One of the DLCI numbers for the PVC.
DLCI USAGE	Lists SWITCHED when the router or access server is used as a switch, or LOCAL when the router or access server is used as a DTE device.
PVC STATUS	Status of the PVC: ACTIVE, INACTIVE, or DELETED.
INTERFACE	Specific subinterface associated with this DLCI.
LOCAL PVC STATUS ¹	Status of PVC configured locally on the NNI interface.
NNI PVC STATUS ¹	Status of PVC learned over the NNI link.
input pkts	Number of packets received on this PVC.
output pkts	Number of packets sent on this PVC.
in bytes	Number of bytes received on this PVC.
out bytes	Number of bytes sent on this PVC.
dropped pkts	Number of incoming and outgoing packets dropped by the router at the Frame Relay level.
in FECN pkts	Number of packets received with the FECN bit set.

Table 1 *show frame-relay pvc Field Descriptions (continued)*

Field	Description
in BECN pkts	Number of packets received with the BECN bit set.
out FECN pkts	Number of packets sent with the FECN bit set.
out BECN pkts	Number of packets sent with the BECN bit set.
in DE pkts	Number of DE packets received.
out DE pkts	Number of DE packets sent.
out bcast pkts	Number of output broadcast packets.
out bcast bytes	Number of output broadcast bytes.
switched pkts	Number of switched packets.
no out intf ²	Number of packets dropped because there is no output interface.
out intf down ²	Number of packets dropped because the output interface is down.
no out PVC ²	Number of packets dropped because the outgoing PVC is not configured.
in PVC down ²	Number of packets dropped because the incoming PVC is inactive.
out PVC down ²	Number of packets dropped because the outgoing PVC is inactive.
pkt too big ²	Number of packets dropped because the packet size is greater than media MTU ³ .
shaping Q full ²	Number of packets dropped because the Frame Relay traffic shaping queue is full.
pkt above DE ²	Number of packets dropped because they are above the DE level when Frame Relay congestion management is enabled.
policing drop ²	Number of packets dropped because of Frame Relay traffic policing.
pvc create time	Time at which the PVC was created.
last time pvc status changed	Time at which the PVC changed status.
priority	Priority assigned to the PVC.
Service type	Type of service performed by this PVC. Can be VoFR or VoFR-cisco.
Post h/w compression queue	Number of packets in the post-hardware-compression queue when hardware compression and Frame Relay fragmentation are configured.
configured voice bandwidth	Amount of bandwidth in bits per second (bps) reserved for voice traffic on this PVC.
used voice bandwidth	Amount of bandwidth in bps currently being used for voice traffic.
voice reserved queues	Queue numbers reserved for voice traffic on this PVC. This field was removed in Cisco IOS Release 12.0(5)T.
service policy	Name of the output service policy applied to the VC.
Class	Class of traffic being displayed. Output is displayed for each configured class in the policy.
Output Queue	The WFQ ⁴ conversation to which this class of traffic is allocated.
Bandwidth	Bandwidth in kbps or percentage configured for this class.
Packets Matched	Number of packets that matched this class.

Table 1 *show frame-relay pvc Field Descriptions (continued)*

Field	Description
Max Threshold	Maximum queue size for this class when WRED is not used.
pkts discards	Number of packets discarded for this class.
bytes discards	Number of bytes discarded for this class.
tail drops	Number of packets discarded for this class because the queue was full.
mean queue depth	Average queue depth based on the actual queue depth on the interface and the exponential weighting constant. It is a moving average. The minimum and maximum thresholds are compared against this value to determine drop decisions.
drops:	WRED parameters.
class	IP precedence value.
random	Number of packets randomly dropped when the mean queue depth is between the minimum threshold value and the maximum threshold value for the specified IP precedence value.
tail	Number of packets dropped when the mean queue depth is greater than the maximum threshold value for the specified IP precedence value.
min-th	Minimum WRED threshold in number of packets.
max-th	Maximum WRED threshold in number of packets.
mark-prob	Fraction of packets dropped when the average queue depth is at the maximum threshold.
Maximum Number of Hashed Queues	(Applies to class default only) Number of queues available for unclassified flows.
fragment type	Type of fragmentation configured for this PVC. Possible types are: end-to-end—Fragmented packets contain the standard FRF.12 header VoFR—Fragmented packets contain the FRF.11 Annex C header VoFR-cisco—Fragmented packets contain the Cisco proprietary header
fragment size	Size of the fragment payload in bytes.
cir	Current CIR in bps.
bc	Current Committed Burst (Bc) size in bits.
be	Current Excess Burst (Be) size in bits.
limit	Maximum number of bytes sent per internal interval (excess plus sustained).
interval	Interval being used internally (may be smaller than the interval derived from Bc/CIR; this happens when the router determines that traffic flow will be more stable with a smaller configured interval).
mincir	Minimum CIR for the PVC.
byte increment	Number of bytes that will be sustained per internal interval.
BECN response	Indication that Frame Relay has BECN adaptation configured.
pkts	Number of packets associated with this PVC that have gone through the traffic-shaping system.

Table 1 *show frame-relay pvc Field Descriptions (continued)*

Field	Description
frags	Total number of fragments shaped on this VC.
bytes	Number of bytes associated with this PVC that have gone through the traffic-shaping system.
pkts delayed	Number of packets associated with this PVC that have been delayed by the traffic-shaping system.
frags delayed	Number of fragments delayed in the shaping queue before being sent.
bytes delayed	Number of bytes associated with this PVC that have been delayed by the traffic-shaping system.
shaping	Indication that shaping will be active for all PVCs that are fragmenting data; otherwise, shaping will be active if the traffic being sent exceeds the CIR for this circuit.
shaping drops	Number of packets dropped by the traffic-shaping process.
Voice Queueing Stats	Statistics showing the size of packets, the maximum number of packets, and the number of packets dropped in the special voice queue created using the frame-relay voice bandwidth command queue keyword.
Discard threshold	Maximum number of packets that can be stored in each packet queue. Additional packets received after a queue is full will be discarded.
Dynamic queue count	Number of packet queues reserved for best-effort traffic.
Reserved queue count	Number of packet queues reserved for voice traffic.
Output queue size	Size in bytes of each output queue.
max total	Maximum number of packets of all types that can be queued in all queues.
drops	Number of frames dropped by all output queues.

1. The LOCAL PVC STATUS and NNI PVC STATUS fields are displayed only for PVCs configured on Frame Relay NNI interface types. These fields are not displayed if the PVC is configured on DCE or DTE interface types.
2. The detailed packet drop fields are displayed for switched Frame Relay PVCs only. These fields are not displayed for terminated PVCs.
3. MTU = maximum transmission unit
4. WFQ = weighted fair queueing.

Related Commands

Command	Description
frame-relay interface-queue priority	Enables FR PIPQ on a Frame Relay interface and assigns priority to a PVC within a Frame Relay map class.
frame-relay pvc	Configures Frame Relay PVCs for FRF.8 Frame Relay-ATM Service Interworking.
service-policy	Attaches a policy map to an input interface or VC, or an output interface or VC, to be used as the service policy for that interface or VC.
show dial-peer voice	Displays configuration information and call statistics for dial peers.
show frame-relay fragment	Displays Frame Relay fragmentation details.
show frame-relay vofr	Displays details about FRF.11 subchannels being used on VoFR DLCIs.
show interfaces serial	Displays information about a serial interface.

■ show frame-relay pvc

Command	Description
show policy-map interface	Displays the configuration of classes configured for service policies on the specified interface or PVC.
show traffic-shape queue	Displays information about the elements queued at a particular time at the VC (DLCI) level.

Debug Commands

This section documents the new **debug** command to be used with the Frame Relay Switching Diagnostics and Troubleshooting feature.

debug frame-relay switching

To display debug messages for switched Frame Relay PVCs, use the **debug frame-relay switching EXEC** command. To disable Frame Relay switching debugging, use the **no** form of this command.

debug frame-relay switching interface *interface dlci* [**interval** *interval*]

no debug frame-relay switching

Syntax Description

interface <i>interface</i>	Name of the Frame Relay interface.
<i>dlci</i>	DLCI number of the switched PVC to be debugged.
interval <i>interval</i>	(Optional) Interval in seconds at which debugging messages will be updated.

Defaults

The default interval is 1 second.

Command History

Release	Modification
12.0(12)S	This command was introduced.
12.1(5)T	This command was implemented in Cisco IOS Release 12.1T.

Usage Guidelines

The **debug frame-relay switching** command can be used only on switched Frame Relay PVCs, not terminated PVCs.

Debug statistics are displayed only if they have changed.



Note

Although statistics are displayed at configured intervals, there may be a delay between the occurrence of a debug event (such as a packet drop) and the display of that event. The delay may be as much as the configured interval plus 10 seconds.

Examples

The following example shows sample output for the **debug frame-relay switching** command:

```
Router# debug frame-relay switching interface s2/1 1000 interval 2
```

```
Frame Relay switching debugging is on
Display frame switching debug on interface Serial2/1 dlci 1000
1d02h: Serial2/1 dlci 1000: 32 packets switched to Serial2/0 dlci 1002
1d02h: Serial2/1 dlci 1000: 1800 packets output
1d02h: Serial2/1 dlci 1000: 4 packets dropped - outgoing PVC inactive
1d02h: Serial2/1 dlci 1000: Incoming PVC status changed to ACTIVE
1d02h: Serial2/1 dlci 1000: Outgoing PVC status changed to ACTIVE
1d02h: Serial2/1 dlci 1000: Incoming interface hardware module state changed to UP
1d02h: Serial2/1 dlci 1000: Outgoing interface hardware module state changed to UP
```