

## show atm vc

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

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

Syntax Description	
<i>vcd</i>	(Optional) Specifies the virtual circuit descriptor (VCD) about which to display information.
<b>interface</b> <i>interface-number</i>	<p>(Optional) Interface number or subinterface number of the PVC or SVC. Displays all PVCs and SVCs on the specified interface or subinterface.</p> <p>The <i>interface-number</i> uses one of the following formats, depending on what router platform you are using:</p> <ul style="list-style-type: none"> <li>For the ATM Interface Processor (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: <i>slot/0[.subinterface-number multipoint]</i></li> <li>For the ATM port adapter and enhanced ATM port adapter on Cisco 7500 series routers: <i>slot/port-adapter/0[.subinterface-number multipoint]</i></li> <li>For the network processing module (NPM) on Cisco 4500 and Cisco 4700 routers: <i>number[.subinterface-number multipoint]</i></li> </ul> <p>For a description of these arguments, refer to the <b>interface atm</b> command.</p>

Command Modes	Privileged EXEC
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Command History	Release	Modification
	10.0	This command was introduced.
	11.1CA	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.
	12.2(25)S	Information about packet drops and errors was added to the command output.
	12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB and implemented on the Cisco 10000 series routers.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines	If no value is specified for the <i>vcd</i> argument, the command displays information for all PVCs and SVCs. The output is in summary form (one line per virtual circuit).
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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 that 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 circuit emulation service (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 Switched Multimegabit Data Service (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 Operation, Administration, and Maintenance (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 *vcid* 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
```

Interface	VCD/ Name	VPI	VCI	Type	Encaps	Peak Kbps	Avg/Min Kbps	Burst 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 leaves of the multipoint VC. This VC was opened by IP multicast. The three leaf routers' ATM addresses are included in the display. The VC is associated with IP group address 10.1.1.1.

```
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 (10.1.1.1)
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 11 describes the fields shown in the displays.

**Table 11** 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 virtual circuit (VC) was configured using the <b>pvc</b> command and the name was specified.
VPI	Virtual path identifier.
VCI	Virtual channel identifier.

**Table 11** *show atm vc Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
Type	Type of VC, either PVC, SVC, TVC, or multipoint SVC (MSVC). <ul style="list-style-type: none"> <li>MSVC (with no -x) indicates that VCD is a leaf of some other router's multipoint VC.</li> <li>MSVC-x indicates there are x leaf routers for that multipoint VC opened by the root.</li> </ul> Type of PVC detected from PVC discovery, either PVC-D, PVC-L, or PVC-M. <ul style="list-style-type: none"> <li>PVC-D indicates a PVC created due to PVC discovery.</li> <li>PVC-L indicates that the corresponding peer of this PVC could not be found on the switch.</li> <li>PVC-M indicates that some or all of the Quality of Service (QoS) parameters of this PVC do not match those of the corresponding peer on the switch.</li> <li>TVC indicates a Tag VC.</li> </ul>
Encaps	Type of ATM adaptation layer (AAL) and encapsulation.
PeakRate	Kilobits per second sent at the peak rate.
Average Rate	Kilobits per second sent at the average rate.
Burst Cells	Value that equals the maximum number of ATM cells the VC can send at peak rate.
Status	Status of the VC connection. <ul style="list-style-type: none"> <li>UP indicates that the connection is enabled for data traffic.</li> <li>DOWN indicates that the connection is not ready for data traffic. When the Status field is DOWN, a State field is shown.</li> <li>INACTIVE indicates that the interface is down.</li> <li>ACTIVE indicates that the interface is in use and active.</li> </ul>
etype	Encapsulation type.

**Table 11** show atm vc Field Descriptions (continued)

Field	Description
Flags	Bit mask describing VC 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 MULTIPPOINT 0x400 DEFAULT_RATE 0x800 DEFAULT_BURST 0x10 ACTIVE 0x20 PVC 0x40 SVC 0x0 AAL5-SNAP 0x1 AAL5-NLPID 0x2 AAL5-FRNLPIID 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 VC. 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 Inverse Address Resolution Protocol (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 VC. This number includes all fast-switched and process-switched packets.
OutPkts	Total number of packets sent on this VC. This number includes all fast-switched and process-switched packets.
InBytes	Total number of bytes received on this VC. This number includes all fast-switched and process-switched packets.
OutBytes	Total number of bytes sent on this VC. This number includes all fast-switched and process-switched packets.
InPRoc	Number of process-switched input packets.
OutPRoc	Number of process-switched output packets.
Broadcasts	Number of process-switched broadcast packets.
InFast	Number of fast-switched input packets.

**Table 11** *show atm vc Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
OutFast	Number of fast-switched output packets.
InAS	Number of autonomous-switched or silicon-switched input packets.
VC TxRingLimit	Transmit Ring Limit for this VC.
VC Rx Limit	Receive Ring Limit for this VC.
Transmit priority	ATM service class transmit priority for this VC.
InCells	Number of incoming cells on this VC.
OutCells	Number of outgoing cells on this VC.
InPktDrops	A non-zero value for the InPktDrops of a VC counter suggests that the ATM interface is running out of packet buffers for an individual VC, or is exceeding the total number of VC buffers that can be shared by the VCs.
OutPktDrops	The PA-A3 driver increments the OutPktDrops counter when a VC fills its individual transmit buffer quota. The purpose of the quota is to prevent a consistently over-subscribed VC from grabbing all of the packet buffer resources and hindering other VCs from transmitting normal traffic within their traffic contracts.
InCellDrops	Number of incoming cells dropped on this VC.
OutCellDrops	Number of outgoing cells dropped on this VC.
InByteDrops	Number of incoming bytes that are dropped on this VC.
OutByteDrops	Number of outgoing bytes that are dropped on this VC.
CrcErrors	Number of cyclic redundancy check (CRC) errors on this VC.
SarTimeOuts	Number of segmentation and reassembly sublayer time-outs on this VC.
OverSizedSDUs	Number of over-sized service data units on this VC
LengthViolation	Number of length violations on this VC. A length violation occurs when a reassembled packet is dropped without checking the CRC.
CPIErrors	The Common Part Indicator error field is a one octet field in the AAL5 encapsulation of an ATM cell and must be set to 0. If it is received with some other value, it is flagged as an error by the interface. For example, this error may indicate data corruption.
Out CLP	Number of Packets and/or cells where the Output Cell Loss Priority bit is set.
OutAS	Number of autonomous-switched or silicon-switched output packets.
OAM cells received	Number of OAM cells received on this VC.
OAM cells sent	Number of OAM cells sent on this VC.
TTL	Time to live in ATM hops across the VC.
VC owner	IP Multicast address of the group.

**Related Commands**

<b>Command</b>	<b>Description</b>
<b>atm nsap-address</b>	Sets the NSAP address for an ATM interface using SVC mode.
<b>show xtagatm vc</b>	Displays information about the VCs on the extended MPLS ATM interfaces.

# 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

<i>vpi</i>	(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.
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## 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 12 describes the fields shown in the display.

**Table 12** 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 circuit emulation service (CES) bandwidth allocated for the VP.
DataVCs	Number of data virtual circuits (VCs) on the VP.
CesVCs	Number of CES VC on the VP.
Status	Current status of the VP. Values are ACTIVE and INACTIVE.

**Table 12** *show atm vp Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
VCD	Virtual circuit descriptor of the VC associated with this VP.
VCI	Virtual channel identifier of the VC associated with this VP.
Type	Type of VC associated with this VP. Values are PVC and 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**

<b>Command</b>	<b>Description</b>
<a href="#">atm pvp</a>	Creates a PVP used to multiplex (or bundle) one or more VCs (especially CES and data VCs).

# show ces

To display details about a Circuit Emulation Service (CES) connection, use the **show ces** privileged EXEC command.

**show ces** [*slot/port*]

<b>Syntax Description</b>	<i>slot/port</i> (Optional) Slot and port number of the CES interface.
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<b>Command Modes</b>	Privileged EXEC
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<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	12.1(2)T	This command was introduced.

<b>Usage Guidelines</b>	This command is used on Cisco 2600 series and Cisco 3600 series routers that have OC-3/STM-1 ATM CES network modules.
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<b>Examples</b>	The following is sample output from the <b>show ces</b> command.
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```
Router#show ces 3/0

CURRENT VPD CES CLOCK:Set to ATM
ATM CLOCKING:Clock Source is Line
VPD BASE ADDRESS->(0x3DE00000)
Multi Mode VPD Installed
VIC/WIC PRESENT-> 2 port drop&insert T1 humvee installed
CONTROLLER CLOCKING-> PORT[0]:Clock is Internal
CONTROLLER CLOCKING-> PORT[1]:Clock is Internal
DCU [0]:
  port State:  active      alarm State:normal      Loop Type:  noloop
  Clocking Mode:loopTimed  Data Mode:  crossConnect  Framing Type: d4
  Line Coding:  ami        t1Cas:      off           tsInUse:   0000001C
  VPI/VCI 6/78  CES AAL1 Input cells 210252  CES AAL1 Output cells 210252
  imRestart 0  xcUndfrmslp 2  overflow 0
DCU [1]:
  port State:  inactive    alarm State:normal      Loop Type:  noloop
  Clocking Mode:synchronous  Data Mode:  clearChannel  Framing Type:none
  Line Coding:  ami        t1Cas:      off           tsInUse:   00000000
DCU [2]:
  port State:  inactive    alarm State:normal      Loop Type:  noloop
  Clocking Mode:synchronous  Data Mode:  clearChannel  Framing Type:none
  Line Coding:  ami        t1Cas:      off           tsInUse:   00000000
DCU [3]:
  port State:  inactive    alarm State:normal      Loop Type:  noloop
  Clocking Mode:synchronous  Data Mode:  clearChannel  Framing Type:none
  Line Coding:  ami        t1Cas:      off           tsInUse:   00000000
```

Table 13 describes significant fields shown in the display.

**Table 13** *show ces Field Descriptions*

Field	Description
CURRENT VPD CES CLOCK	Clock being used by the CES function.
ATM CLOCKING	Clock being used by the ATM interface.
VIC/WIC PRESENT	Type of WIC plugged into the Network Module.
CONTROLLER CLOCKING	Clock being used by the T1 controller.
port State	Current state of port. Values are active or inactive.
alarm State	Current state of the CES port.
Clocking Mode	CES circuit clocking mode.
Data Mode	CES circuit data mode.
Framing Type	CES port framing type. Values are d4 and esf.
Line Coding	CES port line code type. Values are ami and b8zs.
t1Cas	Current state of T1 Channel Associated Signalling on CES port. Values are on and off.
tsInUse	Bit mask of timeslots in use.
VPI/VCI	VPI/VCI used by CES circuit.
CES AAL1 Input cells	Number of CES cells received.
CES AAL1 Output cells	Number of CES cells transmitted.
xcUndfrmslp overflow	Structured CES circuit Under Frame Slips. CES circuit overflows.

#### Related Commands

Command	Description
<a href="#">ces</a>	Configures CES on a router port.

# 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.

```
Router # 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 14](#) describes the fields shown in the display.

**Table 14** 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 and 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 15 describes the fields shown in the display.

**Table 15** show ces circuit interface Field Descriptions

Field	Description
circuit Name	Name of the circuit specified with the <b>ces circuit</b> 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 <b>ces pvc</b> interface command.
Port-Type	Type of interface on the ATM-CES port adapter. Values are T1 and E1.
Port-State	Current status of the port. Values are Up and Down.
Port Clocking	Clocking mode used by the interface specified with the <b>ces dsx1 clock</b> interface command. Values are Loop-Timed and Network-Derived Adaptive.
aal1 Clocking Method	AAL1 clocking mode used by the interface specified with the <b>ces aal1 clock</b> interface command. Values are Adaptive, Synchronous Residual Time Stamp (SRTS), and 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 <b>ces circuit</b> 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 <b>ces circuit</b> 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.
idleCircuitdetect	Indicates whether idle circuit detection is enabled (ON) or disabled (OFF).

**Table 15** show ces circuit interface Field Descriptions (continued)

Field	Description
onHookIdleCode	Indicates that the on-hook detection feature is enabled with the <b>ces circuit</b> 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 <b>ces circuit</b> 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
<a href="#">show ces circuit</a>	Displays detailed circuit information for the CBR interface.
<a href="#">show ces status</a>	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**

<b>Syntax Description</b>	<i>slot/port</i>	Slot and port number of the CES interface.
---------------------------	------------------	--

<b>Command Modes</b>	Privileged EXEC
----------------------	-----------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	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  BESSs      0  DMSs      0
Errors in the last 24Hrs:
  PCVs     514  LCVs      0  ESs      0  SESs      1  SEFSs      0
  UASs      0  CSSs      0  LESs      0  BESSs      0  DMSs      0
Input Counters: 0 cells, 0 bytes
Output Counters: 0 cells, 0 bytes
```

Table 16 describes the fields shown in the display.

**Table 16 show ces interface cbr Field Descriptions**

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

**Table 16** show ces interface cbr Field Descriptions (continued)

Field	Description
LineType	Framing used on the interface specified with the <b>ces dsx1 framing</b> interface command. Values (for T1) are ESF and SF; (for E1) E1-CRC-MFCASLT, E1-CRC-MFLT, E1-LT, and E1-MFCASLT.
LineCoding	Line coding used on the interface specified with the <b>ces dsx1 linecode</b> interface command. Values (for T1) are AMI and B8ZS; (for E1) HDB3.
LoopConfig	Indicates whether the interface is in a loop state specified by the <b>ces dsx1 loopback</b> interface command. Values are line loopback, payload loopback, and noloop.
SignalMode	For T1 to use robbed bit signaling or not.
XmitClockSrc	Transmit clock source specified by the <b>ces dsx1 clock</b> interface command. Values are loop-timed or network-derived.
DataFormat	Type of CES services specified by the <b>ces aal1 service</b> interface command. Values are structured or unstructured.
AAL1 Clocking Mode	AAL1 clocking mode used by the interface specified with the <b>ces aal1 clock</b> interface command. Values are adaptive, synchronous residual time stamp (SRTS), or synchronous.
LineLength	Cable length specified by the <b>ces dsx1 lbo</b> 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: <ul style="list-style-type: none"> <li>• Unknown</li> <li>• NoAlarm</li> <li>• RcvFarEndLOF</li> <li>• XmtFarEndLOF</li> <li>• RcvAIS</li> <li>• XmtAIS</li> <li>• LossOfFrame</li> <li>• LossOfSignal</li> <li>• LoopbackState</li> <li>• T16AIS</li> </ul>
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 16** *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.
SEs	Number of Severely Errored Seconds (SEs). A SEs 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.
UAs	Number of Unavailable Seconds (UAs). 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.
LEs	Number of Line Errored Seconds (LEs). LEs is a second in which one or more Line Code Violation errors are detected.
BEs	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
<a href="#">show interface cbr</a>	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 Name	IF Status	Admin Status	Port Type	Channels in 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
	<a href="#">show ces circuit</a>	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.

## Cisco 2600 and 3600 Series

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

## Cisco 7200 Series

```
show controller atm [slot/port]
```

or

```
show controllers atm [slot/imagroup-number]
```

## Cisco 7500 Series (physical port hardware information)

```
show controllers atm [slot/port-adapter/port]
```

## Cisco 7500 Series (IMA group hardware information)

```
show controllers atm [slot/port-adapter/imagroup-number]
```

### Syntax Description

<i>slot</i>	(Optional) ATM slot number.
<b>ima</b>	(Optional) This keyword indicates an IMA group specification rather than a port value for a UNI interface.
<i>group-number</i>	(Optional) Enter an IMA group number from 0 to 3. If you specify the group number, do not insert a space between <b>ima</b> and the number.
<i>port</i>	(Optional) ATM port number.
<i>port-adapter/</i>	(Optional) ATM port adapter.

### 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 on Cisco 2600 and 3600 series routers.
12.0(5)XE	Support for Cisco 7200 and 7500 series routers was added.
12.0(7)XE1	Support for Cisco 7100 series routers was added.
12.1(5)T	Support for Cisco 7100, 7200, and 7500 series routers was integrated into Cisco IOS Release 12.1(5)T.

### Usage Guidelines

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

## Examples

## Cisco 7100 or 7200 Series Example

On Cisco 7100 series or 7200 series routers, the following example displays detailed information about IMA group hardware related information. It includes the configuration of IMA hardware and IMA alarms.

```

Router# show controllers atm 1/ima0

Interface ATM1/ima0 is up
Hardware is IMA PA - DS1 (1Mbps)
Framer is PMC PM7344, SAR is LSI ATMIZER II
Firmware rev:G102, ATMIZER II rev:3
  idb=0x61DE9F10, ds=0x6185C0A0, vc=0x6187D3C0, pa=0x6184AF40
  slot 1, unit 9, subunit 0, fci_type 0x00BA, ticks 701720
  400 rx buffers:size=512, encap=64, trailer=28, magic=4
Curr Stats:
  rx_cell_lost=0, rx_no_buffer=0, rx_crc_10=0
  rx_cell_len=0, rx_no_vcd=0, rx_cell_throttle=0, tx_aci_err=0
Rx Free Ring status:
  base=0x3CFE0040, size=1024, write=320
Rx Compl Ring status:
  base=0x338DCE40, size=2048, read=1275
Tx Ring status:
  base=0x3CFE8040, size=8192, write=700
Tx Compl Ring status:
  base=0x338E0E80, size=2048, read=344
BFD Cache status:
  base=0x61878340, size=5120, read=5107
Rx Cache status:
  base=0x61863D80, size=16, write=11
Tx Shadow status:
  base=0x618641C0, size=8192, read=687, write=700
Control data:
  rx_max_spins=12, max_tx_count=25, tx_count=13
  rx_threshold=267, rx_count=11, tx_threshold=3840
  tx bfd write indx=0x27, rx_pool_info=0x61863E20
Control data base address:
  rx_buf_base = 0x038A15A0          rx_p_base = 0x6185CB40
  rx_pak      = 0x61863AF0          cmd      = 0x6185C320
  device_base = 0x3C800000          ima_pa_stats = 0x038E2FA0
  sdram_base  = 0x3CE00000          pa_cmd_buf = 0x3CFFFC00
  vcd_base[0] = 0x3CE3C100          vcd_base[1] = 0x3CE1C000
  chip_dump   = 0x038E3D7C          dpram_base = 0x3CD80000
  sar_buf_base[0] = 0x3CE4C000      sar_buf_base[1] = 0x3CF22000
  bfd_base[0]  = 0x3CFD4000          bfd_base[1]  = 0x3CFC0000
  acd_base[0]  = 0x3CE88360          acd_base[1]  = 0x3CE5C200
  pci_atm_stats = 0x038E2EC0
ATM1/ima0 is up
  hwgrp number = 1
grp tx up reg= 0x5, grp rx up reg= 0x3, rx dcb reg= 0xD4 0x4, tx links grp reg=
0x3, scci reg= 0x3C, ima id reg= 0x0, group status reg= 0xA2, tx timing reg= 0x
20, tx test reg= 0x21, tx test pattern reg= 0x41, rx test pattern reg= 0x42, icp
cell link info reg= 0xFC, icp cell link info reg= 0xFC, icp cell link info r
eg= 0x0, icp cell link info reg= 0x0, icp cell link info reg= 0x0, icp cell li
nk info reg= 0x0, icp cell link info reg= 0x0, icp cell link info reg= 0x0

```

**Cisco 2600 or 3600 Series Example**

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 atm 0/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**

<b>Command</b>	<b>Description</b>
<a href="#">show controllers atm</a>	Displays information about an IMA group.
<a href="#">show ima interface atm</a>	Provides information about all configured IMA groups or a specific 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 17](#) explains significant fields shown in the display.

**Table 17** show dxi map Field Descriptions

Field	Description
DFA	Data Exchange Interface (DXI) Frame Address, similar to a data-link connection identifier (DLCI) for Frame Relay. The DFA is shown in decimal, hexadecimal, and DXI header format. The router computes this address value from the virtual path identifier (VPI) and virtual channel identifier (VCI) values.
encapsulation	Encapsulation type selected by the <b>dxi pvc</b> command. Displayed values can be <i>SNAP</i> , <i>NLPID</i> , or <i>VC based MUX</i> .
Linktype	Value used only with MUX encapsulation and therefore with only a single network protocol defined for the permanent virtual circuit (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 18](#) describes significant fields shown in the display.

**Table 18** *show dxi pvc Field Descriptions*

Field	Description
DFA	Data Exchange Interface (DXI) Frame Address, similar to a data-link connection identifier (DLCI) for Frame Relay. The DFA is shown in decimal, hexadecimal, and DXI header format. The router computes this address value from the virtual path identifier (VPI) and virtual channel identifier (VCI) values.
PVC STATUS = STATIC	Only static maps are supported. Maps are not created dynamically.
input pkts	Number of packets received.

**Table 18** *show dxi pvc Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
output pkts	Number of packets transmitted.
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.

## Cisco 2600 and 3600 Series

```
show ima interface atm [slot/imagroup-number] [detail]
```

## Cisco 7200 Series

```
show ima interface atm [slot/port] [detail]
```

or

```
show ima interface atm [slot/port-adapter/imagroup-number] [detail]
```

## Cisco 7500 Series

```
show ima interface atm [slot/port-adapter/slot] [detail]
```

or

```
show ima interface atm [slot/port-adapter/imagroup-number] [detail]
```

Syntax Description		
<i>slot</i>	(Optional) ATM slot number.	
<b>ima</b>	(Optional) This keyword indicates an IMA group specification rather than a port value for a UNI interface.	
<i>group-number</i>	(Optional) Enter an IMA group number from 0 to 3. If you specify the group number, do not insert a space between <b>ima</b> and the number.	
<i>port</i>	(Optional) ATM port number.	
<i>port-adapter/</i>	(Optional) ATM port adapter.	
<b>detail</b>	(Optional) To obtain detailed information, use this keyword.	

Command Modes	
	Privileged EXEC

Command History	Release	Modification
	12.0(5)XK	This command was introduced.
	12.0(5)XE	Support for Cisco 7200 and 7500 series routers was added.
	12.0(7)XE1	Support for Cisco 7100 series routers was added.
	12.1(5)T	Support for Cisco 7100, 7200, and 7500 series routers was integrated in Cisco IOS Release 12.1(5)T.

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

**Examples**

On Cisco 7100 or 7200 series routers, the following example displays detailed information about IMA group 0 on ATM interface 2. If you do not enter the **detail** keyword, you do not see the IMA MIB information or the “Detailed Link Information” output.

```
Router# show ima interface atm 5/ima0 detail

ATM5/ima0 is up
  ImaGroupState:NearEnd = operational, FarEnd = operational
  ImaGroupFailureStatus = noFailure
IMA Group Current Configuration:
  ImaGroupMinNumTxLinks = 2    ImaGroupMinNumRxLinks = 2
  ImaGroupDiffDelayMax = 250  ImaGroupNeTxClkMode = common(ctc)
  ImaGroupFrameLength = 128   ImaTestProcStatus = disabled
  ImaGroupTestLink = 0        ImaGroupTestPattern = 0xFF

IMA MIB Information:
  ImaGroupSymmetry = symmetricOperation
  ImaGroupFeTxClkMode = common(ctc)
  ImaGroupRxFrameLength = 128
  ImaGroupTxTimingRefLink = 0    ImaGroupRxTimingRefLink = 0
  ImaGroupTxImaId = 0           ImaGroupRxImaId = 0
  ImaGroupNumTxCfgLinks = 2     ImaGroupNumRxCfgLinks = 2
  ImaGroupNumTxActLinks = 2     ImaGroupNumRxActLinks = 2
  ImaGroupLeastDelayLink = 0    ImaGroupDiffDelayMaxObs = 0

IMA group counters:
  ImaGroupNeNumFailures = 1     ImaGroupFeNumFailures = 2
  ImaGroupUnAvailSecs = 18     ImaGroupRunningSecs = 241

IMA Detailed Link Information:

ATM5/0 is up
  ImaLinkRowStatus = active
  ImaLinkIfIndex = 1           ImaLinkGroupIndex = 47
  ImaLinkState:
    NeTx = active
    NeRx = active
    FeTx = active
    FeRx = active
  ImaLinkFailureStatus:
    NeRx = noFailure
    FeRx = noFailure
  ImaLinkTxLid = 0            ImaLinkRxLid = 0
  ImaLinkRxTestPattern = 64   ImaLinkTestProcStatus = disabled
  ImaLinkRelDelay = 0

IMA Link counters :
  ImaLinkImaViolations = 1
  ImaLinkNeSevErrorSec = 10    ImaLinkFeSevErrorSec = 10
  ImaLinkNeUnavailSec = 7      ImaLinkFeUnavailSec = 8
  ImaLinkNeTxUnusableSec = 17  ImaLinkNeRxUnusableSec = 16
  ImaLinkFeTxUnusableSec = 17  ImaLinkFeRxUnusableSec = 16
  ImaLinkNeTxNumFailures = 0   ImaLinkNeRxNumFailures = 2
  ImaLinkFeTxNumFailures = 1   ImaLinkFeRxNumFailures = 1

ATM5/1 is up
  ImaLinkRowStatus = active
  ImaLinkIfIndex = 2           ImaLinkGroupIndex = 47
  ImaLinkState:
    NeTx = active
    NeRx = active
    FeTx = active
    FeRx = active
  ImaLinkFailureStatus:
    NeRx = noFailure
    FeRx = noFailure
  ImaLinkTxLid = 1            ImaLinkRxLid = 1
```

```

        ImaLinkRxTestPattern    = 64      ImaLinkTestProcStatus = disabled
        ImaLinkRelDelay         = 0
IMA Link counters :
        ImaLinkImaViolations    = 1
        ImaLinkNeSevErroredSec  = 10      ImaLinkFeSevErroredSec = 10
        ImaLinkNeUnavailSec     = 7        ImaLinkFeUnavailSec    = 8
        ImaLinkNeTxUnusableSec  = 16      ImaLinkNeRxUnUsableSec = 16
        ImaLinkFeTxUnusableSec  = 16      ImaLinkFeRxUnusableSec = 16
        ImaLinkNeTxNumFailures  = 0        ImaLinkNeRxNumFailures = 2
        ImaLinkFeTxNumFailures  = 1        ImaLinkFeRxNumFailures = 1

```

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
<a href="#">show controllers atm</a>	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.

```
Router# 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 19](#) describes the fields shown in the display.

**Table 19** *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, and administratively down.
Hardware is...	Hardware type.
MTU	Maximum transmission unit of the interface.

**Table 19** show interface cbr Field Descriptions (continued)

Field	Description
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 <b>bandwidth</b> 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 that the elapsed time is too large to be displayed. 0:00:00 indicates that the counters were cleared more than 2 <sup>31</sup> ms (and less than 2 <sup>32</sup> 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.
broadcasts	Total number of broadcast or multicast packets received by the interface.

**Table 19** 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
<a href="#">show ces interface cbr</a>	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		
	<i>slot/port</i>	(Optional) ATM slot number and port number. Use this format for the following platform configurations: <ul style="list-style-type: none"> <li>• The AIP on Cisco 7500 series routers.</li> <li>• The ATM port adapter, ATM-CES port adapter, or enhanced ATM port adapter on Cisco 7200 series routers.</li> <li>• The 1-port ATM-25 network module on Cisco 2600 and 3600 series routers.</li> </ul>
	<i>slot/port-adapter/port</i>	(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 10.108.97.165, 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 10.1.1.1/24
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 20 describes the fields shown in both the displays.

**Table 20** *show interfaces atm Field Descriptions*

Field	Description
ATM... is {up   down   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.

**Table 20** show interfaces atm Field Descriptions (continued)

Field	Description
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 <b>bandwidth</b> 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 <b>atm txbuff</b> command.
RX buffers	Number of buffers configured with the <b>atm rxbuff</b> 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.
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 that the elapsed time is too large to be displayed. 0:00:00 indicates that the counters were cleared more than 2 <sup>31</sup> ms (and less than 2 <sup>32</sup> ms) ago.
Queueing strategy	First-in, first-out queueing strategy (other queueing strategies you might see are priority-list, custom-list, and weighted fair).

**Table 20** *show interfaces atm Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
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 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 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.

**Table 20** *show interfaces atm Field Descriptions (continued)*

<b>Field</b>	<b>Description</b>
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.

```
Router# 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
<a href="#">network-clock-select (ATM)</a>	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 21](#) 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 21** *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 21** 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	<i>seconds</i>	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
	<a href="#">sscop max-cc</a>	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*

<b>Syntax Description</b>	<i>seconds</i>	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.
---------------------------	----------------	---

<b>Defaults</b>	5 seconds
-----------------	-----------

<b>Command Modes</b>	Interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

<b>Examples</b>	The following example sets the keepalive timer to 15 seconds: <pre>sscop keepalive-timer 15</pre>
-----------------	--

## 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**

<b>Syntax Description</b>	<i>retries</i>	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 from 1 to 6000.
---------------------------	----------------	---

<b>Defaults</b>	10 retries
-----------------	------------

<b>Command Modes</b>	Interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

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

```
sscop max-cc 20
```

<b>Related Commands</b>	<b>Command</b>	<b>Description</b>
	<a href="#">sscop cc-timer</a>	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**

<b>Syntax Description</b>	<i>seconds</i>	Number of seconds that the router waits between transmission of POLL PDUs.
---------------------------	----------------	--

<b>Defaults</b>	100 seconds
-----------------	-------------

<b>Command Modes</b>	Interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

<b>Usage Guidelines</b>	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.
-------------------------	--

<b>Examples</b>	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**

<b>Syntax Description</b>	<i>packets</i>	Number of packets the interface can receive before it must send an acknowledgment to the ATM switch. Valid range is from 1 to 6000.
---------------------------	----------------	---

<b>Defaults</b>	7 packets
-----------------	-----------

<b>Command Modes</b>	Interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

<b>Examples</b>	The following example sets the receiver's window to 10 packets: <pre>sscop rcv-window 10</pre>
-----------------	---

# 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**

<b>Syntax Description</b>	<i>packets</i>	Number of packets the interface can send before it must receive an acknowledgment from the ATM switch. Valid range is from 1 to 6000.
---------------------------	----------------	---

<b>Defaults</b>	7 packets
-----------------	-----------

<b>Command Modes</b>	Interface configuration
----------------------	-------------------------

<b>Command History</b>	<b>Release</b>	<b>Modification</b>
	10.0	This command was introduced.

<b>Examples</b>	<p>The following example sets the transmitter's window to 10 packets:</p> <pre>sscop send-window 10</pre>
-----------------	---

## 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] [ces]
```

```
no svc [name] [nsap address] [ces]
```

### Syntax Description

<i>name</i>	(Optional) The name of the SVC and map. The name can be up to 16 characters long. A name is required when creating passive a CES SVC.
<b>nsap address</b>	(Optional) The destination ATM NSAP address. Must be exactly 40 hexadecimal digits long and in the correct format. See the “Usage Guidelines” section. An NSAP address is required when creating an active CES SVC.
<b>ces</b>	(Optional) Circuit Emulation Service encapsulation. This keyword is available on the OC-3/STM-1 ATM Circuit Emulation Service network module only.

### Defaults

No NSAP address is defined.

### Command Modes

Interface configuration

### Command History

Release	Modification
11.3	This command was introduced.
12.1(2)T	The <b>ces</b> keyword was added to configure CES encapsulation when using the OC-3/STM-1 ATM Circuit Emulation Service network module on Cisco 2600 and Cisco 3600 series platform.
12.1(3)T	This command was modified to allow an SVC to be created without having a specific NSAP address associated with it.

### Usage Guidelines

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

Once you specify a *name* for an SVC, you can reenter the interface-ATM-VC or interface-CES-VC configuration mode by simply entering **svc name**.

You can remove an NSAP address and any associated parameters by entering **no svc name** or **no svc nsap address**.

ACreating an SVC without a specific NSAP address will allow a router to accept calls from any ATM address, and allow multiple VCs to be set up using the same configuration.

Use the **ces** keyword to configure an active or passive CES SVC. An active CES SVC can originate and terminate SVC calls. A passive CES SVC can only terminate calls.

---

**Examples****SVC Example**

The following example creates an SVC called “chicago” on ATM interface 2/0/0:

```
interface atm 2/0/0
  svc chicago
```

**SVC with NSAP Address Example**

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
```

**Active CES SVC Example**

The following example creates an active CES SVC named "ces1":

```
interface atm 1/0
  svc ces1 nsap 47.00.00.000000.0040.0B0A.2501.ABC1.01.01.00 ces
```

**Passive CES SVC Example**

The following example creates a passive CES SVC named "ces2":

```
interface atm 1/0
  svc ces2 ces
```

# 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), PVC range, switched virtual circuit (SVC), virtual circuit (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

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

## 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)  
 PVC range configuration (for an ATM PVC range)  
 PVC-in-range configuration (for an individual PVC within a PVC range)

## 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.
12.1(5)T	This command was made available in PVC range and PVC-in-range configuration modes.

## 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 9,000 kbps, respectively:

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

## Related Commands

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

<b>Command</b>	<b>Description</b>
<b>precedence</b>	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.
<b>protect</b>	Configures a virtual circuit class with protected group or protected virtual circuit status for application to a virtual circuit bundle member.
<b>protocol (ATM)</b>	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).
<b>pvc-bundle</b>	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.
<b>ubr+</b>	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.
<b>vbr-nrt</b>	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), PVC range, switched virtual circuit (SVC), virtual circuit (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

<i>output-pcr</i>	The output peak cell rate (PCR) in kbps.
<i>output-mcr</i>	The output minimum guaranteed cell rate in kbps.
<i>input-pcr</i>	(Optional for SVCs only) The input PCR in kbps. If this value is omitted, the <i>input-pcr</i> will equal the <i>output-pcr</i> .
<i>input-mcr</i>	(Optional for SVCs only) The input minimum guaranteed cell rate in kbps. If this value is omitted, the <i>input-mcr</i> will equal the <i>output-mcr</i> .

### 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)  
 PVC range configuration (for an ATM PVC range)  
 PVC-in-range configuration (for an individual PVC within a PVC range)

### 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.
12.1(5)T	This command was made available in PVC range and PVC-in-range configuration modes.

### 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 that 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 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
<b>abr</b>	Selects ABR QoS and configures output peak cell rate and output minimum guaranteed cell rate for an ATM PVC or virtual circuit class.
<b>broadcast</b>	Configures broadcast packet duplication and transmission for an ATM VC class, PVC, SVC, or VC bundle.
<b>bump</b>	Configures the bumping rules for a virtual circuit class that can be assigned to a virtual circuit bundle.
<b>bundle</b>	Creates a bundle or modifies an existing bundle to enter bundle configuration mode.
<b>class</b>	Assigns a VC-class to an ATM main interface, subinterface, PVC, SVC, VC bundle, or VC bundle member.
<b>encapsulation</b>	Sets the encapsulation method used by the interface.

<b>Command</b>	<b>Description</b>
<b>inarp</b>	Configures the Inverse ARP time period for an ATM PVC, VC class, or VC bundle.
<b>oam-bundle</b>	Enables end-to-end F5 Operation, Administration, and Maintenance (OAM) loopback cell generation and OAM management for a virtual circuit class that can be applied to a virtual circuit bundle.
<b>oam retry</b>	Configures parameters related to OAM management for an ATM PVC, SVC, VC class, or VC bundle.
<b>precedence</b>	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.
<b>protect</b>	Configures a virtual circuit class with protected group or protected virtual circuit status for application to a virtual circuit bundle member.
<b>protocol (ATM)</b>	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).
<b>pvc-bundle</b>	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.
<b>ubr</b>	Configures UBR QoS and specifies the output peak cell rate for an ATM PVC, SVC, VC class, or VC bundle member.
<b>vbr-nrt</b>	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), PVC range, 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

<i>output-pcr</i>	The output PCR, in kbps.
<i>output-scr</i>	The output SCR, in kbps.
<i>output-mbs</i>	The output maximum burst cell size, expressed in number of cells.
<i>input-pcr</i>	(Optional for SVCs only) The input PCR, in kbps.
<i>input-scr</i>	(Optional for SVCs only) The input SCR, in kbps.
<i>input-mbs</i>	(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)  
 PVC range configuration (for an ATM PVC range)  
 PVC-in-range configuration (for an individual PVC within a PVC range)

### 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.
12.1(5)T	This command was made available in PVC range and PVC-in-range configuration modes.

### 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 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 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
<b>abr</b>	Selects ABR QoS and configures output peak cell rate and output minimum guaranteed cell rate for an ATM PVC or virtual circuit class.
<b>broadcast</b>	Configures broadcast packet duplication and transmission for an ATM VC class, PVC, SVC, or VC bundle.
<b>bump</b>	Configures the bumping rules for a virtual circuit class that can be assigned to a virtual circuit bundle.
<b>bundle</b>	Creates a bundle or modifies an existing bundle to enter bundle configuration mode.
<b>class-int</b>	Assigns a VC class to an ATM main interface or subinterface.
<b>class-vc</b>	Assigns a VC class to an ATM PVC, SVC, or VC bundle member.
<b>encapsulation</b>	Sets the encapsulation method used by the interface.
<b>inarp</b>	Configures the Inverse ARP time period for an ATM PVC, VC class, or VC bundle.

<b>Command</b>	<b>Description</b>
<b>oam-bundle</b>	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.
<b>oam retry</b>	Configures parameters related to OAM management for an ATM PVC, SVC, VC class, or VC bundle.
<b>precedence</b>	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.
<b>protect</b>	Configures a virtual circuit class with protected group or protected virtual circuit status for application to a virtual circuit bundle member.
<b>protocol (ATM)</b>	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).
<b>pvc-bundle</b>	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.
<b>ubr</b>	Configures UBR QoS and specifies the output peak cell rate for an ATM PVC, SVC, VC class, or VC bundle member.
<b>ubr+</b>	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.

## 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. To remove a VC class, use the **no** form of this command.

**vc-class atm** *name*

**no vc-class atm** *name*

### Syntax Description

<i>name</i>	Name of your VC class.
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### Defaults

No VC class is defined.

### Command Modes

Global configuration

### Command History

Release	Modification
11.3 T	This command was introduced.

### Usage Guidelines

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
```

