show atm vc

To display all ATM permanent virtual circuits (PVCs) and switched virtual circuits (SVCs) and traffic information, use the **show atm vc** privileged EXEC command.

show atm vc [*vcd* | **interface** *interface-number*]

Syntax Description

vcd	(Optional) Specifies which virtual circuit about which to display information.
interface *interface-number*	(Optional) Interface number or subinterface number of the PVC or SVC. Displays all PVCs and SVCs on the specified interface or subinterface. The *interface-number* uses one of the following formats, depending on what router platform you are using: • For the AIP on Cisco 7500 series routers; For the ATM port adapter, ATM-CES port adapter, and enhanced ATM port adapter on Cisco 7200 series routers; For the 1-port ATM-25 network module on Cisco 2600 and 3600 series routers: *slot***/0**[**.***subinterface-number* **multipoint**] • For the ATM port adapter and enhanced ATM port adapter on Cisco 7500 series routers: *slot***/***port-adapter***/0**[**.***subinterface-number* **multipoint**] • For the NPM on Cisco 4500 and 4700 routers: *number*[**.***subinterface-number* **multipoint**] For a description of these arguments, refer to the **interface atm** command.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.
11.1 CA	Information about VCs on an ATM-CES port adapter was added to the command output.
12.0(5)T	Information about VCs on an extended Multiprotocol Label Switching (MPLS) ATM interface was added to the command output.

Usage Guidelines

If no *vcd* value is specified, the command displays information for all PVCs and SVCs. The output is in summary form (one line per virtual circuit).

VCs on the extended MPLS ATM interfaces do not appear in the **show atm vc** command output. Instead, the **show xtagatm vc** command provides a similar output which shows information only on extended MPLS ATM VCs.

Examples

The following is sample output from the **show atm vc** command when no *vcd* value is specified. The status field is either ACTIVE or INACTIVE.

```
Router# show atm vc

Interface     VCD   VPI   VCI Type  AAL/Encaps     Peak   Avg.  Burst Status
ATM2/0          1     0     5  PVC  AAL5-SAAL     155000 155000    93 ACTIVE
ATM2/0.4        3     0    32  SVC  AAL5-SNAP     155000 155000    93 ACTIVE
ATM2/0.65432   10    10    10  PVC  AAL5-SNAP     100000  40000    10 ACTIVE
ATM2/0         99     0    16  PVC  AAL5-ILMI     155000 155000    93 ACTIVE
ATM2/0.105    250    33    44  PVC  AAL5-SNAP     155000 155000    93 ACTIVE
ATM2/0.100    300    22    33  PVC  AAL5-SNAP     155000 155000    93 ACTIVE
ATM2/0.12345 2047   255 65535  PVC  AAL5-SNAP         56     28  2047 ACTIVE
```

The following is sample output from the **show atm vc** command when a *vcd* value is specified for a CES circuit:

```
Router# show atm vc 2

ATM6/0: VCD: 2, VPI: 10, VCI: 10
PeakRate: 2310, Average Rate: 2310, Burst Cells: 94
CES-AAL1, etype:0x0, Flags: 0x20138, VCmode: 0x0
OAM DISABLED
InARP DISABLED
OAM cells received: 0
OAM cells sent: 334272
Status: ACTIVE
```

The following is sample output from the **show atm vc** command when a *vcd* value is specified, displaying statistics for that virtual circuit only:

```
Router# show atm vc 8

ATM4/0: VCD: 8, VPI: 8, VCI: 8
PeakRate: 155000, Average Rate: 155000, Burst Cells: 0
AAL5-LLC/SNAP, etype:0x0, Flags: 0x30, VCmode: 0xE000
OAM frequency: 0 second(s)
InARP frequency: 1 minute(s)
InPkts: 181061, OutPkts: 570499, InBytes: 757314267, OutBytes: 2137187609
InPRoc: 181011, OutPRoc: 10, Broadcasts: 570459
InFast: 39, OutFast: 36, InAS: 11, OutAS: 6
OAM cells received: 0
OAM cells sent: 0
Status: UP
```

The following is sample output from the **show atm vc** command when a *vcd* value is specified, AAL3/4 is enabled, an ATM SMDS subinterface has been defined, and a range of message identifier numbers (MIDs) has been assigned to the PVC:

```
Router# show atm vc 1

ATM4/0.1: VCD: 1, VPI: 0, VCI: 1
PeakRate: 0, Average Rate: 0, Burst Cells: 0
AAL3/4-SMDS, etype:0x1, Flags: 0x35, VCmode: 0xE200
MID start: 1, MID end: 16
InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0
InPRoc: 0, OutPRoc: 0, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
```

The following is sample output from the **show atm vc** command when a *vcd* value is specified and generation of OAM F5 loopback cells has been enabled.

```
Router# show atm vc 7

ATM4/0: VCD: 7, VPI: 7, VCI: 7
PeakRate: 0, Average Rate: 0, Burst Cells: 0
AAL5-LLC/SNAP, etype:0x0, Flags: 0x30, VCmode: 0xE000
OAM frequency: 10 second(s)
InARP DISABLED
InPkts: 0, OutPkts: 0, InBytes: 0, OutBytes: 0
InPRoc: 0, OutPRoc: 0, Broadcasts: 0
InFast:0, OutFast:0, InAS:0, OutAS:0
OAM cells received: 0
OAM cells sent: 1
Status: UP
```

The following is sample output from the **show atm vc** command when a *vcd* value is specified, and there is an incoming multipoint virtual circuit.

```
Router# show atm vc 3

ATM2/0: VCD: 3, VPI: 0, VCI: 33
PeakRate: 0, Average Rate: 0, Burst Cells: 0
AAL5-MUX, etype:0x809B, Flags: 0x53, VCmode: 0xE000
OAM DISABLED
InARP DISABLED
InPkts: 6646, OutPkts: 0, InBytes: 153078, OutBytes: 0
InPRoc: 6646, OutPRoc: 0, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
interface =  ATM2/0, call remotely initiated, call reference = 18082
vcnum = 3, vpi = 0, vci = 33, state = Active
 aal5mux vc, multipoint call
Retry count: Current = 0, Max = 10
timer currently inactive, timer value = never
Root Atm Nsap address: DE.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12
```

The following is sample output from the **show atm vc** command when a *vcd* value is specified, and there is an outgoing multipoint virtual circuit.

```
Router# show atm vc 6

ATM2/0: VCD: 6, VPI: 0, VCI: 35
PeakRate: 0, Average Rate: 0, Burst Cells: 0
AAL5-MUX, etype:0x800, Flags: 0x53, VCmode: 0xE000
OAM DISABLED
InARP DISABLED
InPkts: 0, OutPkts: 818, InBytes: 0, OutBytes: 37628
InPRoc: 0, OutPRoc: 0, Broadcasts: 818
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
interface =  ATM2/0, call locally initiated, call reference = 3
vcnum = 6, vpi = 0, vci = 35, state = Active
 aal5mux vc, multipoint call
Retry count: Current = 0, Max = 10
timer currently inactive, timer value = never
Leaf Atm Nsap address: DE.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12
Leaf Atm Nsap address: CD.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.12
```

The following is sample output from the **show atm vc** command when a *vcd* value is specified and there is a PPP-over-ATM connection:

```
Router# show atm vc 1

ATM8/0.1: VCD: 1, VPI: 41, VCI: 41
PeakRate: 155000, Average Rate: 155000, Burst Cells: 96
AAL5-CISCOPPP, etype:0x9, Flags: 0xC38, VCmode: 0xE000
virtual-access: 1, virtual-template: 1
OAM DISABLED
InARP DISABLED
InPkts: 13, OutPkts: 10, InBytes: 198, OutBytes: 156
InPRoc: 13, OutPRoc: 10, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
OAM cells received: 0
OAM cells sent: 0
```

The following is sample output from the **show atm vc** command for IP multicast virtual circuits. The display shows the leaf count for multipoint VCs opened by the root. VCD 3 is a root of a multipoint VC with three leaf routers. VCD 4 is a leaf of some other router's multipoint VC. VCD 12 is a root of a multipoint VC with only one leaf router.

```
Router# show atm vc

             VCD/                                        Peak     Avg/Min     Burst
Interface    Name  VPI   VCI    Type     Encaps          Kbps      Kbps       Cells          Sts
0/0          1       0     5     PVC      SAAL          155000   155000       96           UP
0/0          2       0    16     PVC      ILMI          155000   155000       96           UP
0/0          3       0   124  MSVC-3      SNAP          155000   155000       96           UP
0/0          4       0   125    MSVC      SNAP          155000   155000       96           UP
0/0          5       0   126    MSVC      SNAP          155000   155000       96           UP
0/0          6       0   127    MSVC      SNAP          155000   155000       96           UP
0/0          9       0   130    MSVC      SNAP          155000   155000       96           UP
0/0          10      0   131     SVC      SNAP          155000   155000       96           UP
0/0          11      0   132  MSVC-3      SNAP          155000   155000       96           UP
0/0          12      0   133  MSVC-1      SNAP          155000   155000       96           UP
0/0          13      0   134     SVC      SNAP          155000   155000       96           UP
0/0          14      0   135  MSVC-2      SNAP          155000   155000       96           UP
0/0          15      0   136  MSVC-2      SNAP          155000   155000       96           UP
```

The following is sample output from the **show atm vc** command for an IP multicast virtual circuit. The display shows the owner of the VC and leafs of the multipoint VC. This VC was opened by IP multicast and the three leaf routers' ATM addresses are included in the display. The VC is associated with IP group address 224.1.1.1.

```
Router# show atm vc 11

ATM0/0: VCD: 11, VPI: 0, VCI: 132
PeakRate: 155000, Average Rate: 155000, Burst Cells: 96
AAL5-LLC/SNAP, etype:0x0, Flags: 0x650, VCmode: 0xE000
OAM DISABLED
InARP DISABLED
InPkts: 0, OutPkts: 12, InBytes: 0, OutBytes: 496
InPRoc: 0, OutPRoc: 0, Broadcasts: 12
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
OAM cells received: 0
OAM cells sent: 0
Status: ACTIVE, TTL: 2, VC owner: IP Multicast (224.1.1.1)               <<<
interface =  ATM0/0, call locally initiated, call reference = 2
vcnum = 11, vpi = 0, vci = 132, state = Active
 aal5snap vc, multipoint call
Retry count: Current = 0, Max = 10
timer currently inactive, timer value = 00:00:00
Leaf Atm Nsap address: 47.0091810000000002BA08E101.444444444444.02       <<<
Leaf Atm Nsap address: 47.0091810000000002BA08E101.333333333333.02       <<<
Leaf Atm Nsap address: 47.0091810000000002BA08E101.222222222222.02       <<<
```

The following is sample output from the **show atm vc** command where no VCD is specified and private VCs are present.

```
Router# show atm vc
AAL /         Peak   Avg.  Burst
Interface     VCD   VPI   VCI Type  Encapsulation  Kbps   Kbps  Cells Status
ATM1/0          1     0    40  PVC  AAL5-SNAP          0      0     0 ACTIVE
ATM1/0          2     0    41  PVC  AAL5-SNAP          0      0     0 ACTIVE
ATM1/0          3     0    42  PVC  AAL5-SNAP          0      0     0 ACTIVE
ATM1/0          4     0    43  PVC  AAL5-SNAP          0      0     0 ACTIVE
ATM1/0          5     0    44  PVC  AAL5-SNAP          0      0     0 ACTIVE
ATM1/0         15     1    32  PVC  AAL5-XTAGATM       0      0     0 ACTIVE
ATM1/0         17     1    34  TVC  AAL5-XTAGATM       0      0     0 ACTIVE
ATM1/0         26     1    43  TVC  AAL5-XTAGATM       0      0     0 ACTIVE
ATM1/0         28     1    45  TVC  AAL5-XTAGATM       0      0     0 ACTIVE
ATM1/0         29     1    46  TVC  AAL5-XTAGATM       0      0     0 ACTIVE
ATM1/0         33     1    50  TVC  AAL5-XTAGATM       0      0     0 ACTIVE
```

When you specify a VCD value and the VCD corresponds to that of a private VC on a control interface, the display output appears as follows:

```
Router# show atm vc 15

ATM1/0 33     1    50  TVC  AAL5-XTAGATM       0      0     0 ACTIVE
ATM1/0: VCD: 15, VPI: 1, VCI: 32, etype:0x8, AAL5 - XTAGATM, Flags: 0xD38
PeakRate: 0, Average Rate: 0, Burst Cells: 0, VCmode: 0x0
XTagATM1, VCD: 1, VPI: 0, VCI: 32
OAM DISABLED, InARP DISABLED
InPkts: 38811, OutPkts: 38813, InBytes: 2911240, OutBytes: 2968834
InPRoc: 0, OutPRoc: 0, Broadcasts: 0
InFast: 0, OutFast: 0, InAS: 0, OutAS: 0
OAM F5 cells sent: 0, OAM cells received: 0
Status: ACTIVE
```

Table 8 describes the fields shown in the displays.

Table 8 show atm vc Field Descriptions

Field	Description
Interface	Interface slot and port.
VCD/Name	Virtual circuit descriptor (virtual circuit number). The connection name is displayed if the VC was configured using the **pvc** command and the name was specified.
VPI	Virtual path identifier.
VCI	Virtual channel identifier.
Type	Type of virtual circuit, either PVC, SVC, or MSVC (multipoint SVC). • MSVC (with no -*x*) indicates that VCD is a leaf of some other router's multipoint VC. • MSVC-*x* indicates there are *x* leaf routers for that multipoint VC opened by the root. Type of PVC detected from PVC discovery, either PVC-D, PVC-L, or PVC-M. • PVC-D indicates a PVC created due to PVC discovery. • PVC-L indicates that the corresponding peer of this PVC could not be found on the switch. • PVC-M indicates that some or all of the QOS parameters of this PVC mismatch that of the corresponding peer on the switch.
Encaps	Type of ATM adaptation layer (AAL) and encapsulation.
PeakRate	Kilobits per second transmitted at the peak rate.
Average Rate	Kilobits per second transmitted at the average rate.
Burst Cells	Value that equals the maximum number of ATM cells the virtual circuit can send at peak rate.
Status	Status of the VC connection. • UP indicates that the connection is enabled for data traffic. • DOWN indicates that the connection is not ready for data traffic. When the Status field is DOWN, a State field is shown. See a description of the different values for this field listed later in this table. • INACTIVE indicates that the interface is down.
etype	Encapsulation type.

Table 8 show atm vc Field Descriptions (continued)

Field	Description
Flags	Bit mask describing virtual circuit information. The flag values are summed to result in the displayed value. 0x10000 ABR VC 0x20000 CES VC 0x40000 TVC 0x100 TEMP (automatically created) 0x200 MULTIPOINT 0x400 DEFAULT_RATE 0x800 DEFAULT_BURST 0x10 ACTIVE 0x20 PVC 0x40 SVC 0x0 AAL5-SNAP 0x1 AAL5-NLPID 0x2 AAL5-FRNLPID 0x3 AAL5-MUX 0x4 AAL3/4-SMDS 0x5 QSAAL 0x6 AAL5-ILMI 0x7 AAL5-LANE 0x8 AAL5-XTAGATM 0x9 CES-AAL1 0xA F4-OAM
VCmode	AIP-specific or NPM-specific register describing the usage of the virtual circuit. This register contains values such as rate queue, peak rate, and AAL mode, which are also displayed in other fields.
OAM frequency	Seconds between OAM loopback messages, or DISABLED if OAM is not in use on this VC.
InARP frequency	Minutes between InARP messages, or DISABLED if InARP is not in use on this VC.
virtual-access	Virtual access interface identifier.
virtual-template	Virtual template identifier.
InPkts	Total number of packets received on this virtual circuit. This number includes all fast-switched and process-switched packets.
OutPkts	Total number of packets sent on this virtual circuit. This number includes all fast-switched and process-switched packets.
InBytes	Total number of bytes received on this virtual circuit. This number includes all fast-switched and process-switched packets.
OutBytes	Total number of bytes sent on this virtual circuit. This number includes all fast-switched and process-switched packets.
InPRoc	Number of process-switched input packets.
OutPRoc	Number of process-switched output packets.
Broadcast	Number of process-switched broadcast packets.
InFast	Number of fast-switched input packets.

Table 8 show atm vc Field Descriptions (continued)

Field	Description
OutFast	Number of fast-switched output packets.
InAS	Number of autonomous-switched or silicon-switched input packets.
OutAS	Number of autonomous-switched or silicon-switched output packets.
OAM cells received	Number of OAM cells received on this virtual circuit.
OAM cells sent	Number of OAM cells sent on this virtual circuit.
TTL	Time-to-live in ATM hops across the VC.
VC owner	IP Multicast address of group.

Related Commands

Command	Description
atm nsap-address	Sets the NSAP address for an ATM interface using SVC mode.

show atm vp

To display the statistics for all virtual paths (VPs) on an interface or for a specific VP, use the **show atm vp** privileged EXEC command.

show atm vp [*vpi*]

Syntax Description

vpi	(Optional) ATM network virtual path identifier (VPI) of the permanent virtual path. The range is 0 to 255. The VPI is an 8-bit field in the header of the ATM cell.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show atm vp** command. This output shows the interface name, the status of the interface, the administrative status of the interface, the port type, and the number of channels in use on the interface. The status of the interface can be UP (in operation) or DOWN (not in operation).

```
Router# show atm vp 1
ATM6/0  VPI: 1, PeakRate: 155000, CesRate: 1742, DataVCs: 1, CesVCs:1, Status: ACTIVE

     VCD    VCI   Type   InPkts   OutPkts   AAL/Encap     Status
     1      100   PVC    n/a      n/a       CES-AAL1      ACTIVE
     13     13    PVC    0        0         AAL5-SNAP     ACTIVE
     409    3     PVC    0        0         F4 OAM        ACTIVE
     410    4     PVC    0        0         F4 OAM        ACTIVE

   TotalInPkts: 0, TotalOutPkts: 0, TotalInFast: 0, TotalOutFast: 0, TotalBroadcasts: 0
```

Table 9 describes the fields shown in the display.

Table 9 show atm vp Field Descriptions

Field	Description
ATM6/0	Interface type, slot, and port number of the VP.
VPI	Virtual path identifier of the VP.
PeakRate	Maximum rate in kbps at which the VP can send data. Range is 84 kbps to line rate. The default is the line rate.
CesRate	Total CES bandwidth allocated for the VP.
DataVCs	Number of data VCs on the VP.
CesVCs	Number of CES VC on the VP.
Status	Current status of the VP. Values are ACTIVE or INACTIVE.
VCD	Virtual circuit descriptor of the VC associated with this VP.

Table 9 show atm vp Field Descriptions (continued)

Field	Description
VCI	Virtual channel identifier of the VC associated with this VP.
Type	Type of VC associated with this VP. Values are PVC or SVC.
InPkts	Number of packets received on the VP.
OutPkts	Number of packets transmitted on the VP.
AAL/Encap	Type of encapsulation used on the VC associated with this VP.
Status	Status of the VP (ACTIVE or INACTIVE).
TotalInPkts:	Total number of input packets process-switched and fast-switched on the VP.
TotalOutPkts:	Total number of output packets process-switched and fast-switched on the VP.
TotalInFast	Total number of input packets fast-switched.
TotalOutFast:	Total number of output packets fast-switched.
TotalBroadcasts:	Total number of broadcast packets fast-switched.

Related Commands

Command	Description
atm pvp	Creates a PVP used to multiplex (or bundle) one or more VCs (especially CES and data VCs).

show ces circuit

To display detailed circuit information for the constant bit rate (CBR) interface, use the **show ces circuit** privileged EXEC command.

show ces circuit [**interface cbr** *slot/port* [*circuit-number*]]

Syntax Description

interface cbr *slot/port*	(Optional) Slot and port number of the CBR interface.
circuit-number	(Optional) Circuit identification. For unstructured service, use 0. For T1 structure service, the range is 1 through 24. For E1 structure service, the range is 1 through 31.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show ces circuit** command.

```
Switch# show ces circuit
Interface  Circuit  Circuit-Type     X-interface   X-vpi   X-vci  Status
 CBR6/0      1       HardPVC           ATM6/0        0       34   UP
 CBR6/1      1       HardPVC           ATM6/1        0       34   UP
```

Table 10 describes the fields shown in the display.

Table 10 show ces circuit Field Descriptions

Field	Description
Interface	Type, slot, and port number of the interface.
Circuit	Circuit number assigned to the PVC.
Circuit-Type	Type of circuit.Values are HardPVC or SoftPVC. Only HardPVC is supported on the ATM-CES port adapter.
X-interface	Type, slot, and port number of the destination interface.
X-vpi	Virtual path identifier of the destination interface.
X-vci	Virtual channel identifier of the destination interface.
Status	State of the circuit. Values are Up or Down.

The following is sample output from the **show ces circuit** command for a circuit 1 on CBR interface 6/0:

```
Switch# show ces circuit interface cbr 6/0 1
circuit: Name CBR6/0:1, Circuit-state ADMIN_UP / Interface CBR6/0, Circuit_id 1,
Port-Type T1, Port-State UP
Port Clocking network-derived, aal1 Clocking Method CESIWF_AAL1_CLOCK_Sync
Channel in use on this port: 1
Channels used by this circuit: 1
Cell-Rate: 171, Bit-Rate 64000
cas OFF, cell-header 0X3E80 (vci = 1000)
Configured CDV 2000 usecs, Measured CDV unavailable
ErrTolerance 8, idleCircuitdetect OFF, onHookIdleCode 0x0
state: VcActive, maxQueueDepth       128, startDequeueDepth       111
Partial Fill:       47, Structured Data Transfer 24
HardPVC
src: CBR6/0 vpi 0, vci 16
Dst: ATM6/0 vpi0, vci 1000
```

Table 11 describes the fields shown in the display.

Table 11 show ces circuit interface Field Descriptions

Field	Description
circuit Name	Name of the circuit specified with the **ces circuit** interface command.
Circuit-state	Current configuration state of the circuit. Values are ADMIN_UP or ADMIN_DOWN.
Interface	Type, slot, and port number of the interface.
Circuit_ID	Circuit identification specified with the **ces pvc** interface command.
Port-Type	Type of interface on the ATM-CES port adapter. Values are T1 or E1.
Port-State	Current status of the port. Values are Up or Down.
Port Clocking	Clocking mode used by the interface specified with the **ces dsx1 clock** interface command. Values are Loop-Timed or Network-Derived Adaptive.
aal1 Clocking Method	AAL1 clocking mode used by the interface specified with the **ces aal1 clock** interface command. Values are Adaptive, Synchronous Residual Time Stamp (SRTS), or Synchronous.
Channel in use on this port	Number of active channels used by this interface.
Channels used by this circuit	Number of channels used by the circuit.
Cell-Rate	Number of cells transmitted or received on the interface per second.
Bit-Rate	Speed at which the cells are transmitted or received.
cas	Indicates whether channel-associated signaling (CAS) is enabled on the interface with the **ces circuit** interface command.
cell-header	ATM cell header VCI bytes used for debugging only.
Configured CDV	Indicates the peak-to-peak cell delay variation (CDV) requirement (CDV) in milliseconds specified with the **ces circuit** interface command. The range for CDV is 1 through 65535 milliseconds. The default is 2000 milliseconds.
Measured CDV	Indicates the actual cell delay variation in milliseconds.
ErrTolerance	For internal use only.

Table 11 show ces circuit interface Field Descriptions (continued)

Field	Description
idleCircuitdetect	Indicates whether idle circuit detection is enabled (ON) or disabled (OFF).
onHookIdleCode	Indicates that the on-hook detection feature is enabled with the **ces circuit** interface command and the hex value (0 through F) that indicates a 2 or 4 bit AB[CD] pattern to detect on-hook. The AB[CD] bits are determined by the manufacturer of the voice/video telephony device that is generating the CBR traffic.
state	Current state of the circuit. Values are VcActive, VcInactive, VcLOC (loss of cell), or VcAlarm (alarm condition).
maxQueueDepth	Maximum queue depth in bits.
startDequeueDepth	Start dequeue depth in bits.
Partial Fill	Indicates the partial AAL1 cell fill service for structured service only specified by the **ces circuit** interface command. The range is 0 through 47. The default is 47.
Structured Data Transfer	Size (in bytes) of the structured data transfer frame.
HardPVC	Only hard PVC are supported by the ATM-CES port adapter.
src	Source interface type, slot, and port number and VPI and VCI for the circuit.
Dst	Destination interface interface type, slot, and port number and the VPI and VCI for the circuit.

Related Commands

Command	Description
show ces circuit	Displays detailed circuit information for the CBR interface.
show ces status	Displays the status of the ports on the ATM-CES port adapter.

show ces interface cbr

To display detailed constant bit rate (CBR) port information, use the **show ces interface cbr** privileged EXEC command.

show ces interface cbr *slot*/*port*

Syntax Description

slot	Backplane slot number.
port	Interface port number.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show ces interface cbr** command for CBR interface 6/0:

```
router# show ces interface cbr 6/0
Interface:      CBR6/0          Port-type:T1-DCU
IF Status:      UP              Admin Status: UP
Channels in use on this port: 1
LineType: ESF           LineCoding: B8ZS  LoopConfig: NoLoop
SignalMode: NoSignalling   XmtClockSrc: network-derived
DataFormat: Structured     AAL1 Clocking Mode: Synchronous  LineLength: 0_110
LineState: LossOfSignal
Errors in the Current Interval:
  PCVs        0   LCVs        0   ESs         0   SESs        0   SEFSs        0
  UASs        0   CSSs        0   LESs        0   BESs        0   DMs          0
Errors in the last 24Hrs:
  PCVs      514   LCVs        0   ESs         0   SESs        1   SEFSs        0
  UASs        0   CSSs        0   LESs        0   BESs        0   DMs          0
Input  Counters: 0 cells, 0 bytes
Output Counters: 0 cells, 0 bytes
```

Table 12 describes the fields shown in the display.

Table 12 show ces interface cbr Field Descriptions

Field	Description
Interface	Type, slot, and port number of the interface.
Port-type	Type of port on the ATM-CES port adapter. Values are: T1-DCU or E1-DCU.
IF Status	Status of the interface. Values are Up or Down.
Admin Status	Configured status of the interface. Values are Up or Down (administratively configured down).
Channels in use on this port	Number of active channels used by this interface.

Table 12 show ces interface cbr Field Descriptions (continued)

Field	Description
LineType	Framing used on the interface specified with the **ces dsx1 framing** interface command. Values are ESF or SF for T1 and E1-CRC-MFCASLT, E1-CRC-MFLT, E1-LT, or E1-MFCASLT for E1.
LineCoding	Line coding used on the interface specified with the **ces dsx1 linecode** interface command. Values are AMI, B8ZS (for T1), and HDB3 (for E1).
LoopConfig	Indicates whether the interface in in a loop state specified by the **ces dsx1 loopback** interface command. Values are line loopback, payload loopback, or noloop.
SignalMode	For T1 to use robbed bit signaling or not.
XmitClockSrc	Transmit clock source specified by the **ces dsx1 clock** interface command. Values are loop-timed or network-derived.
DataFormat	Type of CES services specified by the **ces aal1 service** interface command. Values are structured or unstructured.
AAL1 Clocking Mode	AAL1 clocking mode used by the interface specified with the **ces aal1 clock** interface command. Values are adaptive, synchronous residual time stamp (SRTS), or synchronous.
LineLength	Cable length specified by the **ces dsx1 lbo** interface command. Values are 0-110, 10-200, 220-330, 330-440, 440-550, 550-660, 660-above, and square-pulse.
LineState	Current status of the line. Values are: • Unknown • NoAlarm • RcvFarEndLOF • XmtFarEndLOF • RcvAIS • XmtAIS • LossOfFrame • LossOfSignal • LoopbackState • T16AIS
Errors in the Current Interval	Error statistics received during the current 15-minute interval.
PCVs	Number of Path Code Violations (PCVs). PCVs indicate a frame synchronization bit error in the D4 and E1 no-CRC formats, or a CRC error in the ESF and E1 CRC formats.
LCVs	Number of Line Code Violations (LCVs). LCVs indicate the occurrence of either a Bipolar Violation (BPV) or Excessive Zeros (EXZ) error event.

Table 12 show ces interface cbr Field Descriptions (continued)

Field	Description
ESs	Number of errored seconds. In ESF and E1 CRC links, an Errored Second is a second in which one of the following are detected: one or more Path Code Violations, one or more Out of Frame defects, one or more Controlled Slip events, or a detected AIS defect. For SF and E1 no-CRC links, the presence of Bipolar Violations also triggers an Errored Second.
SESs	Number of Severely Errored Seconds (SESs). A SESs is a second with 320 or more path code violation errors events, one or more Out of Frame defects, or a detected AIS defect.
SEFSs	Number of Severely Errored Framing Seconds (SEFS). SEFS is a second with one or more Out of Frame defects or a detected incoming AIS.
UASs	Number of Unavailable Seconds (UASs). UAS is a count of the total number of seconds on the interface.
CSSs	Number of Controlled Slip Second (CSS). CSS is a 1-second interval containing one or more controlled slips.
LESs	Number of Line Errored Seconds (LES). LES is a second in which one or more Line Code Violation errors are detected.
BESs	Number of Bursty Errored Seconds (BES). BES is a second with fewer than 320 and more than one Path Coding Violation error, no Severely Errored Frame defects, and no detected incoming AIS defects. Controlled slips are not included in this parameter.
DMs	Number of Degraded Minutes (DMs). A degraded minute is one in which the estimated error rate exceeds 1E-6 but does not exceed 1E-3. For more information, refer to RFC 1406.
Errors in the last 24Hrs	Error statistics received during the during the last 24 hours.
Input Counters	Number of cells and bytes received on the interface.
Output Counters	Number of cells and bytes.

Related Commands

Command	Description
show interface cbr	Displays the information about the CBR interface on the ATM-CES port adapter.

show ces status

To display the status of the ports on the ATM-CES port adapter, use the **show ces status** privileged EXEC command.

show ces status

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show ces status** command. This output shows the interface name, the status of the interface, the administrative status of the interface, the port type, and the number of channels in use on the interface. The status of the interface can be UP (in operation) or DOWN (not in operation).

```
Router# show ces status
Interface         IF      Admin        Port   Channels in
  Name          Status   Status        Type       use
------------- -------- --------- ----------- -----------
     CBR0/0/0       UP        UP          T1        1-24
     CBR0/0/1       UP        UP          T1        1-24
     CBR0/0/2       UP        UP          T1        1-24
     CBR0/0/3       UP        UP          T1
```

Related Commands

Command	Description
show ces circuit	Displays detailed circuit information for the CBR interface.

show controllers atm

To display information about an inverse multiplexing over ATM (IMA) group, use the **show controllers atm** privileged EXEC command.

show controllers atm [*slot*/**ima** *group-number*]

Syntax Description

slot	(Optional) This setting specifies the slot location of the ATM IMA network module. The values range from 0 to 3 depending on the router.
ima	(Optional) This keyword indicates an IMA group specification rather than a port value for a UNI interface.
group-number	(Optional) Enter an IMA group number from 0 to 3. If you specify the group number, do not insert a space between **ima** and the number.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2 GS	This command was introduced.
12.0(5)T and 12.0(5)XK	This command was modified to support IMA groups.

Usage Guidelines

Use this command to monitor and diagnose ATM IMA links and groups.

Examples

On a Cisco 2600 or 3600 series router, the following example displays detailed information about IMA group 0 on ATM interface 2:

```
router# show controller atm0/ima3
Interface ATM0/IMA3 is up
  Hardware is ATM IMA
LANE client MAC address is 0050.0f0c.148b
  hwidb=0x61C2E990, ds=0x617D498C
  slot 0, unit 3, subunit 3
  rs8234 base 0x3C000000, slave base 0x3C000000
  rs8234 ds 0x617D498C
  SBDs - avail 2048, guaranteed 3, unguaranteed 2045, starved 0
 Seg VCC table 3C00B800, Shadow Seg VCC Table 617EF76C, VCD Table 61805798
 Schedule table 3C016800, Shadow Schedule table 618087C4, Size 63D
 RSM VCC Table 3C02ED80, Shadow RSM VCC Table 6180C994
 VPI Index Table 3C02C300, VCI Index Table 3C02E980
 Bucket2 Table 3C01E500, Shadow Bucket2 Table 6180A0E4
 MCR Limit Table 3C01E900, Shadow MCR Table 617D2160
 ABR template 3C01EB00, Shadow template 614DEEAC
 RM Cell RS Queue 3C02C980
```

```
 Queue            TXQ Addr  Pos  StQ Addr  Pos
 0  UBR CHN0      3C028B00  0    03118540  0
 1  UBR CHN1      3C028F00  0    03118D40  0
 2  UBR CHN2      3C029300  0    03119540  0
 3  UBR CHN3      3C029700  0    03119D40  0
 4  VBR/ABR CHN0 3C029B00  0    0311A540  0
 5  VBR/ABR CHN1 3C029F00  0    0311AD40  0
 6  VBR/ABR CHN2 3C02A300  0    0311B540  0
 7  VBR/ABR CHN3 3C02A700  0    0311BD40  0
 8  VBR-RT CHN0  3C02AB00  0    0311C540  0
 9  VBR-RT CHN1  3C02AF00  0    0311CD40  0
 10 VBR-RT CHN2  3C02B300  0    0311D540  0
 11 VBR-RT CHN3  3C02B700  0    0311DD40  0
 12 SIG          3C02BB00  0    0311E540  0
 13 VPD          3C02BF00  0    0311ED40  0

 Queue            FBQ Addr  Pos  RSQ Addr  Pos
 0  OAM          3C0EED80  255  0311F600  0
 1  UBR CHN0     3C0EFD80  0    03120600  0
 2  UBR CHN1     3C0F0D80  0    03121600  0
 3  UBR CHN2     3C0F1D80  0    03122600  0
 4  UBR CHN3     3C0F2D80  0    03123600  0
 5  VBR/ABR CHN0 3C0F3D80  0    03124600  0
 6  VBR/ABR CHN1 3C0F4D80  0    03125600  0
 7  VBR/ABR CHN2 3C0F5D80  0    03126600  0
 8  VBR/ABR CHN3 3C0F6D80  0    03127600  0
 9  VBR-RT CHN0  3C0F7D80  0    03128600  0
 10 VBR-RT CHN1  3C0F8D80  255  03129600  0
 11 VBR-RT CHN2  3C0F9D80  0    0312A600  0
 12 VBR-RT CHN3  3C0FAD80  0    0312B600  0
 13 SIG          3C0FBD80  255  0312C600  0
SAR Scheduling channels:  -1 -1 -1 -1 -1 -1 -1 -1
ATM channel number is 1
link members are 0x7, active links are 0x0
Group status is blockedNe, 3 links configured,
Group Info: Configured links bitmap 0x7, Active links bitmap 0x0,
    Tx/Rx IMA_id 0x3/0x63,
    NE Group status is startUp,
    frame length 0x80, Max Diff Delay 0,
    1 min links, clock mode ctc, symmetry symmetricOperation, trl 0,
    Group Failure status is startUpNe.
    Test pattern procedure is disabled
SAR counter totals across all links and groups:
   0 cells output, 0 cells stripped
   0 cells input, 0 cells discarded, 0 AAL5 frames discarded
   0 pci bus err, 0 dma fifo full err, 0 rsm parity err
   0 rsm syn err, 0 rsm/seg q full err, 0 rsm overflow err
   0 hs q full err, 0 no free buff q err, 0 seg underflow err
   0 host seg stat q full err
```

Related Commands

Command	Description
show ima interface atm	Provides information about all configured IMA groups or a specific IMA group.
show controllers atm	Displays information about an IMA group.

show dxi map

To display all the protocol addresses mapped to a serial interface, use the **show dxi map** EXEC command.

show dxi map

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.3	This command was introduced.

Examples

The following is sample output from the **show dxi map** command. It displays output for several previously defined ATM-DXI maps that defined Apollo, IP, DECnet, CLNS, and AppleTalk protocol addresses, various encapsulations, and broadcast traffic.

```
Router# show dxi map

Serial0 (administratively down): ipx 123.0000.1234.1234
   DFA 69(0x45,0x1050), static, vpi = 4, vci = 5,
   encapsulation: SNAP
Serial0 (administratively down): appletalk 2000.5
   DFA 52(0x34,0xC40), static, vpi = 3, vci = 4,
   encapsulation: NLPID
Serial0 (administratively down): ip 172.21.177.1
   DFA 35(0x23,0x830), static,
   broadcast, vpi = 2, vci = 3,
   encapsulation: VC based MUX,
   Linktype IP
```

Table 13 explains significant fields shown in the display.

Table 13 show dxi map Field Descriptions

Field	Description
DFA	DXI Frame Address, similar to a DLCI for Frame Relay. The DFA is shown in decimal, hexadecimal, and DXI header format. The router computes this address value from the VPI and VCI values.
encapsulation	Encapsulation type selected by the **dxi pvc** command. Displayed values can be *SNAP*, *NLPID*, or *VC based MUX*.
Linktype	Value used only with MUX encapsulation and therefore with only a single network protocol defined for the PVC. Maps configured on a PVC with MUX encapsulation must have the same link type.

show dxi pvc

To display the permanent virtual circuit (PVC) statistics for a serial interface, use the **show dxi pvc** EXEC command.

show dxi pvc

Syntax Description

This command has no arguments or keywords.

Command Modes

EXEC

Command History

Release	Modification
10.3	This command was introduced.

Examples

The following is sample output from the **show dxi pvc** command. It displays output for ATM-DXI PVCs previously defined for serial interface 0.

```
Router# show dxi pvc

PVC Statistics for interface Serial0 (ATM DXI)

DFA = 17, VPI = 1, VCI = 1, PVC STATUS = STATIC, INTERFACE = Serial0

  input pkts 0             output pkts 0            in bytes 0
  out bytes 0              dropped pkts 0

DFA = 34, VPI = 2, VCI = 2, PVC STATUS = STATIC, INTERFACE = Serial0

  input pkts 0             output pkts 0            in bytes 0
  out bytes 0              dropped pkts 0

DFA = 35, VPI = 2, VCI = 3, PVC STATUS = STATIC, INTERFACE = Serial0

  input pkts 0             output pkts 0            in bytes 0
  out bytes 0              dropped pkts 0
```

Table 14 describes significant fields shown in the display.

Table 14 show dxi pvc Field Descriptions

Field	Description
DFA	DXI Frame Address, similar to a DLCI for Frame Relay. The DFA is shown in decimal, hexadecimal, and DXI header format. The router computes this address value from the VPI and VCI values.
PVC STATUS = STATIC	Only static maps are supported. Maps are not created dynamically.
input pkts	Number of packets received.
output pkts	Number of packets transmitted.

Table 14 show dxi pvc Field Descriptions (continued)

Field	Description
in bytes	Number of bytes in all packets received.
out bytes	Number of bytes in all packets transmitted.
dropped pkts	Should display a zero (0) value. A nonzero value indicates a configuration problem, specifically that a PVC does not exist.

show ima interface atm

To display information about all configured inverse multiplexing over ATM (IMA) groups or a specific group, use the **show ima interface atm** privileged EXEC command.

show ima interface atm [*slot*]**/ima**[*group-number*] [**detail**]

Syntax Description

slot	(Optional) This setting specifies the slot location of the ATM IMA network module. The values range from 0 to 3 depending on the router.
/ima *group-number*	(Optional) Enter an IMA group number from 0 to 3. If you specify the group number, do not insert a space between **ima** and the number.
detail	(Optional) To obtain detailed information, use this keyword.

Defaults

No default behavior or values.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(5)XK	This command was introduced.

Usage Guidelines

Use this command to monitor the status of IMA group links.

Examples

On a Cisco 2600 or 3600 series router, the following example displays detailed information about IMA group 0 on ATM interface 2. Without the **detail** keyword, only the information up to "Detailed group Information:" appears.

```
Router# show ima interface atm 4/ima0 detail
Interface ATM2/IMA2 is up
        Group index is 2
        Ne state is operational, failure status is noFailure
        active links bitmap 0x30
    IMA Group Current Configuration:
        Tx/Rx configured links bitmap 0x30/0x30
        Tx/Rx minimum required links 1/1
        Maximum allowed diff delay is 25ms, Tx frame length 128
        Ne Tx clock mode CTC, configured timing reference link ATM2/4
        Test pattern procedure is disabled
    Detailed group Information:
        Tx/Rx Ima_id 0x22/0x40, symmetry symmetricOperation
        Number of Tx/Rx configured links 2/2
        Number of Tx/Rx active links 2/2
        Fe Tx clock mode ctc, Rx frame length 128
        Tx/Rx timing reference link 4/4
        Maximum observed diff delay 0ms, least delayed link 5
```

```
        Running seconds 32
        GTSM last changed 10:14:41 UTC Wed Jun 16 1999
    IMA Group Current Counters (time elapsed 33 seconds):
        3 Ne Failures, 3 Fe Failures, 4 Unavail Secs
    IMA Group Total Counters (last 0 15 minute intervals):
        0 Ne Failures, 0 Fe Failures, 0 Unavail Secs
    Detailed IMA link Information:

Interface ATM2/4 is up
        ifIndex 13, Group Index 2, Row Status is active
        Tx/Rx Lid 4/4, relative delay 0ms
        Ne Tx/Rx state active/active
        Fe Tx/Rx state active/active
        Ne Rx failure status is noFailure
        Fe Rx failure status is noFailure
        Rx test pattern 0x41, test procedure disabled
    IMA Link Current Counters (time elapsed 35 seconds):
        1 Ima Violations, 0 Oif Anomalies
        1 Ne Severely Err Secs, 2 Fe Severely Err Secs
        0 Ne Unavail Secs, 0 Fe Unavail Secs
        2 Ne Tx Unusable Secs, 2 Ne Rx Unusable Secs
        0 Fe Tx Unusable Secs, 2 Fe Rx Unusable Secs
        0 Ne Tx Failures, 0 Ne Rx Failures
        0 Fe Tx Failures, 0 Fe Rx Failures
    IMA Link Total Counters (last 0 15 minute intervals):
        0 Ima Violations, 0 Oif Anomalies
        0 Ne Severely Err Secs, 0 Fe Severely Err Secs
        0 Ne Unavail Secs, 0 Fe Unavail Secs
        0 Ne Tx Unusable Secs, 0 Ne Rx Unusable Secs
        0 Fe Tx Unusable Secs, 0 Fe Rx Unusable Secs
        0 Ne Tx Failures, 0 Ne Rx Failures
        0 Fe Tx Failures, 0 Fe Rx Failures

Interface ATM2/5 is up
        ifIndex 14, Group Index 2, Row Status is active
        Tx/Rx Lid 5/5, relative delay 0ms
        Ne Tx/Rx state active/active
        Fe Tx/Rx state active/active
        Ne Rx failure status is noFailure
        Fe Rx failure status is noFailure
        Rx test pattern 0x41, test procedure disabled
    IMA Link Current Counters (time elapsed 46 seconds):
        1 Ima Violations, 0 Oif Anomalies
        1 Ne Severely Err Secs, 2 Fe Severely Err Secs
        0 Ne Unavail Secs, 0 Fe Unavail Secs
        2 Ne Tx Unusable Secs, 2 Ne Rx Unusable Secs
        0 Fe Tx Unusable Secs, 2 Fe Rx Unusable Secs
        0 Ne Tx Failures, 0 Ne Rx Failures
        0 Fe Tx Failures, 0 Fe Rx Failures
    IMA Link Total Counters (last 0 15 minute intervals):
        0 Ima Violations, 0 Oif Anomalies
        0 Ne Severely Err Secs, 0 Fe Severely Err Secs
        0 Ne Unavail Secs, 0 Fe Unavail Secs
        0 Ne Tx Unusable Secs, 0 Ne Rx Unusable Secs
        0 Fe Tx Unusable Secs, 0 Fe Rx Unusable Secs
        0 Ne Tx Failures, 0 Ne Rx Failures
        0 Fe Tx Failures, 0 Fe Rx Failures
```

Related Commands

Command	Description
show controllers atm	Displays information about an IMA group.

show interface cbr

To display information about the constant bit rate (CBR) interface on the ATM-CES port adapter, use the **show interface cbr** privileged EXEC command.

show interface cbr

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1	This command was introduced.

Examples

The following is sample output from the **show interface cbr** command.

```
Switch# show interface cbr 6/0
CBR6/0 is up, line protocol is up
  Hardware is DCU
  MTU 0 bytes, BW 1544 Kbit, DLY 0 usec, rely 255/255, load 248/255
  Encapsulation ET_ATMCES_T1, loopback not set
  Last input 00:00:00, output 00:00:00, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/0, 0 drops; input queue 0/75, 0 drops
  5 minute input rate 1507000 bits/sec, 3957 packets/sec
  5 minute output rate 1507000 bits/sec, 3955 packets/sec
     3025960 packets input, 142220120 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     3030067 packets output, 142413149 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

Table 15 describes the fields shown in the display.

Table 15 show interface cbr Field Descriptions

Field	Description
CBR6/0 is...	Type, slot, and port number of the interface and indicates whether the interface hardware is currently active (whether carrier detect is present), down, or if it has been taken down by an administrator.
line protocol is...	Indicates whether the software processes that handle the line protocol think the line is usable (that is, whether keepalives are successful). Values are up, down, or administratively down.
Hardware is...	Hardware type.
MTU	Maximum transmission unit of the interface.
BW	Bandwidth of the interface in kilobits per second.

Table 15 show interface cbr Field Descriptions (continued)

Field	Description
DLY	Delay of the interface in microseconds.
rely	Reliability of the interface as a fraction of 255 (255/255 is 100% reliability), calculated as an exponential average over 5 minutes.
load	Load on the interface as a fraction of 255 (255/255 is completely saturated), calculated as an exponential average over 5 minutes. The calculation uses the value from the **bandwidth** interface configuration command.
Encapsulation	Encapsulation method assigned to interface.
loopback not set	Indicates whether or not loopback is set.
Last input	Number of hours, minutes, and seconds since the last packet was successfully received by an interface. Useful for knowing when a dead interface failed. This counter is updated only when packets are process switched, not when packets are fast switched.
Last output	Number of hours, minutes, and seconds since the last packet was successfully transmitted by an interface. This counter is updated only when packets are process switched, not when packets are fast switched.
output hang	Number of hours, minutes, and seconds (or never) since the interface was last reset because of a transmission that took too long. When the number of hours in any of the "last" fields exceeds 24 hours, the number of days and hours is printed. If that field overflows, asterisks are printed.
Last clearing	The time at which the counters that measure cumulative statistics (such as number of bytes transmitted and received) shown in this report were last reset to zero. Note that variables that might affect routing (for example, load and reliability) are not cleared when the counters are cleared. *** indicates the elapsed time is too large to be displayed. 0:00:00 indicates the counters were cleared more than 2^{31}ms (and less than 2^{32}ms) ago.
Queueing strategy	First-in, first-out queuing strategy (other queueing strategies you might see are priority-list, custom-list, and weighted fair).
Output queue, drops input queue, drops	Number of packets in output and input queues. Each number is followed by a slash, the maximum size of the queue, and the number of packets dropped due to a full queue.
5 minute input rate, 5 minute output rate	Average number of bits and packets transmitted per second in the last 5 minutes.
packets input	Total number of error-free packets received by the system.
bytes input	Total number of bytes, including data and MAC encapsulation, in the error free packets received by the system.
no buffer	Number of received packets discarded because there was no buffer space in the main system. Compare with ignored count. Broadcast storms on Ethernets and bursts of noise on serial lines are often responsible for no input buffer events.
broadcasts	Total number of broadcast or multicast packets received by the interface.

Table 15 show interface cbr Field Descriptions (continued)

Field	Description
runts	Number of packets that are discarded because they are smaller than the medium's minimum packet size.
giants	Number of packets that are discarded because they exceed the medium's maximum packet size.
input errors	Total number of no buffer, runts, giants, CRCs, frame, overrun, ignored, and abort counts. Other input-related errors can also increment the count, so that this sum may not balance with the other counts.
CRC	Cyclic redundancy checksum generated by the originating LAN station or far end device does not match the checksum calculated from the data received. On a LAN, this usually indicates noise or transmission problems on the LAN interface or the LAN bus itself. A high number of CRCs is usually the result of collisions or a station transmitting bad data. On a serial link, CRCs usually indicate noise, gain hits or other transmission problems on the data link.
frame	Number of packets received incorrectly having a CRC error and a noninteger number of octets.
overrun	Number of times the serial receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers. These buffers are different than the system buffers mentioned previously in the buffer description. Broadcast storms and bursts of noise can cause the ignored count to be incremented.
abort	Illegal sequence of one bits on the interface. This usually indicates a clocking problem between the interface and the data link equipment.
packets output	Total number of messages transmitted by the system.
bytes	Total number of bytes, including data and MAC encapsulation, transmitted by the system.
underruns	Number of times that the transmitter has been running faster than the router can handle. This may never be reported on some interfaces.
output errors	Sum of all errors that prevented the final transmission of datagrams out of the interface being examined. Note that this may not balance with the sum of the enumerated output errors, as some datagrams may have more than one error, and others may have errors that do not fall into any of the specifically tabulated categories.
collisions	Because collisions do not occur on CBR interfaces, this statistic is always zero.
interface resets	Number of times an interface has been reset. The interface may be reset by the administrator or automatically when an internal error occurs.
output buffer failures	Number of no resource errors received on the output.
output buffers swapped out	Number of packets swapped to DRAM.

Related Commands

Command	Description
show ces interface cbr	Displays detailed CBR port information.

show interfaces atm

To display information about the ATM interface, use the **show interfaces atm** privileged EXEC command.

Cisco 7500 series with AIP; Cisco 7200 series with ATM, ATM-CES, and enhanced ATM port adapter; Cisco 2600 and 3600 series with 1-port ATM-25 network module

show interfaces atm [*slot*/*port*]

Cisco 7500 series routers with the ATM port adapter and enhanced ATM port adapter

show interfaces atm [*slot*/*port-adapter*/*port*]

Syntax Description

slot/*port*	(Optional) ATM slot number and port number. Use this format for the following platform configurations: • The AIP on Cisco 7500 series routers. • The ATM port adapter, ATM-CES port adapter, or enhanced ATM port adapter on Cisco 7200 series routers. • The 1-port ATM-25 network module on Cisco 2600 and 3600 series routers.
slot/*port-adapter*/*port*	(Optional) ATM slot, port adapter, and port numbers. Use this format for the ATM port adapter or enhanced ATM port adapter on Cisco 2600 and 3600 series routers.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show interfaces atm** command:

```
Router# show interfaces atm 4/0

ATM4/0 is up, line protocol is up
 Hardware is cxBus ATM
 Internet address is 131.108.97.165, subnet mask is 255.255.255.0
 MTU 4470 bytes, BW 100000 Kbit, DLY 100 usec, rely 255/255, load 1/255
 ATM E164 Auto Conversion Interface
 Encapsulation ATM, loopback not set, keepalive set (10 sec)
 Encapsulation(s): AAL5, PVC mode
 256 TX buffers, 256 RX buffers, 1024 Maximum VCs, 1 Current VCs
 Signalling vc = 1, vpi = 0, vci = 5
 ATM NSAP address: BC.CDEF.01.234567.890A.BCDE.F012.3456.7890.1234.13
 Last input 0:00:05, output 0:00:05, output hang never
 Last clearing of "show interface" counters never
 Output queue 0/40, 0 drops; input queue 0/75, 0 drops
 Five minute input rate 0 bits/sec, 0 packets/sec
 Five minute output rate 0 bits/sec, 0 packets/sec
     144 packets input, 3148 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     154 packets output, 4228 bytes, 0 underruns
     0 output errors, 0 collisions, 1 interface resets, 0 restarts
```

The following is sample output from the **show interfaces atm** command for the ATM port adapter on a Cisco 7500 series router:

```
Router# show interfaces atm 0/0/0
ATM0/0/0 is up, line protocol is up
 Hardware is cyBus ATM
 Internet address is 1.1.1.1/24
 MTU 4470 bytes, sub MTU 4470, BW 156250 Kbit, DLY 80 usec, rely 255/255, load 1/255
 Encapsulation ATM, loopback not set, keepalive set (10 sec)
 Encapsulation(s): AAL5, PVC mode
 256 TX buffers, 256 RX buffers,
 2048 maximum active VCs, 1024 VCs per VP, 1 current VCCs
 VC idle disconnect time: 300 seconds
 Last input never, output 00:00:05, output hang never
 Last clearing of "show interface" counters never
 Queueing strategy: fifo
 Output queue 0/40, 0 drops; input queue 0/75, 0 drops
 5 minute input rate 0 bits/sec, 1 packets/sec
 5 minute output rate 0 bits/sec, 1 packets/sec
     5 packets input, 560 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
     5 packets output, 560 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 output buffer failures, 0 output buffers swapped out
```

Table 16 describes the fields shown in both the displays.

Table 16 show interfaces atm Field Descriptions

Field	Description
ATM... is {up | down} is administratively down	Indicates whether the interface hardware is currently active (whether carrier detect is present) and if it has been taken down by an administrator.
line protocol is {up | down | administratively down}	Indicates whether the software processes that handle the line protocol think the line is usable (that is, whether keepalives are successful).
Hardware is	Hardware type.
Internet address is	Internet address and subnet mask.
MTU	Maximum Transmission Unit of the interface.
sub MTU	Maximum Transmission Unit of the subinterface.
BW	Bandwidth of the interface in kilobits per second.
DLY	Delay of the interface in microseconds.
rely	Reliability of the interface as a fraction of 255 (255/255 is 100% reliability), calculated as an exponential average over 5 minutes.
load	Load on the interface as a fraction of 255 (255/255 is completely saturated), calculated as an exponential average over 5 minutes. The calculation uses the value from the **bandwidth** interface configuration command.
ATM E164 Auto Conversion Interface	Indicates that ATM E164 auto conversion is enabled. When this field is not present, ATM E164 auto conversion is disabled.
Encapsulation	Encapsulation method assigned to interface.
loopback	Indicates whether the interface is configured for loopback testing.
keepalive	Indicates whether keepalives are set or not.
Encapsulation(s)	Type of encapsulation used on the interface (for example, AAL5, and either PVC or SVC mode).
TX buffers	Number of buffers configured with the **atm txbuff** command.
RX buffers	Number of buffers configured with the **atm rxbuff** command.
Maximum active VCs	Maximum number of virtual circuits.
VCs per VP	Number of virtual circuits per virtual path (the default is 1024).
Current VCs	Number of virtual circuit connections currently open.
VC idle disconnect time	Number of seconds the SVC must be idle before the SVC is disconnected.
Signalling vc	Number of the signaling PVC.
vpi	Virtual path identifier number.
vci	Virtual channel identifier number.
ATM NSAP address	NSAP address of the ATM interface.
Last input	Number of hours, minutes, and seconds since the last packet was successfully received by an interface. Useful for knowing when a dead interface failed. This counter is updated only when packets are process switched, not when packets are fast switched.

Table 16 show interfaces atm Field Descriptions (continued)

Field	Description
Last output	Number of hours, minutes, and seconds since the last packet was successfully transmitted by an interface. This counter is updated only when packets are process switched, not when packets are fast switched.
output hang	Number of hours, minutes, and seconds (or never) since the interface was last reset because of a transmission that took too long. When the number of hours in any of the "last" fields exceeds 24 hours, the number of days and hours is printed. If that field overflows, asterisks are printed.
Last clearing	The time at which the counters that measure cumulative statistics (such as number of bytes transmitted and received) shown in this report were last reset to zero. Note that variables that might affect routing (for example, load and reliability) are not cleared when the counters are cleared. *** indicates the elapsed time is too large to be displayed. 0:00:00 indicates the counters were cleared more than 2^{31}ms (and less than 2^{32}ms) ago.
Queueing strategy	First-in, first-out queueing strategy (other queueing strategies you might see are priority-list, custom-list, and weighted fair).
Output queue, drops input queue, drops	Number of packets in output and input queues. Each number is followed by a slash, the maximum size of the queue, and the number of packets dropped due to a full queue.
5 minute input rate, 5 minute output rate	Average number of bits and packets transmitted per second in the last 5 minutes.
packets input	Total number of error-free packets received by the system.
bytes input	Total number of bytes, including data and MAC encapsulation, in the error free packets received by the system.
no buffer	Number of received packets discarded because there was no buffer space in the main system. Compare with ignored count. Broadcast storms on Ethernets and bursts of noise on serial lines are often responsible for no input buffer events.
Received broadcasts	Total number of broadcast or multicast packets received by the interface.
runts	Number of packets that are discarded because they are smaller than the medium's minimum packet size.
giants	Number of packets that are discarded because they exceed the medium's maximum packet size.
input errors	Total number of no buffer, runts, giants, CRCs, frame, overrun, ignored, and abort counts. Other input-related errors can also increment the count, so that this sum may not balance with the other counts.
CRC	Cyclic redundancy checksum generated by the originating LAN station or far end device does not match the checksum calculated from the data received. On a LAN, this usually indicates noise or transmission problems on the LAN interface or the LAN bus itself. A high number of CRC's is usually the result of collisions or a station transmitting bad data. On a serial link, CRC's usually indicate noise, gain hits or other transmission problems on the data link.

Table 16 show interfaces atm Field Descriptions (continued)

Field	Description
frame	Number of packets received incorrectly having a CRC error and a noninteger number of octets.
overrun	Number of times the serial receiver hardware was unable to hand received data to a hardware buffer because the input rate exceeded the receiver's ability to handle the data.
ignored	Number of received packets ignored by the interface because the interface hardware ran low on internal buffers. These buffers are different than the system buffers mentioned previously in the buffer description. Broadcast storms and bursts of noise can cause the ignored count to be incremented.
abort	Illegal sequence of one bits the interface. This usually indicates a clocking problem between the interface and the data link equipment.
packets output	Total number of messages transmitted by the system.
bytes	Total number of bytes, including data and MAC encapsulation, transmitted by the system.
underruns	Number of times that the transmitter has been running faster than the router can handle. This may never be reported on some interfaces.
output errors	Sum of all errors that prevented the final transmission of datagrams out of the interface being examined. Note that this may not balance with the sum of the enumerated output errors, as some datagrams may have more than one error, and others may have errors that do not fall into any of the specifically tabulated categories.
collisions	This feature is not applicable for ATM interfaces.
interface resets	Number of times an interface has been completely reset. This can happen if packets queued for transmission were not sent within several seconds. On a serial line, this can be caused by a malfunctioning modem that is not supplying the transmit clock signal, or by a cable problem. If the system notices that the carrier detect line of a serial interface is up, but the line protocol is down, it periodically resets the interface in an effort to restart it. Interface resets can also occur when an interface is looped back or shut down.
output buffer failures	Number of times that a packet was not output from the output hold queue because of a shortage of MEMD shared memory.
output buffers swapped out	Number of packets stored in main memory when the output queue is full; swapping buffers to main memory prevents packets from being dropped when output is congested. The number is high when traffic is bursty.
restarts	Number of times the controller was restarted because of errors.

show network-clocks

To display the current configured and active network clock sources, use the **show network-clocks** privileged EXEC command.

show network-clocks

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.1	This command was introduced.

Usage Guidelines

This command applies to Voice over Frame Relay, Voice over ATM, and Voice over HDLC on the Cisco MC3810.

The Cisco MC3810 has a background task that verifies whether a valid clocking configuration exists every 120 seconds. If this task detects an error, you will be reminded every 120 seconds until the error is corrected. A clocking configuration error may be generated for various reasons. Using the **show network-clocks** command, you can display the clocking configuration status.

Examples

The following is sample output from the **show network-clocks** EXEC command.

```
Switch# show network-clocks
Priority 1 clock source: ATM3/0/0
Priority 2 clock source: System clock
Priority 3 clock source: System clock
Priority 4 clock source: System clock

Current clock source:ATM3/0/0, priority:1
```

The following is sample output from the **show network-clocks** command on the Cisco MC3810:

```
router# show network-clocks
Priority 1 clock source(inactive config): T1 0
Priority 1 clock source(active config) : T1 0
Clock switch delay: 10
Clock restore delay: 10
T1 0 is clocking system bus for 9319 seconds.
Run Priority Queue: controller0
```

In this display, inactive configuration is the new configuration that has been established. Active configuration is the run-time configuration. Should an error be made in the new configuration, the inactive and active configurations will be different. In the above example, the clock priority configuration is valid, and the system is being clocked as indicated.

The following is another sample output from the **show network-clocks** command:

```
router# show network-clocks
Priority 1 clock source(inactive config) : T1 0
Priority 2 clock source(inactive config) : T1 1
Priority 1 clock source(active config) : T1 0
Clock switch delay: 10
Clock restore delay: 10
T1 0 is clocking system bus for 9319 seconds.
Run Priority Queue: controller0
```

In this display, the new clocking configuration has an error for controller T1 1. This is indicated by checking differences between the last valid configuration (active) and the new proposed configuration (inactive). The error may result from hardware (the system controller board or MFT) unable to support this mode, or controller T1 1 is currently configured as "clock source internal."

Since the active and inactive configurations are different, the system will periodically display the warning message about the wrong configuration.

Related Commands

Command	Description
network-clock-select (ATM)	Establishes the sources and priorities of the requisite clocking signals for an ATM-CES port adapter.

show sscop

To show Service-Specific Connection-Oriented Protocol (SSCOP) details for all ATM interfaces, use the **show sscop** privileged EXEC command.

show sscop

Syntax Description

This command has no arguments or keywords.

Command Modes

Privileged EXEC

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following is sample output from the **show sscop** command:

```
Router# show sscop
SSCOP details for interface ATM4/0
   Current State = Data Transfer Ready
   Send Sequence Number: Current = 2,  Maximum = 9
   Send Sequence Number Acked = 3
   Rcv Sequence Number: Lower Edge = 2, Upper Edge = 2, Max = 9
   Poll Sequence Number = 1876, Poll Ack Sequence Number = 2
   Vt(Pd) = 0
   Connection Control:  timer = 1000
   Timer currently Inactive
   Keep Alive Timer = 30000
   Current Retry Count = 0, Maximum Retry Count = 10
      Statistics -
      Pdu's Sent = 0, Pdu's Received = 0, Pdu's Ignored = 0
      Begin = 0/1, Begin Ack = 1/0, Begin Reject = 0/0
      End = 0/0, End Ack = 0/0
      Resync = 0/0, Resync Ack = 0/0
      Sequenced Data = 2/0, Sequenced Poll Data = 0/0
      Poll = 1591/1876, Stat = 0/1591, Unsolicited Stat = 0/0
      Unassured Data = 0/0, Mgmt Data = 0/0, Unknown Pdu's = 0
```

Table 17 describes the fields shown in the display. Interpreting this output requires a good understanding of the SSCOP; it is usually displayed by our technicians to help diagnose network problems.

Table 17 show sscop Field Descriptions

Field	Description
SSCOP details for interface	Interface slot and port.
Current State	SSCOP state for the interface.
Send Sequence Number	Current and maximum send sequence number.
Send Sequence Number Acked	Sequence number of packets already acknowledged.

Table 17 show sscop Field Descriptions (continued)

Field	Description
Rcv Sequence Number	Sequence number of packets received.
Poll Sequence Number	Current poll sequence number.
Poll Ack Sequence Number	Poll sequence number already acknowledged.
Vt(Pd)	Number of sequenced data (SD) frames sent, which triggers a sending of a Poll frame.
Connection Control	Timer used for establishing and terminating SSCOP.
Keep Alive Timer	Timer used to send keepalives on an idle link.
Current Retry Count	Current count of the retry counter.
Maximum Retry Count	Maximum value the retry counter can take.
Pdu's Sent	Total number of SSCOP frames sent.
Pdu's Received	Total number of SSCOP frames received.
Pdu's Ignored	Number of invalid SSCOP frames ignored.
Begin	Number of Begin frames sent/received.
Begin Ack	Number of Begin Ack frames sent/received.
Begin Reject	Number of Begin Reject frames sent/received.
End	Number of End frames sent/received.
End Ack	Number of End Ack frames sent/received.
Resync	Number of Resync frames sent/received.
Resync Ack	Number of Resync Ack frames sent/received.
Sequenced Data	Number of Sequenced Data frames sent/received.
Sequenced Poll Data	Number of Sequenced Poll Data frames sent/received.
Poll	Number of Poll frames sent/received.
Stat	Number of Stat frames sent/received.
Unsolicited Stat	Number of Unsolicited Stat frames sent/received.
Unassured Data	Number of Unassured Data frames sent/received.
Mgmt Data	Number of Mgmt Data frames sent/received.
Unknown Pdu's	Number of Unknown Pdu's frames sent/received.

sscop cc-timer

To change the connection control timer, use the **sscop cc-timer** interface configuration command. To restore the default value, use the **no** form of this command.

sscop cc-timer *seconds*

no sscop cc-timer

Syntax Description

seconds	Number of seconds between Begin messages.

Defaults

1 second

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The connection control timer determines the time between transmission of BGN (establishment), END (release), or RS (resynchronization) protocol data units (PDUs) as long as an acknowledgment has not been received.

Examples

The following example sets the connection control timer 15 seconds:

```
sscop cc-timer 15
```

Related Commands

Command	Description
sscop max-cc	Changes the SSCOP retry count of connection control.

sscop keepalive-timer

To change the keepalive timer, use the **sscop keepalive-timer** interface configuration command. To restore the default value, use the **no** form of this command.

sscop keepalive-timer *seconds*

no sscop keepalive-timer *seconds*

Syntax Description

seconds	Number of seconds the router waits between transmission of POLL PDUs when no sequential data (SD) or SDP PDUs are queued for transmission or are outstanding pending acknowledgments.

Defaults

5 seconds

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example sets the keepalive timer to 15 seconds:

```
sscop keepalive-timer 15
```

sscop max-cc

To change the retry count of connection control, use the **sscop max-cc** interface configuration command. To restore the default value, use the **no** form of this command.

sscop max-cc *retries*

no sscop max-cc

Syntax Description

retries	Number of times that SSCOP will retry to transmit BGN (establishment), END (release), or RS (resynchronization) PDUs as long as an acknowledgment has not been received. Valid range is 1 to 6000.

Defaults

10 retries

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example sets the retry count of the connection control to 20:

```
sscop max-cc 20
```

Related Commands

Command	Description
sscop cc-timer	Changes the SSCOP connection control timer.

sscop poll-timer

To change the poll timer, use the **sscop poll-timer** interface configuration command. To restore the default value, use the **no** form of this command.

sscop poll-timer *seconds*

no sscop poll-timer

Syntax Description

seconds	Number of seconds the router waits between transmission of POLL PDUs.

Defaults

100 seconds

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Usage Guidelines

The poll timer controls the maximum time between transmission of POLL PDUs when SD or SDP PDUs are queued for transmission or are outstanding pending acknowledgments.

Examples

The following example sets the poll timer to 15 seconds:

```
sscop poll-timer 15
```

sscop receive-window

To change the receiver window, use the **sscop receive-window** interface configuration command. To restore the default value, use the **no** form of this command.

sscop receive-window *packets*

no sscop receive-window

Syntax Description

packets	Number of packets the interface can receive before it must send an acknowledgment to the ATM switch. Valid range is 1 to 6000.

Defaults

7 packets

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example sets the receiver's window to 10 packets:

```
sscop rcv-window 10
```

sscop send-window

To change the transmitter window, use the **sscop send-window** interface configuration command. To restore the default value, use the **no** form of this command.

sscop send-window *packets*

no sscop send-window

Syntax Description

packets	Number of packets the interface can send before it must receive an acknowledgment from the ATM switch. Valid range is 1 to 6000.

Defaults

7 packets

Command Modes

Interface configuration

Command History

Release	Modification
10.0	This command was introduced.

Examples

The following example sets the transmitter's window to 10 packets:

```
sscop send-window 10
```

SVC

To create an ATM switched virtual circuit (SVC) and specify the destination network service access point (NSAP) address on a main interface or subinterface, use the **svc** interface configuration command. To disable the SVC, use the **no** form of this command.

svc [*name*] **nsap** *address*

no svc [*name*] **nsap** *address*

Syntax Description

name	(Optional) The name of the SVC and map. The name can be up to 16 characters long.
nsap *address*	The destination ATM NSAP address. Must be exactly 40 hexadecimal digits long and in the correct format. See the "Usage Guidelines" section below.

Defaults

No NSAP address is defined.

Command Modes

Interface configuration

Command History

Release	Modification
11.3	This command was introduced.

Usage Guidelines

Once you specify a *name* for an SVC, you can reenter the interface-ATM-VC configuration mode by simply entering **svc** *name*. You can remove an NSAP address any associated parameters by entering **no svc** *name* or **no svc** *nsap address*.

Note After configuring the parameters for an ATM SVC, you must exit the interface-ATM-VC configuration mode in order to enable the SVC settings.

Examples

The following example creates an SVC with the name lion and specifies the 40-digit hexadecimal destination ATM NSAP address:

```
svc lion nsap 47.0091.81.000000.0040.0B0A.2501.ABC1.3333.3333.05
```

ubr

To configure unspecified bit rate (UBR) quality of service (QoS) and specify the output peak cell rate (PCR) for an ATM permanent virtual circuit (PVC), switched virtual circuit (SVC), VC class, or VC bundle member, use the **ubr** command in the appropriate command mode. To remove the UBR parameter, use the **no** form of this command.

ubr *output-pcr* [*input-pcr*]

no ubr *output-pcr* [*input-pcr*]

Syntax Description

output-pcr	The output PCR in kilobits per second (kbps).
input-pcr	(Optional for SVCs only) The input peak cell rate (PCR) in kilobits per second. If this value is omitted, the *input-pcr* will equal the *output-pcr*.

Defaults

UBR QoS at the maximum line rate of the physical interface.

Command Modes

Interface-ATM-VC configuration (for an ATM PVC or SVC).

VC-class configuration (for a VC class).

Bundle-vc configuration (for ATM VC bundle members).

Command History

Release	Modification
11.3 T	This command was introduced.
12.0(3)T	This command was enhanced to support selection of UBR QoS and configuration of output PCR for ATM VC bundles and ATM VC bundle members.

Usage Guidelines

To configure ATM SVCs with an output PCR and an input PCR that differ from each other, you must expressly configure an output value and an input value using the *output-pcr* and *input-pcr* arguments, respectively.

Configure QoS parameters using the **ubr**, **ubr+**, or **vbr-nrt** command. The last command you enter will apply to the PVC or SVC you are configuring.

If the **ubr** command is not explicitly configured on an ATM PVC, SVC, or VC bundle member, the VC inherits the following default configuration (listed in order of next highest precedence):

- Configuration of any QoS command (**ubr**, **ubr+**, or **vbr-nrt**) in a VC class assigned to the PVC or SVC itself.
- Configuration of any QoS command (**ubr**, **ubr+**, or **vbr-nrt**) in a VC class assigned to the PVC's or SVC's ATM subinterface.
- Configuration of any QoS command (**ubr**, **ubr+**, or **vbr-nrt**) in a VC class assigned to the PVC's or SVC's ATM main interface.
- Global default: UBR QoS at the maximum line rate of the PVC or SVC.

To use this command in VC-class configuration mode, enter the **vc-class atm** global configuration command. This command has no effect if the VC class that contains the command is attached to a standalone VC, that is, if the VC is not a bundle member.

To use this command in bundle-vc configuration mode, first enter the **bundle** command to specify the bundle, then enter bundle configuration mode. Then enter the **pvc-bundle** configuration command to add the VC to the bundle as a member of it and enter bundle-vc configuration mode.

VCs in a VC bundle are subject to the following configuration inheritance rules (listed in order of next highest precedence):

- VC configuration in bundle-vc mode
- Bundle configuration in bundle mode (with effect of assigned VC-class configuration)
- Subinterface configuration in subinterface mode

Examples

The following example specifies the *output-pcr* argument for an ATM PVC to be 100,000 kbps:

```
pvc 1/32
 ubr 100000
```

The following example specifies the *output-pcr* and *input-pcr* arguments for an ATM SVC to be 10,000 kbps and 9000 kbps, respectively:

```
svc lion nsap 47.0091.81.000000.0040.0B0A.2501.ABC1.3333.3333.05
 ubr 10000 9000
```

Related Commands

Command	Description
abr	Selects ABR QoS and configures output peak cell rate and output minimum guaranteed cell rate for an ATM PVC or virtual circuit class.
broadcast	Configures broadcast packet duplication and transmission for an ATM VC class, PVC, SVC, or VC bundle.
bump	Configures the bumping rules for a virtual circuit class that can be assigned to a virtual circuit bundle.
bundle	Creates a bundle or modifies an existing bundle to enter bundle configuration mode.
class-int	Assigns a VC class to an ATM main interface or subinterface.
class-vc	Assigns a VC class to an ATM PVC, SVC, or VC bundle member.
encapsulation	Sets the encapsulation method used by the interface.
inarp	Configures the Inverse ARP time period for an ATM PVC, VC class, or VC bundle.
oam-bundle	Enables end-to-end F5 OAM loopback cell generation and OAM management for a virtual circuit class that can be applied to a virtual circuit bundle.
oam retry	Configures parameters related to OAM management for an ATM PVC, SVC, VC class, or VC bundle.
precedence	Configures precedence levels for a virtual circuit class that can be assigned to a virtual circuit bundle and thus applied to all virtual circuit members of that bundle.

Command	Description
protect	Configures a virtual circuit class with protected group or protected virtual circuit status for application to a virtual circuit bundle member.
protocol	Configures a static map for an ATM PVC, SVC, VC class, or VC bundle. Enables Inverse ARP or Inverse ARP broadcasts on an ATM PVC by either configuring Inverse ARP directly on the PVC, on the VC bundle, or in a VC class (applies to IP and IPX protocols only).
pvc-bundle	Adds a PVC to a bundle as a member of the bundle and enters bundle-vc configuration mode in order to configure that PVC bundle member.
ubr+	Configures UBR QoS and specifies the output peak cell rate and output minimum guaranteed cell rate for an ATM PVC, SVC, VC class, or VC bundle member.
vbr-nrt	Configures the VBR-NRT QoS and specifies output peak cell rate, output sustainable cell rate, and output maximum burst cell size for an ATM PVC, SVC, VC class, or VC bundle member.

ubr+

To configure unspecified bit rate (UBR) quality of service (QoS) and specify the output peak cell rate and output minimum guaranteed cell rate for an ATM permanent virtual circuit (PVC), switched virtual circuit (SVC), VC class, or VC bundle member, use the **ubr+** command in the appropriate command mode. To remove the UBR+ parameters, use the **no** form of this command.

ubr+ *output-pcr output-mcr* [*input-pcr*] [*input-mcr*]

no ubr+ *output-pcr output-mcr* [*input-pcr*] [*input-mcr*]

Syntax Description

output-pcr	The output PCR in kilobits per second (kbps).
output-mcr	The output minimum guaranteed cell rate in kbps.
input-pcr	(Optional for SVCs only) The input PCR in kbps. If this value is omitted, the *input-pcr* will equal the *output-pcr*.
input-mcr	(Optional for SVCs only) The input minimum guaranteed cell rate in kbps. If this value is omitted, the *input-mcr* will equal the *output-mcr*.

Defaults

UBR QoS at the maximum line rate of the physical interface.

Command Modes

Interface-ATM-VC configuration (for an ATM PVC or SVC).

VC-class configuration (for a VC class).

Bundle-vc configuration (for ATM VC bundle members).

Command History

Release	Modification
11.3 T	This command was introduced.
12.0(3)T	This command was enhanced to support selection of UBR+ QoS and configuration of output PCR and output minimum guaranteed cell rate ATM VC bundles, and VC bundle members.

Usage Guidelines

To configure ATM SVCs with an output PCR and an input PCR that differ from each other, you must expressly configure an output value and an input value using the *output-pcr, output-mcr, input-pcr,* and *input-mcr* arguments, respectively.

Configure QoS parameters using the **ubr**, **ubr+**, or **vbr-nrt** command. The last command you enter will apply to the PVC or SVC you are configuring.

If the **ubr+** command is not explicitly configured on an ATM PVC or SVC, the VC inherits the following default configuration (listed in order of next highest precedence):

- Configuration of any QoS command (**ubr**, **ubr+**, or **vbr-nrt**) in a VC class assigned to the PVC or SVC itself.
- Configuration of any QoS command (**ubr**, **ubr+**, or **vbr-nrt**) in a VC class assigned to the PVC's or SVC's ATM subinterface.

- Configuration of any QoS command (**ubr**, **ubr+**, or **vbr-nrt**) in a VC class assigned to the PVC's or SVC's ATM main interface.
- Global default: UBR QoS at the maximum line rate of the PVC or SVC.

To use this command in VC-class configuration mode, enter the **vc-class atm** global configuration command before you enter the **ubr+** command. This command has no effect if the VC class that contains the command is attached to a standalone VC, that is, if the VC is not a bundle member.

To use this command in bundle-vc configuration mode, first enter the **bundle** command to specify the bundle the VC member belongs to, then enter bundle configuration mode. Then enter the **pvc-bundle** bundle configuration command to add the VC to the bundle as a member of it.

VCs in a VC bundle are subject to the following configuration inheritance rules (listed in order of next highest precedence):

- VC configuration in bundle-vc mode
- Bundle configuration in bundle mode (with effect of assigned VC-class configuration)
- Subinterface configuration in subinterface mode

Examples

The following example specifies the *output-pcr* argument for an ATM PVC to be 100,000 kbps and the *output-mcr* to be 3000 kbps:

```
pvc 1/32
 ubr+ 100000 3000
```

The following example specifies the *output-pcr*, *output-mcr*, *input-pcr*, and *input-mcr* arguments for an ATM SVC to be 10,000 kbps, 3000 kbps, 9000 kbps, and 1000 kbps, respectively:

```
svc lion nsap 47.0091.81.000000.0040.0B0A.2501.ABC1.3333.3333.05
 ubr+ 10000 3000 9000 1000
```

Related Commands

Command	Description
abr	Selects ABR QoS and configures output peak cell rate and output minimum guaranteed cell rate for an ATM PVC or virtual circuit class.
broadcast	Configures broadcast packet duplication and transmission for an ATM VC class, PVC, SVC, or VC bundle.
bump	Configures the bumping rules for a virtual circuit class that can be assigned to a virtual circuit bundle.
bundle	Creates a bundle or modifies an existing bundle to enter bundle configuration mode.
class	Assigns a VC-class to an ATM main interface, subinterface, PVC, SVC, VC bundle, or VC bundle member.
encapsulation	Sets the encapsulation method used by the interface.
inarp	Configures the Inverse ARP time period for an ATM PVC, VC class, or VC bundle.
oam-bundle	Enables end-to-end F5 OAM loopback cell generation and OAM management for a virtual circuit class that can be applied to a virtual circuit bundle.
oam retry	Configures parameters related to OAM management for an ATM PVC, SVC, VC class, or VC bundle.

Command	Description
precedence	Configures precedence levels for a virtual circuit class that can be assigned to a virtual circuit bundle and thus applied to all virtual circuit members of that bundle.
protect	Configures a virtual circuit class with protected group or protected virtual circuit status for application to a virtual circuit bundle member.
protocol	Configures a static map for an ATM PVC, SVC, VC class, or VC bundle. Enables Inverse ARP or Inverse ARP broadcasts on an ATM PVC by either configuring Inverse ARP directly on the PVC, on the VC bundle, or in a VC class (applies to IP and IPX protocols only).
pvc-bundle	Adds a PVC to a bundle as a member of the bundle and enters bundle-vc configuration mode in order to configure that PVC bundle member.
ubr	Configures UBR QoS and specifies the output peak cell rate for an ATM PVC, SVC, VC class, or VC bundle member.
vbr-nrt	Configures the VBR-NRT QoS and specifies output peak cell rate, output sustainable cell rate, and output maximum burst cell size for an ATM PVC, SVC, VC class, or VC bundle member.

vbr-nrt

To configure the variable bit rate-nonreal time (VBR-NRT) quality of service (QoS) and specify output peak cell rate (PCR), output sustainable cell rate, and output maximum burst cell size for an ATM permanent virtual circuit (PVC), switched virtual circuit (SVC), VC class, or VC bundle member, use the **vbr-nrt** command in the appropriate command mode. To remove the VBR-NRT parameters, use the **no** form of this command.

vbr-nrt *output-pcr output-scr output-mbs* [*input-pcr*] [*input-scr*] [*input-mbs*]

no vbr-nrt *output-pcr output-scr output-mbs* [*input-pcr*] [*input-scr*] [*input-mbs*]

Syntax Description

output-pcr	The output PCR in kilobits per second (kbps).
output-scr	The output SCR in kbps.
output-mbs	The output maximum burst cell size expressed in number of cells.
input-pcr	(Optional for SVCs only) The input PCR in kbps.
input-scr	(Optional for SVCs only) The input SCR in kbps.
input-mbs	(Optional for SVCs only) The input maximum burst cell size expressed in number of cells.

Defaults

UBR QoS at the maximum line rate of the physical interface.

Command Modes

Interface-ATM-VC configuration (for an ATM PVC or SVC)

VC-class configuration (for a VC class)

Bundle-vc configuration (for ATM VC bundle members)

Command History

Release	Modification
11.3 T	This command was introduced.
12.0(3)T	This command was enhanced to support configuration of VBR-NRT QoS and specification of output PCR, output SCR, and output maximum burst cell size for ATM bundles and VC bundle members.

Usage Guidelines

Configure QoS parameters using the **ubr**, **ubr+**, or **vbr-nrt** command. The last command you enter will apply to the PVC or SVC you are configuring.

If the **vbr-nrt** command is not explicitly configured on an ATM PVC or SVC, the VC inherits the following default configuration (listed in order of next highest precedence):

- Configuration of any QoS command (**ubr**, **ubr+**, or **vbr-nrt**) in a VC class assigned to the PVC or SVC itself.
- Configuration of any QoS command (**ubr**, **ubr+**, or **vbr-nrt**) in a VC class assigned to the PVC's or SVC's ATM subinterface.

- Configuration of any QoS command (**ubr**, **ubr+**, or **vbr-nrt**) in a VC class assigned to the PVC's or SVC's ATM main interface.
- Global default: UBR QoS at the maximum line rate of the PVC or SVC.

To use this command in VC-class configuration mode, enter the **vc-class atm** global configuration command before you enter the **vbr-nrt** command. This command has no effect if the VC class that contains the command is attached to a standalone VC, that is, if the VC is not a bundle member.

To use this command in bundle-vc configuration mode, first enter the **pvc-bundle** configuration command to add the VC to the bundle as a member of it, then and enter bundle-vc configuration mode.

VCs in a VC bundle are subject to the following configuration inheritance rules (listed in order of next highest precedence):

- VC configuration in bundle-vc mode
- Bundle configuration in bundle mode (with effect of assigned VC-class configuration)
- Subinterface configuration in subinterface mode

Examples

The following example specifies the *output-pcr* argument for an ATM PVC to be 100,000 kbps, the *output-scr* argument to be 50,000 kbps, and the *output-mbs* to be 64:

```
pvc 1/32
 vbr-nrt 100000 50000 64
```

The following example specifies the VBR-NRT output and input parameters for an ATM SVC:

```
svc lion nsap 47.0091.81.000000.0040.0B0A.2501.ABC1.3333.3333.05
 vbr-nrt 10000 5000 32 20000 10000 64
```

Related Commands

Command	Description
abr	Selects ABR QoS and configures output peak cell rate and output minimum guaranteed cell rate for an ATM PVC or virtual circuit class.
broadcast	Configures broadcast packet duplication and transmission for an ATM VC class, PVC, SVC, or VC bundle.
bump	Configures the bumping rules for a virtual circuit class that can be assigned to a virtual circuit bundle.
bundle	Creates a bundle or modifies an existing bundle to enter bundle configuration mode.
class-int	Assigns a VC class to an ATM main interface or subinterface.
class-vc	Assigns a VC class to an ATM PVC, SVC, or VC bundle member.
encapsulation	Sets the encapsulation method used by the interface.
inarp	Configures the Inverse ARP time period for an ATM PVC, VC class, or VC bundle.
oam-bundle	Enables end-to-end F5 OAM loopback cell generation and OAM management for a virtual circuit class that can be applied to a virtual circuit bundle.
oam retry	Configures parameters related to OAM management for an ATM PVC, SVC, VC class, or VC bundle.

Command	Description
precedence	Configures precedence levels for a virtual circuit class that can be assigned to a virtual circuit bundle and thus applied to all virtual circuit members of that bundle.
protect	Configures a virtual circuit class with protected group or protected virtual circuit status for application to a virtual circuit bundle member.
protocol (ATM)	Configures a static map for an ATM PVC, SVC, VC class, or VC bundle. Enables Inverse ARP or Inverse ARP broadcasts on an ATM PVC by either configuring Inverse ARP directly on the PVC, on the VC bundle, or in a VC class (applies to IP and IPX protocols only).
pvc-bundle	Adds a PVC to a bundle as a member of the bundle and enters bundle-vc configuration mode in order to configure that PVC bundle member.
ubr	Configures UBR QoS and specifies the output peak cell rate for an ATM PVC, SVC, VC class, or VC bundle member.
ubr+	Configures UBR QoS and specifies the output peak cell rate and output minimum guaranteed cell rate for an ATM PVC, SVC, VC class, or VC bundle member.

vbr-rt

To configure the real-time variable bit rate (VBR) for voice connections on the Cisco MC3810, use the **vbr-rt** in the appropriate command mode. To restore the default value, use the **no** form of this command.

vbr-rt *peak-rate average-rate burst*

no vbr-rt *peak-rate average-rate burst*

Syntax Description

peak-rate	The Peak Information Rate (PIR) of the voice connection in kbps. The range is from 56 to 10,000.
average-rate	The Average Information Rate (AIR) of the voice connection in kbps. The range is from 1 to 56.
burst	Burst size in number of cells. The range is from 0 to 65536.

Defaults

No vbr-rt settings are configured.

Command Modes

Interface-ATM-VC configuration (for an ATM PVC or SVC)

VC-class configuration (for a VC class)

Bundle-vc configuration (for ATM VC bundle members)

Command History

Release	Modification
12.0	This command was introduced.

Usage Guidelines

This command applies to Voice over ATM on the Cisco MC3810.

The **vbr-rt** command configures traffic shaping between voice and data PVCs. Traffic shaping is required so that the carrier does not discard calls. To configure voice and data traffic shaping, you must configure the peak, average, and burst options for voice traffic. Configure the burst value if the PVC will be carrying bursty traffic. The peak, average, and burst values are needed so the PVC can effectively handle the bandwidth for the number of voice calls. To calculate the minimum peak, average, and burst values for the number of voice calls, use the following calculations:

- Peak value: (2 x the maximum number of calls) x 16 kb
- Average value: (1 x the maximum number of calls) x 16 kb
- Burst value: (4 x the maximum number of calls)

Note When you configure data PVCs that will be traffic shaped with voice PVCs, use the aalsnap encapsulation and calculate the overhead as 1.13 times the voice rate.

Examples

The following example configures the traffic shaping rate for ATM PVC 20 on a Cisco MC3810. In the example, the peak, average and burst rates are calculated based on a maximum of 20 calls on the PVC.

```
pvc 20
 encapsulation aal5mux voice
 vbr-rt 640 320 80
```

Related Commands

Command	Description
encapsulation aal5	Configures the AAL and encapsulation type for an ATM PVC, SVC, or VC class.

vc-class atm

To create a virtual circuit (VC) class for an ATM permanent virtual circuit (PVC), switched virtual circuit (SVC), or ATM interface and enter vc-class configuration mode, use the **vc-class atm** global configuration command. Use the **no** form of this command to remove a VC class.

vc-class atm *name*

no vc-class atm *name*

Syntax Description

name	Name of your VC class.

Defaults

No VC class is defined.

Command Modes

Global configuration

Command History

Release	Modification
11.3 T	This command was introduced.

Usage Guidelines

The following commands can be configured once you are inside a VC class:

- **broadcast**
- **encapsulation**
- **idle-timeout**
- **ilmi manage**
- **inarp**
- **oam-pvc**
- **oam retry**
- **oam-svc**
- **protocol**
- **ubr**
- **ubr+**
- **vbr-nrt**

If an SVC command (for example, the **idle-timeout** or **oam-svc** command) is applied on a PVC, the command is ignored. This is also true if a PVC command is applied to an SVC.

Examples

The following example creates a VC class named pvc-qos:

```
vc-class atm pvc-qos
```