38 Configuring ATM Services

Introduction

Alcatel Omni Switch/Routers, OmniSwitches, and OmniStacks provide several powerful ATM services. ATM Services run over an ATM backbone and provide a variety of mechanisms to switch or route traffic (including Groups and VLANs) over a connection-oriented ATM network:

- Classical IP, ATM Trunking, and Point-to-Point (PTOP) Bridging provide solutions for interconnecting IP-based networks via ATM backbones.
- LANE Client Services provide connectivity between ATM and non-ATM (legacy) networks by emulating the services of a LAN.
- VLAN Clusters provide a loop-free bridging topology over a meshed ATM backbone.

ATM Services

Alcatel ATM access modules (ASMs and FCSMs on the OmniSwitch and ASXs on the Omni Switch/Router) provide support for five (5) ATM services:

- LANE Client (Ethernet and Token Ring) - enables devices on legacy Ethernet- and Token Ring-based LANs to communicate over ATM networks. (See *LANE Client (LEC) Services* on page 38-3.) FDDI services can be supported over either topology by performing appropriate packet translations.
- ATM Trunking - enables Groups and VLANs to be extended across an ATM backbone network. (See *ATM Trunking* on page 38-8.)
- Classical IP Routing (RFC 1577) - provides connectivity between IP-based networks via an ATM backbone network. (See *Classical IP Routing* on page 38-11.)
- Point to Point Bridging - enables two groups to communicate across an ATM network using a single virtual circuit (VC). (See *Point-to-Point Bridging* on page 38-13.)
- VLAN Clusters - enables mesh-interconnection of point-to-point and point-to-multipoint virtual circuits. (See *VLAN Clusters* on page 38-14.)

On the FCSM II, you can also create 1483 Scaling Services, which enable approximately 1000 permanent virtual circuits (PVCs) on a single port. Each virtual circuit (VC) maps to an OmniSwitch group ID. (See *1483 Scaling Services* on page 38-16.)

Except for 1483 scaling services, you can run multiple services of the same or different type on a single port. (If you configure one or more 1483 scaling services on a FCSM II, you will be able to configure one PTOP service on this module but no more additional ATM services of any kind.) Each ATM port (a single base MAC address) can support up to 16 bridging services.

With two ATM ports on an ATM access module (two base MAC addresses), up to 32 bridging services are supported. Bridging services include all ATM services except Classical IP. It is possible to add more base MAC addresses to an ATM module. (You can have up to 8 MAC address per switching module.) If locally-administered MAC support is enabled, the MAC space is doubled, allowing twice as many ATM services (32). For more information on adding MAC addresses, contact Alcatel Internetworking technical support.

All ATM access ports must be associated with at least one ATM service. When a switch containing an ATM access module is booted up without configuration information, or when an ATM access is hot-swapped into a chassis, a default service is automatically created. This default service will be an Ethernet (802.3) LANE Client. You can delete this default service only after you have created another one. If you delete all services and don't create a new one, a PTOP PVC service will automatically be created.

PVC/SVC Support

ATM services use either PVCs, Switched Virtual Circuits (SVCs), or both, depending upon the service. If you are setting up a service that supports both SVCs and PVCs, you will be prompted for different parameters, depending upon which virtual circuit type you chose.

♦ Note ♦

All newly-installed or unconfigured ATM access ports default to SVC mode, ready to support SSCOP and ILMI protocols.

The table below lists what services support which connection types (SVC or PVC):

Service	SVC	PVC
LANE Client	X	
ATM Trunking	X	X
Classical IP	X	X
PTOP Bridging	X	X
VLAN Clusters		X
1483 Scaling (FCSM II Only)		X

♦ Note ♦

The current version of software supports ATM SVCs on up to 10 ATM access ports per switch.

LANE Client (LEC) Services

In a LANE configuration, ATM stations become LECs to allow non-ATM devices on legacy Ethernet- and Token Ring-based LANs to communicate over ATM networks and support existing applications. Such a configuration is called an Emulated LAN, or ELAN. This ability to work with existing networking infrastructure makes it possible to plan for a gradual transition from legacy networks to an ATM-based network.

Because ATM is a connection-oriented technology, and Token Ring and Ethernet LANs are connectionless (i.e., based upon MAC addresses), you need some way of correlating ATM addresses to MAC addresses. This is one of the functions that LANE services provides. The ATM access module supplies a LAN Emulation Client (LEC) function, not LANE Services (LES). The OmniMSS normally provides LES. For information on configuring LANE services, see Chapter 37, "LANE Server Configuration."

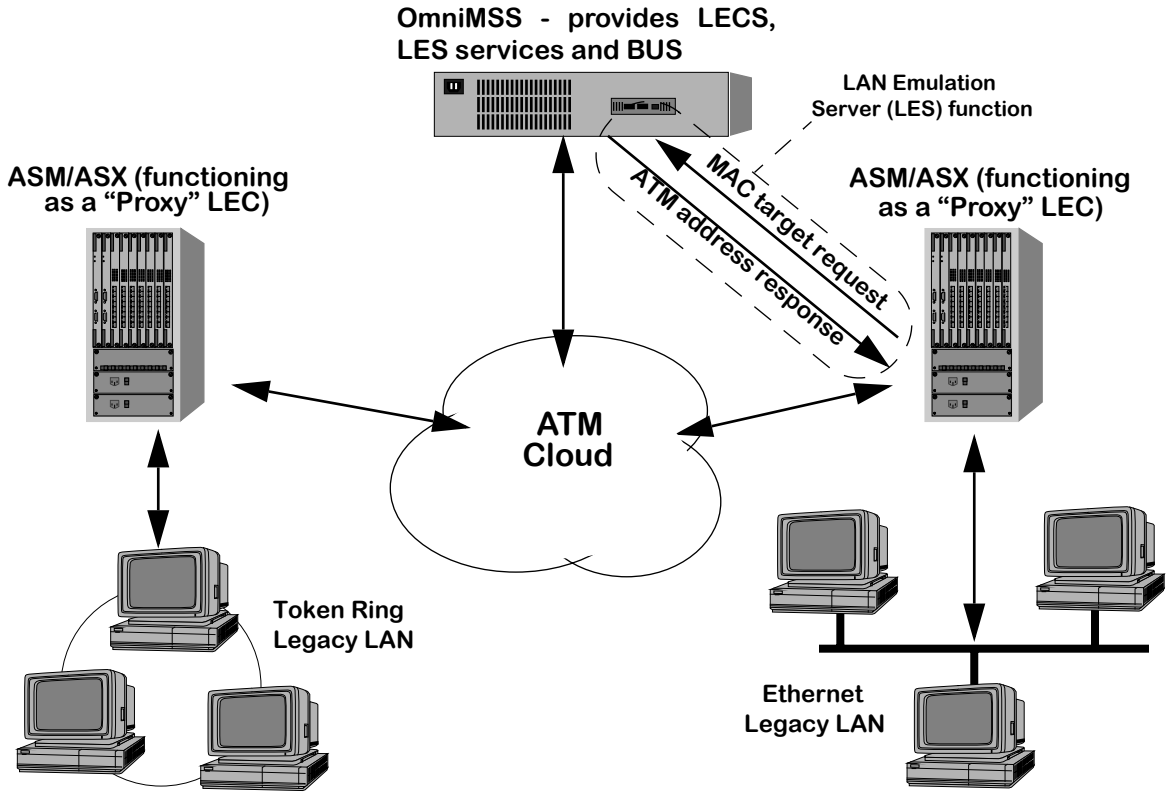
An ELAN consists of the following components:

- LANE Client (LEC): An LEC is responsible for forwarding data and address resolution. This function is provided by an end-station ATM access configured as a LANE Client.
- LAN Emulation Configuration Server (LECS): An LECS assigns clients to particular ELAN services. This function is usually provided by an MSS (Multiprotocol Switching Services)-type device.
- LAN Emulation Server (LES): The LES uses Address Resolution Protocol (ARP) to translate and map MAC addresses to ATM addresses. This service can be provided either by the LES functionality of the MPM/MPX, or an OmniMSS.
- Broadcast and Unknown Server (BUS): The BUS handles initial unicast, multicast and broadcast traffic sent to it by the LEC. This service can be provided either by the BUS functionality of the switch MSM, or an OmniMSS.

The figure on the following page shows the interrelationships of the major components in a typical LANE configuration.

♦ Note ♦

Up to 16 LANE LECs of global MAC address plus 16 LECs of local Administrative MAC address per port and a maximum of 64 LECs per switch has been tested.



LANE Services Architecture

Both the LES and BUS can use either a point-to-multipoint connection or a bidirectional point-to-point connection to communicate with a client (LEC). The LECS uses a point-to-point connection.

Token Ring vs. Ethernet Networks

Token Ring 802.5 LE clients and Ethernet 802.3 clients perform similar functions with the following differences:

- For Token Ring LECs, MAC data frames are transmitted within an 802.5 ELAN type frame using an 802.5 frame format. For Ethernet LECs, MAC data frames are transmitted within an 802.3 ELAN type frame using an 802.3 frame format.
- Token Ring LE_ARPs use a non-canonical MAC address format (i.e., the most significant bit of each address byte is transmitted first), whereas Ethernet LEC clients use a canonical format.
- Source-routed traffic is supported by Token Ring, but not by Ethernet LEC clients.

Source-Routed Traffic

Source-routed traffic is handled by assigning a ring number to the ELAN and adding intelligence to the forwarding decision of the Token Ring LEC. The LEC examines frames for the next hop after the ELAN of which it is a member. With this information, the LEC can forward the frame to the correct next hop LEC. Knowledge of the next hop allows a LEC to avoid forwarding frames to all LECs on the ring—an action that would typically occur in traditional Token Ring networks.

From the perspective of the source routing logic and AutoTracker, a Token Ring LEC is treated like another Token Ring interface. For this reason, source routing commands, such as **sts** (Spanning Tree Statistics) and **stc** (Spanning Tree Configuration), may be used with Token Ring LECs. For more information on using these commands, see Chapter 23, "Configuring Bridging Parameters."

Ethernet and Token Ring LECs cannot be directly connected. However, ELANs to which dissimilar LECs belong can be connected through the switch via translational bridging or routing.

LANE Version 2.0

In Release 4.0 and higher, LANE Version 2.0 is supported on ATM access modules for the Omni Switch/Router and OmniSwitch. This enhanced version of LANE provides support for ATM Forum Multiprotocol Over ATM (MPOA).

LAN Emulated Client Start–Up and Back-Off Timers

Alcatel LECs provide the capability of backing-off if the LEC notices calls being released or when multiple LECs on the same switch are being enabled at the same time (e.g., a cable is disconnected/reconnected). The amount of time (in ticks) and nature (fixed/random) of the back-off period can be controlled using the variables described in the table below.

Timer Name	Description	Range	Default value
atmlec_randomize_throttle	This flag determines if the procedure uses random back off or fixed back off.	0 (fixed back off) or 1 (random back off)	1
atmlec_backoff	The back off percentage in both random and fixed procedures. For example, setting this flag will set the percentage to 500%.	>= 100	300
atmlec_lecs_throttle_ticks	All values for ticks should be a power of two (e.g., 8, 16, 32, 64, etc.). Each tick is 16.66 milliseconds long.	Power of 2 and >=2	32
atmlec_les_throttle_ticks	All values for ticks should be a power of two (e.g., 8, 16, 32, 64, etc.). Each tick is 16.66 milliseconds long.	Power of 2 and >=2	32
atmlec_bus_throttle_ticks	All values for ticks should be a power of two (e.g., 8, 16, 32, 64, etc.). Each tick is 16.66 milliseconds long.	Power of 2 and >=2	32
atmlec_lecs_retry	Number of LECS retries before restarting the LEC	>= 3	7
atmlec_les_retry	Number of LES retries before restarting the LEC	>= 3	7
atmlec_bus_retry	Number of BUS retries before restarting the LEC	>= 3	7

It should be noted that the adjustment of these values needs to be done only if the ATM network (which the LECs are connected) is not capable of processing the total number of calls that could be generated by all the LECs connected to the ATM network. This scenario is most likely to occur under the following two situations:

- During a global restart of all the LECs due to power on or power failure.
- During a global attempt to join an ELAN when a central LANE server resource such as LECs/LES/BUS is disconnected/reconnected or some failure.

Each LEC needs to setup a call to the LEC/LES and BUS before it stops retrying. If any fails, the LEC backs off and continues the process of attempting to join the ELAN. The default values are chosen so that calls to the LECs/LES/BUS are individually throttled by a time period of 16.66 — 266.56 milliseconds.

To modify these default timers, you must edit the **mpm.cmd** or **mpx.cmd** command files. (See Chapter 11, "Managing Files," for more information on editing the command file.). For example, to change the **atmlec_lecs_throttle_ticks** timer on an OmniSwitch to 64, add :

```
atmlec_lecs_throttle_ticks=64
```

to the **mpm.cmd** file.

♦ Note ♦

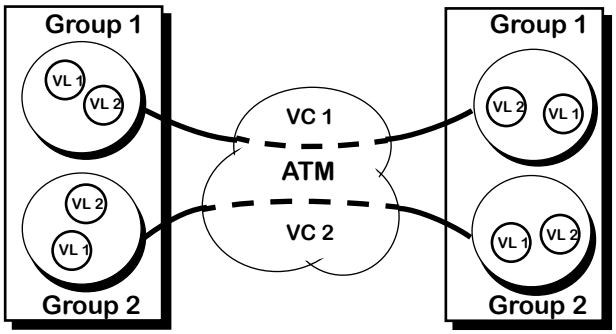
You must add the timers after the **cmInit** line.

ATM Trunking

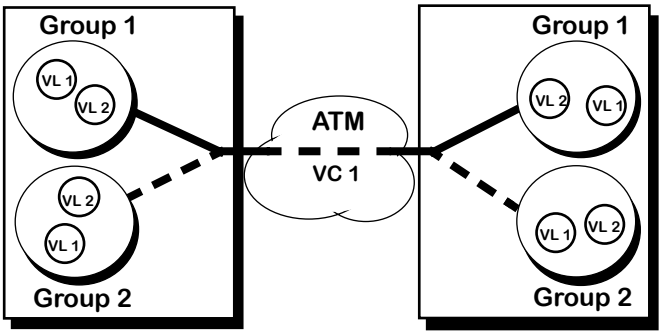
ATM Trunking is a proprietary service that allows Groups and VLANs to be extended across an ATM backbone network. This trunking service operates in a manner similar to Frame Relay Trunking (for more information on Frame Relay Trunking, see the "Trunking" section in Chapter 49, "Managing Frame Relay").

Groups over ATM

An ATM trunk is actually a virtual connection, rather than a physical line. A common implementation is to connect to an external router to provide interconnectibility. This service enables a single ATM access port to send traffic to multiple destinations on the other side of the ATM cloud. A single ATM port can support several trunk port connections to other switches on an ATM network. The switch will bridge between the assigned trunk ports.



With straight group-to-group bridging (no trunking), different groups must use two separate virtual circuits across an ATM interface.



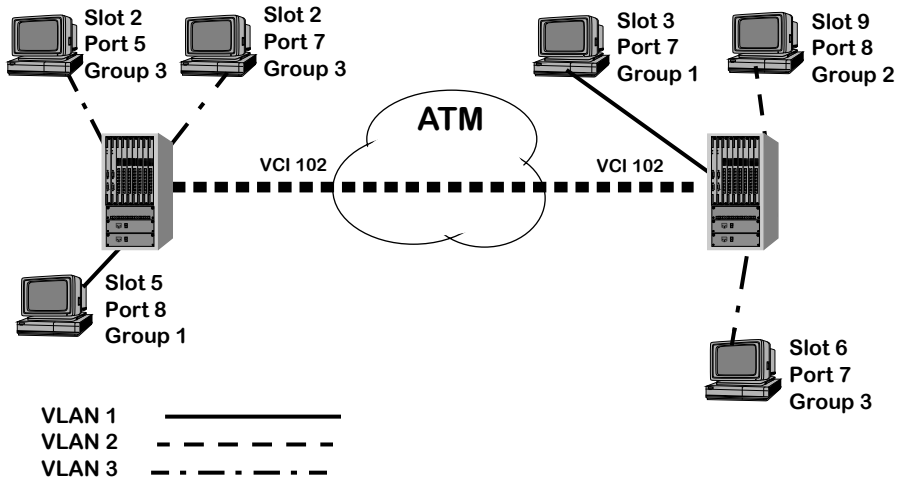
With Trunking, separate Groups can share the same ATM virtual circuit. Group 1 traffic will only be sent to Group 1 and Group 2 traffic will only be sent to Group 2.

VLANs over ATM

An ATM trunking service supports VLANs distributed across an ATM network. Trunk ports encapsulate the bridged frames within a proprietary frame, which includes information needed to reproduce the frame on the opposite end of the trunk and to maintain VLAN separation. Each switch will only participate in those VLANs to which it is assigned.

VLAN Groups can be carried within the encapsulation header. As long as the same VLAN policies are maintained at both ends of the trunk, VLAN segregation may be maintained (via AutoTracker rules; for more details, see Chapter 29, "Managing AutoTracker VLANs"). If a port is configured as a trunk port, it can support groups distributed across multiple switches connected by LANs or ATM networks.

In the example below, members of three different Groups on one side of the ATM cloud are able to communicate with members of their respective Groups on the far end of the ATM cloud (via VCI 102).



Typical VLAN Over ATM Configuration

Physical LAN interfaces are mapped one-to-one to virtual bridge ports. For ATM interfaces, a Trunking service and a Point-to-Point Bridging service could also be run simultaneously on the same VLAN.

Spanning Tree and Trunking

Via a Trunk port, each Group with its own spanning tree can be extended across an ATM network. As with normal Spanning Tree, BPDUs are processed and Spanning Tree dynamically controls the forwarding state.

Translations Across Trunks

The switch sends frames onto the trunk in the same format as the original LAN type. Any necessary translation is performed at the destination switch.

ATM Trunking and Older ATM Access Modules

If you have an older ATM access module (OmniSwitch ASM and FCSM I modules but not Omni Switch/Router ASX modules or OmniSwitch ASM2 and FCSM II modules) and you want to maintain compatibility with switches running Release 3.2 and earlier versions of ATM trunking, add the following to the **mpm.cmd** file:

```
atm_use_old_trunk=1
```

Make sure that it is added prior to the **cmInit** line. (See Chapter 11, "Managing Files," for more information on editing the **mpm.cmd** file.)

Classical IP Routing

In classical IP (CIP) routing, ATM is used to interconnect ATM switches with IP-based ATM devices in a routed environment. ATM networks are configured as Logical IP Subnetworks (LISs). Communication between the LIS-configured ATM networks is accomplished through the routing of Groups. A Group is created for routing CIP only. Each Group consists of a router port and its associated ATM CIP service.

♦ Note on Terminology ♦

You can use SVC and PVCs in CIP routing. Using PVCs in CIP is also known as *routed 1483*.

LLC Header Encapsulation

CIP is routed across ATM networks by the use of routed Protocol Data Units (PDUs) encapsulated in LLC Headers and distributed over ATM Adaptation Layer 5 (AAL 5). For a detailed description of LLC encapsulation, refer to RFC-1483, *"Multiprotocol Encapsulation Over ATM Adaptation Layer 5."*

IP to ATM Address Resolution

For SVC-based CIP services, the following sequence establishes a CIP connection over an ATM network:

1. An IP Host sends a request to the ARP server. IP addresses are resolved to ATM addresses via the Inverse ARP function of the ARP server within the LIS. An MSS-type device usually provides the ARP server function. (For PVC-based CIP services, no ARP server is required; VCs are configured manually via VCI numbers.)

2. The ARP Server returns an ATM address to the requesting station. Once it has the ATM address, the IP Host will establish an SVC.

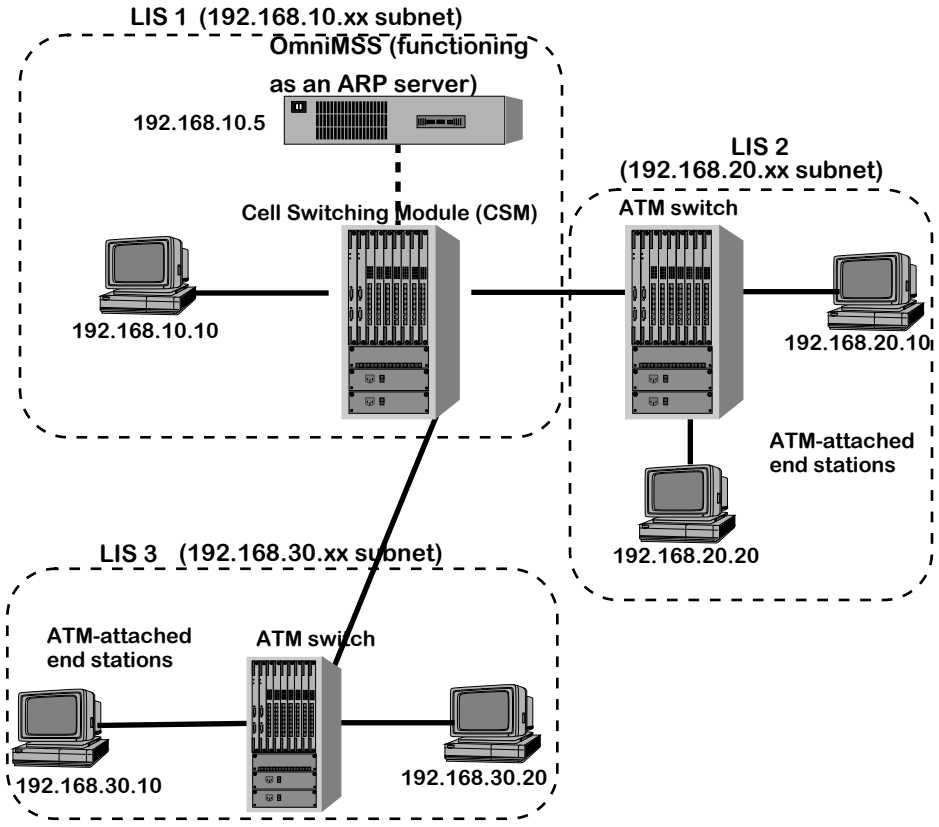
3. Once the setup is completed and confirmed a VCI now exists, and data can be sent.

IP Over ATM Signaling

CIP over ATM uses local ATM call control signaling to initiate and terminate ATM connections. For a complete description of the content and format of ATM signaling, refer to RFC-1577, *ATM Signaling Support for IP over ATM*."

Typical CIP over ATM Configuration

In the following illustration, three ATM networks are configured as Logical IP Subnetworks (LIS1, LIS2, and LIS3). The ATM switches in subnets 20.xx and 30.xx provide IP routing services for their respective endstations.



Classical IP Architecture

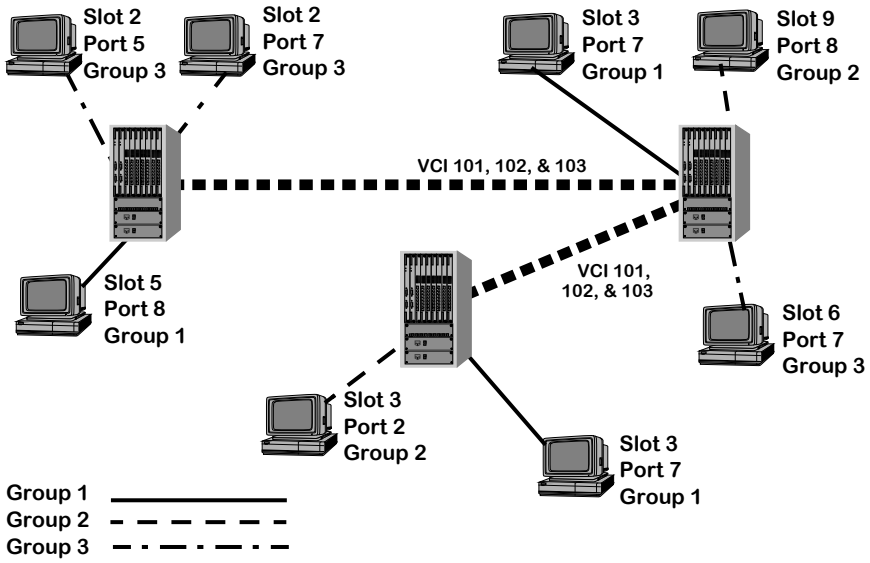
Point-to-Point Bridging

Point to point bridging is a service that enables two Groups to communicate across an ATM network using a single virtual circuit (VC). The VC can be configured to be a Switched Virtual Circuit (SVC) or a Permanent Virtual Circuit (PVC).

Point to point bridging can use either of two types of encapsulation.

- RFC 1483 — LLC encapsulation. RFC 1483 defines two methods for transmitting data over a VC: VC-Based Multiplexing and LLC encapsulation. The OmniSwitch and Omni Switch/Router support only LLC encapsulation. The main advantage of RFC 1483 is its interoperability with other vendors.
- OmniSwitch encapsulation. OmniSwitch encapsulation is a more efficient method, because it uses fewer bytes and word-aligns the frame for transmission.

The following illustration shows how multiple instances of Point-to-Point bridging can be supported over separate VCIs. Three Groups are linked over the ATM backbone in a one-to-one configuration, with Group 1 communicating over VCI 101, Group 2 communicating over VCI 102, and Group 3 communicating over VCI 103.



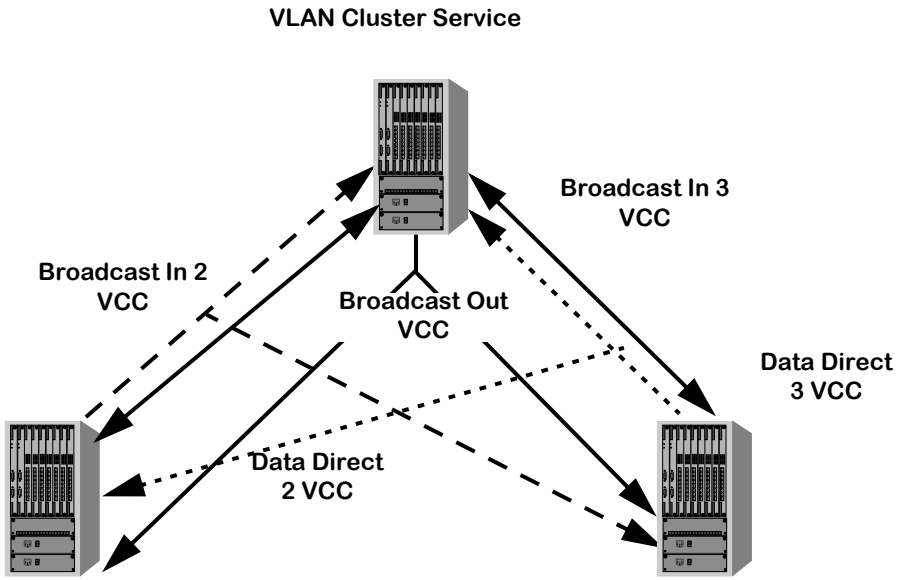
Point-to-Point Bridging

VLAN Clusters

A VLAN cluster (X-LANE) consists of a collection of switches interconnected over an ATM-switched network, in which the switches are mesh-interconnected with point-to-point and (optionally) point-to-multipoint virtual circuits. Up to 33 switches (including the local switch) may be included in a VLAN cluster. The mesh of circuits acts as a single VLAN cloud, appearing as a loop-free bridge topology. This configuration is further optimized through the use of point-to-multipoint virtual circuits to provide a distributed broadcast/unknown capability.

A VLAN cluster implementation is similar to LANE, but has the following advantages:

- It is more scalable.
- It is static (no dynamic VCs)
- The need for PNNI is eliminated
- The packet format remains unchanged; no translations are made
- A number of VLAN Groups can be attached to the same VLAN Cluster
- It is not susceptible to a single point of failure or choke point, as is LANE, in which the LE servers must be distributed to avoid creating a single point of failure.



VLAN Clusters

The VLAN Cluster service can interface to multiple VLAN Cluster services over a single ATM interface. You have the option of configuring one or more Groups to multiplex each set of mesh interconnections. (The number of Groups that can be multiplexed depends upon the encapsulation—Alcatel Trunking or 1483—that you select.) The user also has the option to select one of two methods for forwarding of broadcast, multicast, or unknown unicast destination traffic. These two methods are either to allow all traffic to bi-directionally traverse point-to-point (Data Direct) circuits along with the known unicast traffic, or to allow broadcast, multicast and unknown unicast traffic to use a separate set of point-to-multipoint virtual circuits.

VLAN Clusters can use either of two types of ATM virtual circuits; point-to-point or point-to-multipoint. The following paragraphs describe how these circuits are configured for each method of operation.

Method 1

Method 1 provides both point-to-point virtual circuits (for VLAN forwarding) and point-to-multipoint (for flooding) virtual circuits.

- **Data Direct** circuits (Data Direct 2 and Data Direct 3, above) are point-to-point virtual circuits that forward frames that have known unicast destination addresses with a learned association with the circuit. These circuits are used for two-way frame forwarding between pairs of switches in a full mesh throughout the VLAN Cluster.
- **Broadcast** circuits (Broadcast Out, Broadcast In 2, and Broadcast In 3, above) are point-to-multipoint virtual circuits that are used to forward frames that have a broadcast, multicast, or unknown unicast destination address. These circuits are used for one-way traffic only. One circuit originates at each switch and terminates at all switches in the cluster. This configuration provides a distributed BUS function, in contrast to the centralized BUS server provided with LANE.

Method 2

In Method 2, Data Direct circuits provide the functionality of both types of circuits used in method 1. That is, Data Direct circuits provide point-to-point virtual circuits that handle both VLAN forwarding and flooding traffic.

These types of frames must be sent to each switch that is part of the Cluster. Therefore, a copy of a frame is sent on each Data Direct virtual circuit within the Cluster. This method minimizes the number of connections required to support full connectivity between Alcatel switches while providing a loop-free bridged topology.

VLAN Clusters can be configured to use the same encapsulation as that used by either Alcatel's ATM trunking service or RFC 1483 encapsulation. With VLAN Clusters, Alcatel switches learn the data associated with a remote switch by directly associating the MAC addresses with the circuit.

1483 Scaling Services

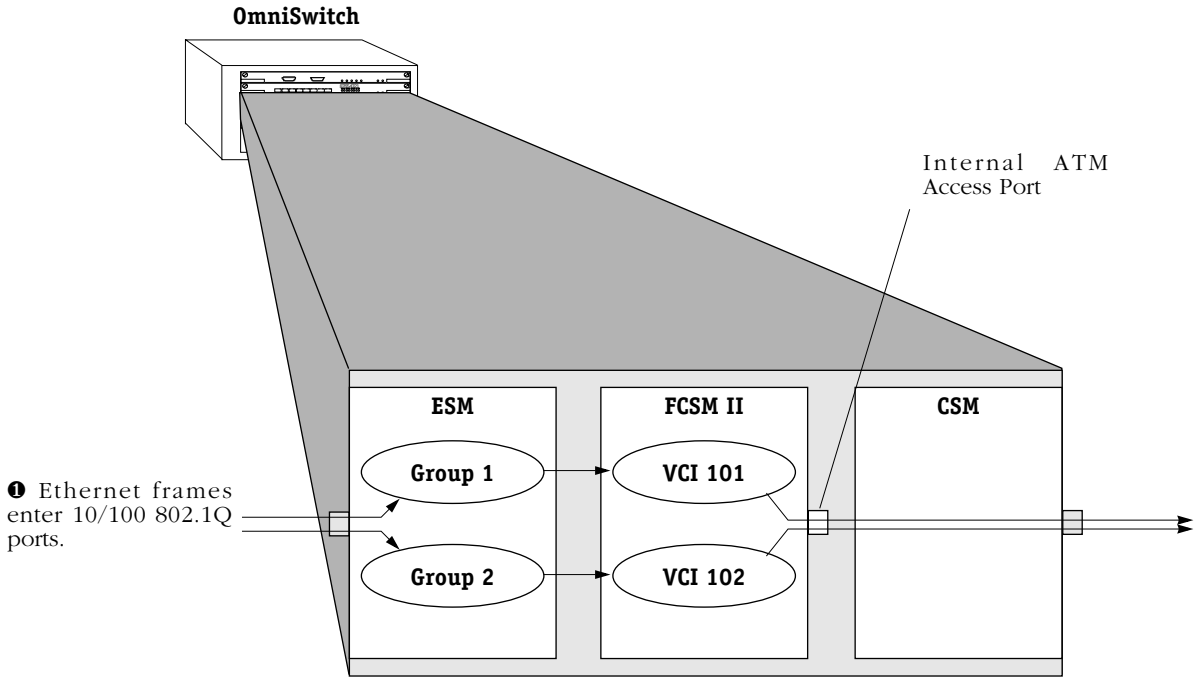
A 1483 scaling service maps OmniSwitch Ethernet groups (including standard IEEE 802.1Q groups) to ATM virtual circuits (VCs) on a one-to-one basis. This is accomplished by mapping the group ID to an ATM Virtual Circuit Identifier (VCI). The use of 1483 data encapsulation ensures interoperability with hardware from other vendors.

♦ Important Note ♦

In the current release, 1483 scaling services are only supported on the FCSM II module. This feature is not supported on other ATM access modules or on Cell Switching Modules (CSMs).

You can create approximately 1000 permanent virtual circuits (PVCs) on a single port in a 1483 scaling service. (The actual number of services is dependent on the total amount of flash memory.) And a 1483 scaling service can coexist on the same port with other ATM services. However, only one (1) 1483 scaling service can be configured on a port. In addition, Switched Virtual Circuits (SVCs) are not supported.

The figure below shows a diagram of a 1483 scaling service. The OmniSwitch is a hybrid LAN/ATM switch with an FCSM II, ESMs, and CSMs. VCI 101 is mapped to 802.1Q Group 1 and VCI 102 is mapped to 802.1Q Group 2. The ESMs map each frame to an 802.1Q group determined by the 802.1Q tag. A 1483 scaling service has been created on an FCSM II, which maps each 802.1Q group to a VC on a one-to-one basis.



❷ Frames are mapped to a particular group determined by the 802.1Q tag.

❸ Each 802.1Q group is associated with a virtual circuit (VC).

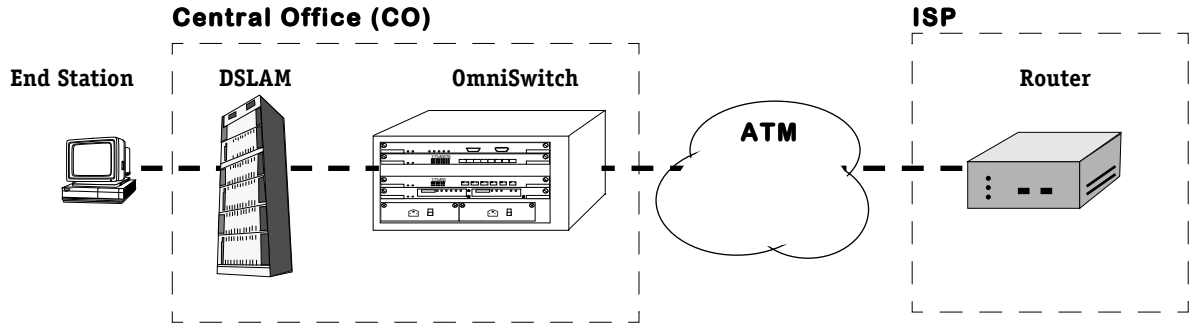
❹ Frames are transmitted to an ATM access port.

❺ Cells are sent by ATM access port to a CSM switch port.

1483 Scaling Service Diagram

The FCSM II uses its SAR functionality to convert the frames into cells and transmits them to the OmniSwitch's cell matrix. CSMs then transmit cells across an ATM network. The whole process is reversed for cells received by the CSMs.

The illustration below shows an application of 1483 scaling service. An end station transmits frames to a Digital Subscriber Line Access Multiplexer (DSLAM) device at a Central Office (CO). The DSLAM tags all frames via 802.1Q and transmits the frames across 10/100 Mbps Ethernet lines to an OmniSwitch.



1483 Scaling Service Application Example

A 1483 scaling service has been created on the OmniSwitch that maps the frames from 802.1Q groups to VCIs according to the 802.1Q group IDs. The OmniSwitch sends the frames across an ATM network to an Internet Service Provider (ISP). The whole process is reversed for cells transmitted back to an end station.

♦ Note ♦

If you configure one or more 1483 scaling services on a FCSM II, you will be able to configure one (1) PTOP service on this module but no more additional ATM services of any kind.

Configuring ATM Services

The five ATM Services (LANE Client, Trunking, Classical IP, Point-to-Point Bridging, and VLAN Clusters) are created and configured primarily with the following commands:

- **cas** - Create a Service. Use this command to create a new ATM service.
- **mas** - Modify a Service. Use this command to modify an existing ATM service.
- **das** - Delete a Service. Use this command to delete an existing ATM service.
- **vas** - View a Service. Use this command to view configuration information for one or all ATM services currently on the switch.

In addition, you can view status and statistical information for LANE Client, Classical IP, and VLAN Clusters services with the **vss** command. The **vss** command is part of the ATM menu, but it is not necessary to actually be in the ATM menu when you invoke the command.

Services Menu

To view the Services menu, type **services** at any prompt, then type **?** to see the list of commands.

```
/Services % ?

  Command      Service Menu
  -------------  ------------------------------------------------------------------------------------------
  cas          Create a service (PTOP bridging/Classical IP/Trunking/LANE
  mas          Modify a service
  das          Delete a service
  vas          View a service


  Main         File         Summary      VLAN         Networking
  Interface    Security     System       Services     Help

Services %
```

Creating a Service

Any of the six ATM services is created by basically the same process, with additional configuration required for some services. Those parameters unique to a particular service are described under the applicable heading later in this chapter. To create an ATM service:

1. Type **cas**, followed by the slot/port for the service. A screen similar to that shown below is displayed:

```
/Services % cas 3/1

  Slot 3 Port 1 Service 1 Configuration

1)   Description (30 chars max)        : LAN Emulation Service 2
2)   Service type  { LANE Client (1),
                     1483 Scaling (2)
                     Trunking (4),
                     Classical IP(5),
                     PTOP Bridging(6),
                     VLAN cluster(7) }  : LAN Emulation
     21) LAN Type { 802.3 (1),
                    802.5 (2) }         : 802.3
     22) Change LANE Cfg { NO (1),
                           YES (2) }    : NO
     23) V2 Capable { Disable (1),
                      Enable (2) }      : Enable
3)   Connection Type { PVC(1),
                       SVC(2) }         : SVC
     30) SEL for the ATM address        : 02
4)   LAN Emulated Groups                : 1
5)   LECS Address (40-char-hex)         : 47007900000000000000000000A03E00000100
6)   Admin Status { disable(1),
                    enable(2) }         : Enable
7)   Bandwidth Group (1-8)              : 1

Enter (option=value/save/cancel) :
```

2. The following fields are common to all ATM service types. Enter values for the remaining fields, as described below:

   a. **1. Description**: Enter a description of this service (up to 30 characters).

   b. **2. Service Type**: Note that ATM services for ports on a newly-installed ATM board default to 802.3 LANE Client (LEC). To change the port to another service, enter one of the following: **2=2** for 1483 scaling service;**2=4** (for Trunking); **2=5** (for Classical IP); **2=6** (for PTOP Bridging); **2=7** (for VLAN Cluster).

   c. **3. Connection Type:** Enter **3=1** for PVC or **3=2** for SVC. For more details, see *PVC/SVC Support* on page 38-2.

   d. **6. Admin Status:** Enter **6=1** to disable the Administrative Status, **6=2** to enable it. Disabling Admin Status has the effect of taking the Port off-line.

   e. **7. Bandwidth Group:** A bandwidth group is a reserved amount of bandwidth on a port. All ASX, ASM2, and FCSM II modules allow you to configure up to eight (8) bandwidth groups. Bandwidth groups are ordered by priority, with bandwidth group 1 having the highest priority and bandwidth group 8 having the lowest. See Chapter 35, "Managing ATM Access Ports," for documentation on configuring and displaying bandwidth group parameters.

Creating a LANE Client Service

To create a LANE Client service:

1. Type **cas** followed by the slot/port for the service. A screen similar to that shown below is displayed:

```
/Services % cas 3/1

   Slot 3 Port 1 Service 2 Configuration

1)   Description (30 chars max)          : PTOP Bridging Service 1
2)   Service type  { LANE Client (1),
                     1483 Scaling (2)
                     Trunking (4),
                     Classical IP(5),
                     PTOP Bridging(6),
                     VLAN cluster(7) }   : PTOP Bridging
     10) Encaps Type { Private (1),
                       RFC1483(2) }      : Private
3)   Connection Type { PVC(1),
                       SVC(2) }          : PVC
4)   PTOP Groups                         : 1
5)   PTOP connection                     : none
6)   Admin Status { disable(1),
                     enable(2) }         : Enable
7)   Bandwidth Group (1-8)               : 1

Enter (option=value/save/cancel) : 2=1
```

2. Note that, if this is a previously-unconfigured port, the service will have already defaulted to an 802.3 LANE Client service. In that case, this step is not necessary. If you are changing from another service (such as PTOP, as shown above) to LANE CLient, enter:

```
2=1 (for LANE Client)
```

♦ Note ♦

The connection type must be SVC to use LANE client service. If the connection type is not already SVC, it will automatically be set to SVC when you select LANE Client as the service type.

This will display the LANE Client menu, shown below. This menu contains default values for the new service you are creating.

```
Slot 3 Port 1 Service 2 Configuration

1)   Description (30 chars max)        : LAN Emulation Service 2
2)   Service type  { LANE Client (1),
                     1483 Scaling (2)
                     Trunking (4),
                     Classical IP(5),
                     PTOP Bridging(6),
                     VLAN cluster(7) }  : LAN Emulation
     21) LAN Type { 802.3 (1),
                    802.5 (2) }         : 802.3
     22) Change LANE Cfg { NO (1),
                           YES (2) }    : NO
     23) V2 Capable { Disable (1),
                      Enable (2) }      : Enable
3)   Connection Type { PVC(1),
                       SVC(2) }         : SVC
     30) SEL for the ATM address        : 02
4)   LAN Emulated Group                 : 1
5)   LECS Address (40-char-hex)         : 47007900000000000000000000A03E00000100
6)   Admin Status { disable(1),
                    enable(2) }         : Enable
7)   Bandwidth Group (1-8)              : 1

Enter (option=value/save/cancel) :
```

3. To change any of the remaining fields, enter the option number, followed by the value you want to change, as described in the paragraphs below:

   a. **21. LAN type**: The type of LAN supported by the LE Client. Enter **21=1** for Ethernet (**802.3**), or **21=2** for Token Ring (**802.5**) clients.

   b. **22. Change LANE Cfg**: Enter Yes (2) if you want to make LANE configuration changes. A submenu appears, allowing you to change your LANE configuration parameters. This submenu is described below.

   c. **23. V2 Capable**: The version of LANE supported by the LE Client. Enter **23=1** for Version 1.0, or **23=2** for Version 2.0. See *LANE Version 2.0* on page 38-5 for more information on LANE Version 2.0.

   d. **3. Connection Type**: Enter **3=2** for SVC. LANE client service supports only SVC. For more details, see *PVC/SVC Support* on page 38-2.

   e. **30. SEL for the ATM address**: For SVCs, enter a hexadecimal selector (SEL) byte from **0** to **ff** for the ATM address. This value *must* be equal to the last byte of both end point addresses of the SVC. (This option will *not* appear unless you select SVC as the connection type in option 3.)

   f. **4. LAN Emulated Groups**: Enter the number of the group(s) that is to be part of the LANE client service.

   g. **5. LECS Address**: Enter the 40 character hex address of the LECS (LAN Emulation Configuration Server). The default is the ATM Forum-defined, well-known LECS address.

4. After you have made all the changes, type **save** to create your configuration. If you need to configure additional LANE Client parameters, continue to the next section.

Setting LANE Client Parameters

LANE configuration parameters are set from a submenu that you access from the **cas** or **mas** command by typing **22=2** (change LANE configuration) while the LANE Client menu is displayed. A screen similar to that shown below will then be displayed.

♦ Note ♦

If you have multiple ELANs configured in your ATM network, you will need to specify an ELAN name (line 16) that this service is to join. The ELAN name must match the name used in the LECS. If the names do not match, this ELAN will be joined with the default ELAN.

```
Enter (option=value/save/cancel) : 22=2
   Slot 3 Port 1 Service 4 LANE Configuration Parameters
1)   Proxy { NO (1), YES (2) }                              : YES
2)   Max Frame Size { 1516 (1), 4544 (2)
                       9234 (3), 18190 (4)
                       1580 (5)                          } : 1516
3)   Use translation options{NO (1), YES (2)               : YES (use Swch menu to set)
4)   Use Fwd Delay time { NO (1), YES (2)                  : NO
5)   Use LE Cfg Server (LECS) { NO (1), YES (2)}           : YES
6)   Use Default LECS Address (LECS) { NO (1), YES (2)}    : YES
7)   Control Time-out (in seconds)                         : 10
8)   Max Unknown Frame Count                               : 10
9)   Max Unknown Frame Time (in seconds)                   : 10
10)  VCC Time-out Period (in minutes)                      : 20
11)  Max Retry Count                                       : 2
12)  Aging Time (in seconds)                               : 300
13)  Expected LE_ARP Resp Time (in seconds)                : 1
14)  Flush Time-out (in seconds)                           : 4
15)  Path Switching Delay (in seconds)                     : 6
16)  ELAN name (32 chars max)                              : ELAN 1
17)  Ring Number (1 - 4095)                                : 0
18)  Bridge Number (1 - 15)                                : 0
19)  Initial Control Timeout (in seconds)                  : 5
20)  Control Timeout Multiplier (2-5)                      : 2

Enter (option=value/save/cancel) :
```

Modify the fields, as applicable, as described below:

1. Proxy: Always set to YES. Instead of registering MAC addresses at initialization time, the switch processes every LE_ARP sent by the LES. It looks up the forwarding table (filtering database) maintained by source learning to check whether the requested MAC address can be reached through another interface on the virtual bridge (same virtual LAN).

2. Max Frame Size: The maximum size of a data frame that the LE client will send over the Multicast Send VCC, or receive on either the Multicast Send VCC or the Multicast Forward VCC. Enter **2=1** for 1516 frames; **2=2** for 4544 frames; **2=3** for 9234 frames; **2=4** for 18190 frames, or **2=5** for 1580 frames.

3. Use translation options: Indicate whether you want to use the frame translations offered through the **switch** menu, which is described in Chapter 24, "Configuring LAN Switch Translations." If you choose **No**, Ethertype frames will be used by default for 802.3 ELANs.

4. Use Fwd Delay time: (Default NO) If used, it is the maximum time (in seconds) that an LE Client will maintain an entry for a non-local MAC address in its MAC table without verification.

5. Use LE Cfg Server: (Default YES). If you set this parameter to NO, you will need to enter a LES Address, as it will be set to all zeroes. You can enter this address after you exit this submenu and return to the **cas** or **mas** menu.

6. Use Default LECS address: (Default YES). If you set this parameter to NO, you will need to enter a LECS Address. You can enter this address after you exit this submenu and return to the **cas** or **mas** menu.

7. Control Time-out: The timeout period (in seconds) used for most request/response control frame interactions. Default 120, Min=10, Max=300.

8. Max Unknown Frame Count: The number of frames as specified in item 9 below.

9. Max Unknown Frame Time: The length of time (in seconds) during which the LE Client will send no more than the number of frames specified in Maximum Unknown Frame Count (see item 8 above) to the BUS for a given unicast LAN Destination. It is also the maximum time the LE Client will wait before it must initiate an ARP frame to resolve that LAN Destination. Default=1, Min=1, Max=60.

10. VCC Time-out Period: The maximum length of time (in minutes) that an LE Client will keep a Data Direct VCC after it has not been used to transmit or receive frames. Used only for SVC Data Direct VCCs. Default=20, No Max or Min.

11. Max Retry Count: Maximum number of times an LE Client may retry an **LE_ARP_REQUEST** for a given frame's LAN Destination. The original request does not count. Default=1, Min=0, Max=2.

12. Aging Time: The maximum time (in seconds) that an LE Client will maintain an entry in its LE_ARP cache. If the address is not resolved within this time period, the entry is deleted. Default=300, Min=10, Max=300.

13. Expected LE_ARP Resp Time: The maximum time (in seconds) the LE Client expects an ARP request/response cycle to take. Used for retries and verifies. Default=1, Min=1, Max=30.

14. Flush Time-out: Length of time (in seconds) an LE Client will wait for an **LE_FLUSH_RESPONSE** after sending an **LE_FLUSH_REQUEST**, after which it will begin taking recovery action. Default=4, Min=1, Max=4.

15. Path Switching Delay: After sending a frame to the BUS, the length of time (in seconds) the LE Client will wait before assuming the frame has either been delivered to the client or has been discarded. Default=6, Min=1, Max=8.

16. ELAN name: Enter a name (up to 32 characters) for the emulated LAN the LEC either wants to join or has last joined.

17. Ring Number: The ring number assigned to the Token Ring for participation in source routing. This field displays only for 802.5 Token Ring clients, not 802.3 Ethernet.

18. Bridge Number: A unique number used to identify the source routing bridge. This field displays only for 802.5 Token Ring clients. If you are configuring an 802.3 Ethernet client, this field will not display.

19. Initial Control Timeout: The timeout period (in seconds) used for timing out most request/response control frame interactions. The valid range is 1 to 10 seconds. (The default is 5 seconds.)

20. Control Timeout Multiplier: The retry multiplier of the control timeout parameter (set in option 19 above). The valid range is 2 to 5. (The default is 2.)

Creating a Trunking Service

To create a trunking service:

1. Type **cas**, followed by the slot/port for the service:

2. From the **cas** menu, enter:

```
2=4
```

   This will display the Trunking menu (shown below).

```
Enter (option=value/save/cancel) : 2=4

   Slot 3 Port 1 Service 2 Configuration

1)  Description (30 chars max)        : Trunking Service 2
2)  Service type { LANE client (1),
                   1483 Scaling (2)
                   Trunking (4),
                   Classical IP(5),
                   PTOP Bridging(6),
                   VLAN cluster(7) }  : Trunking
3)  Connection Type { PVC(1),
                      SVC(2) }        : PVC
    30) SEL for the ATM address       : 02
4)  Trunked Groups                    : 1
5)  Connection                        : none
6)  Admin Status { disable(1),
                   enable(2) }        : Enable
7)  Bandwidth Group (1-8)             : 1
```

3. You must create at least one connection. Type **5=** followed by the connection number, which must be in the range from 1-1023. For example:

```
5=700

Enter (option=value/save/cancel) : 5=700
Conn VCI 700 doesn't exist, VCI 700 will be created w/default values!
```

4. Finish your configuration by changing the default values of any of the remaining fields, if required, as described below:

   a. **3. Connection Type**: Enter **3=1** for PVC or **3=2** for SVC. ATM Trunking supports either connection type. For more details, see *PVC/SVC Support* on page 38-2.

   b. **30. SEL for the ATM address**: For SVCs, enter a hexadecimal selector (SEL) byte from **0** to **ff** for the ATM address. This value *must* be equal to the last byte of both end point addresses of the SVC. (This option will *not* appear unless you select SVC as the connection type in option 3.)

   c. **4. Trunked Groups**: Enter the number of the group that is to be part of the trunking service. The group number must match the group number on the remote switch.

♦ Note ♦

The maximum number supported in ATM trunking is 48, depending on the number of MAC addresses available. Each group will use up one (1) MAC address for the vport. Therefore, if you want to trunk 48 groups, you must have 48 MAC addresses.

d. **5. Connection**: Enter the number of the VCI that is to be part of the trunking service. Use the command **vvc** to view VCI numbers. If the VCI you name doesn't exist, it will be created.

5. After you have made all the changes, type **save** to create your configuration.

Creating a Classical IP Service

To create a Classical IP service:

1. Type **cas** followed by the slot/port for the service. It shows the default service:

```
/Services % cas 3/1

   Slot 3 Port 1 Service 7 Configuration
1)   Description (30 chars max)          : PTOP Bridging Service 7
2)   Service type { LANE client (1),
                    1483 Scaling (2)
                    Trunking (4),
                    Classical IP(5),
                    PTOP Bridging(6),
                    VLAN cluster(7) }    : PTOP Bridging
     10) Encaps Type { Private (1),
                       RFC1483(2) }      : Private
3)   Connection Type { PVC(1),
                       SVC(2) }          : PVC
4)   PTOP Groups                         : 1
5)   PTOP connection                     : none
6)   Admin Status { disable(1),
                    enable(2) }          : Enable
7)   Bandwidth Group (1-8)          : 1
```

2. Enter:

```
2=5
```

♦ Note ♦

The group to which you are assigning Classical IP must be a CIP group. If it is not, the following error message will be displayed:

```
Group is not CIP..
```

You must create a new group with ATM CIP enabled. You cannot modify an existing group to enable CIP. See the **crgp** command in the VLAN menu in Chapter 25, "Managing Groups and Ports."

3. Once the group is defined as a CIP group, you can now run CIP over that group. To do this, you must first assign the service you are creating to the CIP group. For example, to assign the service to Group 4, enter:

```
4=4
```

The following message will be displayed:

```
Warning Group is CIP, change Group (n)?  :
```

Enter 'Yes'

4. You can now create the CIP service. To create the service, enter:

```
Enter (option=value/save/cancel) : 2=5
```

A screen similar to the following will be displayed:

```
 Slot 3 Port 1 Service 7 Configuration
1)  Description (30 chars max)        : Classical IP Service 7
2)  Service type { LANE client (1),
                   1483 Scaling (2)
                   Trunking (4),
                   Classical IP(5),
                   PTOP Bridging(6),
                   VLAN cluster(7) }  : Classical IP
3)  Connection Type { PVC(1),
                      SVC(2) }        : PVC
4)  Classical IP Groups               : 4
5)  Neighboring connections           : none
6)  Admin Status { disable(1),
                   enable(2) }        : Enable
7)  Bandwidth Group (1-8)             : 1

Enter (option=value/save/cancel) :
```

5. Before you can save the CIP service, you must specify a connection using a VCI. If the VCI doesn't exist, the system will create it. For example to specify the connection as VCI 201, enter:

```
5=201
```

A screen similar to the following will be displayed:

```
Conn VCI 201 doesn't exist, VCI 201 will be created w/ default values!

Enter (option=value/save/cancel) :
```

6. Enter **save** to create the service.

7. Enter values for the following fields as described below if any of the defaults do not match your desired configuration:

   a. **3. Connection Type**: Choose PVC or SVC. Classical IP supports both. For more details, see *PVC/SVC Support* on page 38-2.

> **♦ Note ♦**
>
> The CIP service uses PVC as the default connection type. A CIP configuration that uses PVCs is known a routed 1483 configuration. With PVCs you do not need an ARP server. To use SVCs, you will need to supply an ARP server address. For details on how to accomplish this, see *Modifying a Classical IP Service* on page 38-41.

   b. **30. SEL for the ATM address**: For SVCs, enter a hexadecimal selector (SEL) byte from **0** to **ff** for the ATM address. This value *must* be equal to the last byte of both end point addresses of the SVC. (This option will *not* appear unless you select SVC as the connection type in option 3.)

   c. **4. Classical IP Groups**: Enter the group number that is to be part of the Classical IP service.

d. **5. Neighboring connections**: Enter the number of the VCI that is to be part of the Classical IP service. Use the command **vvc** to view VCI numbers. If the VCI you name doesn't exist, it will be created.

8. After you have made all the changes, type save to create the service.

Creating a PTOP Bridging Service

To create a PTOP Bridging service:

1. Type **cas**, followed by the slot/port for the service. It shows the current values for the default service. A screen similar to the following will be displayed:

```
Services % cas 3/1


   Slot 3 Port 1 Service 1 Configuration
1)    Description (30 chars max)        : LANE Client 1
2)    Service type { LANE client (1),
                     1483 Scaling (2)
                     Trunking (4),
                     Classical IP(5),
                     PTOP Bridging(6),
                     VLAN cluster(7) }   : LANE Client
   10) Encaps Type { Private (1),
                       RFC1483(2) }      : Private
3) Connection Type { PVC(1),
                     SVC(2) }            : PVC
4) PTOP Groups: 1
5) PTOP connection: none
6) Admin Status { disable(1),
                  enable(2) }            : Enable
7)    Bandwidth Group (1-8)             : 1

Enter (option=value/save/cancel) :
```

2. To select PTOP Bridging as the service, enter:

```
2=6
```

A screen similar to the following will be displayed:

```
 Slot 3 Port 1 Service 1 Configuration


1)    Description (30 chars max)        : PTOP Bridging Service 1
2)    Service type { LANE client (1),
                     1483 Scaling (2)
                     Trunking (4),
                     Classical IP(5),
                     PTOP Bridging(6),
                     VLAN cluster(7) }   : PTOP Bridging
   10) Encaps Type { Private (1),
                       RFC1483(2) }      : Private
3)    Connection Type { PVC(1),
                        SVC(2) }         : PVC
4)    PTOP Groups                       : 1
5)    PTOP connection                   : none
6)    Admin Status { disable(1),
                     enable(2) }         : Enable
7)    Bandwidth Group (1-8)             : 1

Enter (option=value/save/cancel) :
```

3. A PTOP bridging service must have at least one connection. To create that connection, type **5=** followed by the connection number, which is in the range from 1-1023. For example:

```
Enter (option=value/save/cancel) : 5=2

Conn VCI 2 doesn't exist, VCI 2 will be created w/default values!


Services % cas 3/1
```

4. Finish your configuration by changing the default values of any of the remaining fields, if required, as described below:

   a. **10. Encaps Type**: Select the encapsulation type to use for frames. You can select RFC 1483 encapsulation or the same encapsulation used for Alcatel ATM trunking (i.e., private encapsulation). The 1483 encapsulation enables interoperability with other vendor switches. Enter **10=1** for private encapsulation or **10=2** for 1483 encapsulation.

   b. **3. Connection Type**: Enter **3=1** for PVC or **3=2** for SVC. PTOP Bridging supports either type. For more details, see *PVC/SVC Support* on page 38-2.

   c. **30. SEL for the ATM address**: For SVCs, enter a hexadecimal selector (SEL) byte from **0** to **ff** for the ATM address. This value *must* be equal to the last byte of both end point addresses of the SVC. (This option will *not* appear unless you select SVC as the connection type in option 3.)

   d. **4. PTOP Groups**: Enter the number of the Group that is to be part of the PTOP service.

   e. **5. PTOP Connection**: Enter the number of the VCI that is to be part of the PTOP service. Use the **vvc** command first to determine what VCI numbers have been assigned. If the VCI you name doesn't exist, it will be created.

5. After you have made all the changes, type **save** to create your configuration.

```
Enter (option=value/save/cancel) : save

Creating service, please wait...

Enabling service...
/Services %
```

Creating a VLAN Cluster Service

To create a VLAN cluster service:

1. Type **cas**, followed by the slot/port for the service. It shows the default service (LANE Client):

```
Services % cas 3/1


   Slot 3 Port 1 Service 1 Configuration
1)    Description (30 chars max)        : LANE Client 1
2)    Service type { LANE client (1),
                     1483 Scaling (2)
                     Trunking (4),
                     Classical IP(5),
                     PTOP Bridging(6),
                     VLAN Cluster (7),
                     VLAN cluster(7) }   : LANE Client
   10) Encaps Type { Private (1),
                       RFC1483(2) }      : Private
3) Connection Type { PVC(1),
                       SVC(2) }          : PVC
4) PTOP Groups: 1
5) PTOP connection: none
6) Admin Status { disable(1),
                    enable(2) }          : Enable
7)    Bandwidth Group (1-8)             : 1
```

2. Enter:

```
2=7
```

3. This will display the VLAN Cluster menu, as shown below.

```
   Slot 3 Port 1 Service 1 Configuration
1)    Description (30 chars max)        : VLAN cluster Service 1
2)    Service type { LANE client (1),
                     1483 Scaling (2)
                     Trunking (4),
                     Classical IP(5),
                     PTOP Bridging(6),
                     VLAN cluster(7) }   : VLAN cluster
   21) Number of others in cluster       : 0
   22) Change cluster information
              { NO (1), YES (2) }        : NO
   23) Encapsulation format
   { 1483 (1), Alcatel trunking (2) }    : 2
3)    Connection Type { PVC(1),
                       SVC(2) }          : PVC
4)    Trunked Groups                    : 1
5)    Broadcast Out VC                  : 0
6)    Admin Status { disable(1),
                     enable(2) }         : Enable
7)    Bandwidth Group (1-8)             : 1
Enter (option=value/save/cancel) :
```

4. Finish your configuration by changing the default values of any of the remaining fields, if required, as described below:

   a. **21. Number of others in cluster**: The number of switches included in this VLAN cluster. You may include up to 32 switches in a single cluster. This field must be greater than zero (0).

b. **22. Change cluster info**: Enter Yes (2) if you want to configure Data Direct and Broadcast virtual circuits. A submenu appears, allowing you to configure these virtual circuits. This submenu is described in *Modifying VLAN Cluster Parameters* on page 38-46.

c. **23. Encapsulation format**: Select the encapsulation type to use for frames. You can select RFC 1483 encapsulation or the same encapsulation used for Alcatel ATM trunking. The 1483 encapsulation enables interoperability with other vendor switches, such as the Newbridge 36150 and 36170.

♦ Note ♦

If you select 1483 encapsulation, you can only multiplex a single group across the switches in a cluster. Alcatel trunking encapsulation allows you to multiplex multiple groups across switches in this cluster service. However, Alcatel trunking is not supported on newer ATM access modules (Omni Switch/Router ASX modules or OmniSwitch ASM2 and FCSM II modules).

d. **3. Connection Type**: Enter **3=1** for PVC. VLAN Clusters supports only PVC. For more details, see *PVC/SVC Support* on page 38-2.

e. **4. Trunked/Bridged Groups**: Enter the number of the Group that is to be part of this VLAN cluster service. If you selected 1483 encapsulation in Line 23, this line will read **Bridged Group** and you can specify only one Group. If you select the Alcatel trunking encapsulation in Line 23, this line will read **Trunked Groups** and you can specify multiple Groups.

f. **5. Broadcast Out VC**: Enter the number of the VCI to where broadcast frames will be sent. Use the command **vvc** to see what VCI numbers have already been assigned. If the VCI you name doesn't exist, it will be created.

5. After you have made all the changes, type **save** to create your configuration.

```
Enter (option=value/save/cancel) : save

Creating service, please wait...

Enabling service...
/Services %
```

Creating a 1483 Scaling Service

Follow the steps below to create a 1483 scaling service.

♦ Important Note ♦

In the current release, 1483 scaling services are only supported on the FCSM II module.

1. At the system prompt, enter **cas** followed by the slot/port for the 1483 scaling service. For example, to assign a 1483 scaling service on Port 1 in Slot 2, enter

   ```
   cas 2/1
   ```

   at the system prompt. A screen similar to the following will be displayed.

   ```
     Slot 2 Port 1 Service 2 Configuration
   1)  Description (30 chars max)          : PTOP Bridging Service 2
   2)  Service type { LANE client (1),
                      1483 Scaling (2)
                      Trunking (4),
                      Classical IP(5),
                      PTOP Bridging(6),
                      VLAN cluster(7) }    : PTOP Bridging
     10) Encaps Type { Private (1),
                       RFC1483(2) }        : Private
   3)  Connection Type { PVC(1),
                         SVC(2) }          : PVC
   4)  PTOP Group                          : 1
   5)  PTOP Connection                     : none
   6)  Admin Status { disable(1),
                      enable(2) }          : Enable
   7)  Bandwidth Group (1-8)               : 1

   Enter (option=value/save/cancel) :
   ```

   ♦ Note ♦

   You *must* create the group(s) before you can create a 1483 scaling service. See Chapter 25, "Managing Groups and Ports," for more information on creating groups and see Chapter 20, "802.1Q," for more information on 802.1Q groups.

2. The default service for a port is a PTOP bridging service. To create a 1483 scaling service, enter

   ```
   2=2
   ```

   at the prompt. A screen similar to the following will be displayed.

```
  Slot 2 Port 1 Service 2 Configuration
1)  Description (30 chars max)          : 1483 Scaling Bridge Service 2
2)  Service type { LANE client (1),
                   1483 Scaling (2)
                   Trunking (4),
                   Classical IP(5),
                   PTOP Bridging(6),
                   VLAN cluster(7) }    : 1483 Scaling
   21) Number of entries saved          : 0
   22) Change mapping information
              { NO (1), YES (2) }       : NO
3)  Connection Type { PVC(1),
                      SVC(2) }          : PVC
4)  Primary Group                       : 1
5)  Primary Connection                  : none
6)  Admin Status { disable(1),
                   enable(2) }          : Enable
7)  Bandwidth Group (1-8)               : 1

Enter (option=value/save/cancel) :
```

♦ Note ♦

You can create only one 1483 scaling service per physical port.

3. Finish your configuration by changing the default values of any of the remaining fields, if required, as described below:

a. **21) Number of entries saved**. This read-only field displays the number of mapping entries (which list the group and the VCI it is mapped to) for this 1483 scaling service. (You *cannot* modify this field.) Mapping entries can be displayed and modified by Option 22, which is described below.

b. **22) Change mapping information**. Enter **2** (yes) to enter a submenu for displaying and configuring 1483 mapping parameters. This submenu is described in *Editing and Displaying 1483 Mapping Parameters* on page 38-35.

♦ Note ♦

You *must* set the Virtual Channel Identifier (VCI) with Option 5 (described on the following page) you can enter the 1483 mapping submenu.

c. **4) Primary Group**. Enter the number of the primary group ID.

d. **5) Primary Connection**. Enter the number for the primary VCI.

♦ Note ♦

If you configure one or more 1483 scaling services on a FCSM II, you will be able to configure one (1) PTOP service on this module but no more additional ATM services of any kind.

4. After you have made all the changes, type **save** to create your configuration, or **cancel** to discard your changes and exit. If a 1483 scaling service was successfully created, the following messages will be displayed

   Creating service, please wait...

   Enabling service...

Editing and Displaying 1483 Mapping Parameters

Mapping parameters for 1483 scaling services are displayed and set from a submenu that you access from the **cas** or **mas** command. (See *Modifying a 1483 Scaling Service* on page 38-47 for more information on using the **mas** command on a 1483 scaling service.) While the 1483 scaling services menu is displayed, enter

```
22=2
```

at the prompt. A screen similar to the following will be displayed.

```
Slot 3 port 1 Group ID to Virtual Circuit Mapping

Total number of mapping configured : 1

1) Add Mapping Entry.
2) Add Mapping Entry by Range.
3) Delete Mapping Entry.
4) Delete Mapping Entry by Range.
5) View All Existing Mapping Entries.
6) View Existing Entry by Group ID.
7) View Existing Entry by virtual circuit.
8) Exit.
Enter option :
```

Enter one of the eight (8) options described below. You can display and edit mapping entries, which list the group and the Virtual Circuit Identifier (VCI) it is mapped to. Except for Option 8 (Exit), all options will display a concluding message, similar to the following, indicating how many mapping entries have been configured.

```
Total number of mapping configured : 2
```

♦ Note ♦

If you are logged into the UI and you do not have the write privilege, you can display 1483 scaling mapping entries with the **vgptovc** command, which is described in *Viewing 1483 Scaling Service Parameters* on page 38-62.

1) Add Mapping Entry

Follow the steps below to add a single mapping entry.

a. Enter **1** at the prompt. The following prompt will be displayed.

```
Enter Group number :
```

b. Enter the group to be mapped to. The following prompt will be displayed.

```
Enter Virtual Circuit (1 - 1024) :
```

c. Enter the Virtual Circuit Identifier (VCI) to be mapped to the group you selected in Step b. If the mapping entry was successfully created, messages similar to the following will be displayed.

```
Group 1, vci 101 added to the beginning of the mapping table

Slot 2 port 1 Group ID to Virtual Circuit Mapping

Total number of mapping configured : 2
```

2) Add Mapping Entry by Range

Follow the steps below to add a range of mapping entries.

a. Enter **2** at the prompt. The following prompt will be displayed.

```
Enter Beginning Group number :
```

b. Enter the first group to be mapped to. The following prompt will be displayed.

```
Enter Ending Group number :
```

c. Enter the ending group to be mapped to. The following prompt will be displayed.

```
Enter Beginning Virtual Circuit(1 - 1024) :
```

d. Enter the beginning Virtual Circuit Identifier (VCI) to be mapped to the group you selected in Step b. The following prompt will be displayed.

```
Enter Beginning Virtual Circuit(1 - 1024) :
```

e. Enter the ending VCI to be mapped to the group you selected in Step 2. If the mapping entry was successfully created, messages similar to the following will be displayed.

```
Slot 2 port 1 Group ID to Virtual Circuit Mapping

Total number of mapping configured : 2
```

3) Delete Mapping Entry

Follow the steps below to delete a single mapping entry.

a. Enter **3** at the prompt. The following prompt will be displayed.

```
Enter Group number :
```

b. Enter the group to be deleted from the 1483 scaling service. If the group was successfully deleted from the 1483 scaling service, messages similar to the following will be displayed.

```
Group 1 deleted from the head of the mapping table

Slot 2 port 1 Group ID to Virtual Circuit Mapping

Total number of mapping configured : 1
```

4) Delete Mapping Entry by Range

Follow the steps below to delete a range of mapping entries.

a. Enter **4** at the prompt. The following prompt will be displayed.

```
Enter Beginning Group number :
```

b. Enter the first group to be deleted. The following prompt will be displayed.

```
Enter Ending Group number :
```

c. Enter the ending group to be deleted. If the groups were successfully deleted from the 1483 scaling service, messages similar to the following will be displayed.

```
Slot 2 port 1 Group ID to Virtual Circuit Mapping

Total number of mapping configured : 1
```

♦ Note ♦

Options 5 (**View All Existing Mapping Entries**) through 7 (**View Existing Entry by virtual circuit**) provide a simple display of mapping entries for 1483 scaling services. Only the group and the VCI associated with it are displayed. To display a more complete set of statistics, use the **vgptovc** command, which is described in *Viewing 1483 Scaling Service Parameters* on page 38-62.

5) View all Existing Mapping Entries

To display all mapping entries, enter

```
5
```

at the prompt. A screen similar to the following will be displayed.

```
Slot 2 port 1 Group ID to Virtual Circuit Mapping

Group ID to  Virtual Circuit Mapping table:

Group ID     Virtual Circuit
-------------  ----------------------
  1              55
  2              56

Slot 2 port 1 Group ID to Virtual Circuit Mapping

Total number of mapping configured : 3
```

6) View Existing Mapping Entries by Group ID

Follow the steps below to display mapping entries by group ID.

a. Enter **6** at the prompt. The following prompt will be displayed.

```
Enter Group number :
```

b. Enter the group to be displayed in this 1483 scaling service. A screen similar to the following will be displayed.

```
Slot 2 port 1 Group ID to Virtual Circuit Mapping

Group ID     Virtual Circuit
-------------  ----------------------
  2              56

Slot 2 port 1 Group ID to Virtual Circuit Mapping

Total number of mapping configured : 3
```

7) View Existing Entry by virtual circuit

Follow the steps below to display mapping entries by Virtual Circuit Identifier (VCI).

a. Enter **7** at the prompt. The following prompt will be displayed.

```
Enter Virtual Circuit Identifier :
```

b. Enter the VCI of the virtual circuit to be displayed in this 1483 scaling service. A screen similar to the following will be displayed.

```
Slot 2 port 1 Group ID to Virtual Circuit Mapping

Group ID      Virtual Circuit
-------------  ----------------------
  2                56

Slot 2 port 1 Group ID to Virtual Circuit Mapping

Total number of mapping configured : 3
```

8) Exit

Enter **8** to exit this submenu and return to the main 1483 scaling menu.

Modifying a Service

To modify a service, type **mas**, followed by the slot/port and service number for the service. (The **vas** command shows the service numbers.) It shows the current values. Enter the number of the value you want to change followed by an equal sign and the new value.

Modifying a LANE Client Service

To modify a LANE client service, type **mas** followed by the slot/port and service number for the service. It shows the current values.

```
Services % mas 3/1 4

   Slot 3 Port 1 Service 4 Configuration

1)    Description (30 chars max)          : LANE Client Service 4
2)    LAN Emulated Groups
       21) LAN Type { 802.3 (1),
                      802.5 (2) }          : 802.3
       22) Change LANE Cfg { NO (1),
                             YES (2) }     : NO
       23) V2 Capable { Disable (1),
                        Enable (2) }       : Enable
3)     LECS Address (40-char-hex)          : 47007900000000000000000000000A03E00000100
4)     Admin Status { disable(1),
                      enable(2) }          : Enable
6)     Connection Type { PVC(1),
                         SVC(2) }          : SVC
       60) SEL for the ATM address         : 04
7)     Bandwidth Group (1-8)               : 1

Enter (option=value/save/cancel) :
```

Enter the number of the value you want to change followed by an equal sign and the new value, for example to change the ATM address selector from 04 to 05, enter:

```
60=05

Enter (option=value/save/cancel) : 60=05

   Slot 3 Port 1 Service 4 Configuration

1)    Description (30 chars max)          : LANE Client Service 4
2)    LAN Emulated Groups
       21) LAN Type { 802.3 (1),
                      802.5 (2) }          : 802.3
       22) Change LANE Cfg { NO (1),
                             YES (2) }     : NO
       23) V2 Capable { Disable (1),
                        Enable (2) }       : Enable
3)     LECS Address (40-char-hex)          : 47007900000000000000000000000A03E00000100
4)     Admin Status { disable(1),
                      enable(2) }          : Enable
6)     Connection Type { PVC(1),
                         SVC(2) }          : SVC
       60) SEL for the ATM address         : 05
7)     Bandwidth Group (1-8)               : 1

Enter (option=value/save/cancel) :
```

After you have made all the changes, type **save** to update your configuration.

Modifying a Trunking Service

To modify an ATM trunking service, type **mas** followed by the slot/port and service number for the service. It shows the current values.

```
Services % mas 3/1 2


   Slot 3 Port 1 Service 2 Configuration

1)   Description (30 chars max)      : Trunking Service 2
2)   Trunked Groups                  : 1
3)   Connection                      : 700
4)   Admin Status { disable(1),
                       enable(2) }   : Enable
6)   Connection Type { PVC(1),
                         SVC(2) }    : PVC
7)   Bandwidth Group (1-8)           : 1
```

Enter the number of the value you want to change followed by an equal sign and the new value, for example to change the Connection Type to SVC, type:

```
6=2

Enter (option=value/save/cancel) : 6=2

   Slot 3 Port 1 Service 2 Configuration

1)   Description (30 chars max)      : Trunking Service 2
2)   Trunked Groups                  : 1
3)   Address (40-char-hex)           : none
4)   Admin Status { disable(1),
                       enable(2) }   : Enable
6)   Connection Type { PVC(1),
                         SVC(2) }    : SVC
     60) SEL for the ATM address     : 02
7)   Bandwidth Group (1-8)           : 1

Enter (option=value/save/cancel) :
```

After you have made all the changes, type **save** to update your configuration.

Modifying a Classical IP Service

To modify a Classical IP service, type **mas**, followed by the slot/port and service number for the service. It shows the current values. Enter the number of the value you want to change followed by an equal sign and the new value. For example, to change the connection type to SVC, type:

```
6=2


Enter (option=value/save/cancel) : 6=2

   Slot 3 Port 1 Service 7 Configuration
1)    Description (30 chars max)        : Classical IP Service 7
2)    Classical IP Groups               : 4
3)    Neighboring addresses (40 chr-hex): none
4)    Admin Status { disable(1),
                     enable(2) }        : Enable
6) Connection Type { PVC(1),
                     SVC(2) }           : SVC
   60) SEL for the ATM address          : 07

7)    Bandwidth Group (1-8)             : 1
```

Note that when you create an SVC connection, there are several other parameters you can change. The parameters below are the same as those used in the **cva** command, which can be found in the ATM menu. The **cva** command is described in Chapter 35, "Configuring ATM Access Modules." The example below shows the service being modified with a new neighboring address:

```
Enter (option=value/save/cancel) : 3=111111111122222222233333333334444444444

Address '111111111122222222223333333333444444444':
   doesn't exist, this address will be created with default values!

Connection Address 111111111122222222223333333333444444444 Configuration

1)   Description (30 chars max)                          : Address 3
2)   Requested Tx QoS Class { Unspecified }              : Unspecified
3)   Requested TX Best Effort { False (1), True (2) }    : True
4)   Requested Tx Traffic Descriptor { NoCLPNoSCR(2) }   : NoCLP NoSCR
     20) Peak Cell Rate (cells/sec) for CLP=0+1          : 353208
5)   Requested Rx QoS Class { Unspecified }              : Unspecified
6)   Requested RX Best Effort { False (1), True (2) }    : True
7)   Requested Rx Traffic Descriptor { NoCLPNoSCR(2) }   : NoCLP NoSCR
     30) Peak Cell Rate (cells/sec) for CLP=0+1          : 353208
14)  Tx Maximum Frame Size                               : 4520
15)  Rx Maximum Frame Size                               : 4520
```

After you have made all changes, type **save** to update your configuration.

```
Enter (option=value/save/cancel) : save
Creating address connection, please wait...

   Slot 3 Port 1 Service 7 Configuration

1)   Description (30 chars max)          : Classical IP Service 7
2)   Classical IP Groups                 : 4
3)   Neighboring addresses (40 chr-hex) : 111111111122222222233333333334444444444
4)   Admin Status { disable(1),
                    enable(2) }          : Enable
6)   Connection Type { PVC(1),
                       SVC(2) }          : SVC
     60)  SEL for the ATM address        : 07
7)   Bandwidth Group (1-8)          : 1

Enter (option=value/save/cancel) : save
Modifying service, please wait...

Resetting service, please wait...
Enabling service...
/Services %
```

Adding Static ARP Entries for CIP

To add static entries to the CIP ARP table, use the **aat** command (found in the ATM menu):

1. Enter **aat,** followed by the slot number, a slash (/), the port number and the CIP service number where you want to create this static entry. For example, to add an ARP entry for service number 4 on the first port in slot 3, you would enter:

   aat 3/1 4

   Make sure the service number you indicate is an ATM CIP service. You cannot use the **aat** command with any service type but CIP. See *Modifying a Classical IP Service* on page 38-41 for more information on creating a CIP service.

2. The following prompt displays:

   Enter <IP addr> <vci> :

   Enter the IP address and the Virtual Circuit Identifier (VCI) for the CIP ARP entry you want to add. Press **<Enter>** when complete.

3. A message displays indicating the CIP ARP entry was added to the table:

   Static entry successfully added to the CIP ARP table.

   The screen again prompts you to enter more ARP entries.

   Enter <IP addr> <vci> :

4. Continue entering ARP entries until you are complete. Press **<Enter>** at the **Enter <IP addr> <vci> :** prompt when you are done adding entries, and you will be exited from the **aat** command.

Modifying a PTOP Bridging Service

To modify a PTOP Bridging service:

1. Type **mas** followed by the slot/port and service number for the service. The current values are displayed.

```
/Services % mas 3/1 1

   Slot 3 Port 1 Service 1 Configuration

1)   Description (30 chars max)        : PTOP Bridging Service 1
2)   PTOP Groups                       : 1
3)   PTOP connection                   : 2
4)   Admin Status { disable(1),
                    enable(2) }        : Enable
5)   Encaps Type { Private (1),
                  RFC1483(2) }         : Private
6)   Connection Type { PVC(1),
                       SVC(2) }        : PVC
7)   Bandwidth Group (1-8)              : 1

Enter (option=value/save/cancel) : 5=2
```

2. Enter the number of the value you want to change followed by an equal sign and the new value, for example to change the encapsulation type to RFC1483, type:

```
5=2
```

   The modified configuration is now displayed.

```
   Slot 3 Port 1 Service 1 Configuration

1)   Description (30 chars max)        : PTOP Bridging Service 1
2)   PTOP Groups                       : 1
3)   PTOP connection                   : 2
4)   Admin Status { disable(1),
                    enable(2) }        : Enable
5)   Encaps Type { Private (1),
                  RFC1483(2) }         : RFC 1483
6)   Connection Type { PVC(1),
                       SVC(2) }        : PVC
7)   Bandwidth Group (1-8)              : 1
```

3. After you have made all the changes, type **save** to update your configuration.

```
Enter (option=value/save/cancel) : save
Modifying service, please wait...

Resetting service, please wait...
Enabling service...

/Services %
```

Modifying a VLAN Cluster Service

To modify a VLAN Cluster service:

1. Type **mas**, followed by the slot/port and service number for the service. The current values are displayed.

```
Services % mas 3/1
   Slot 3 Port 1 Service 1 Configuration

1)    Description (30 chars max)          : VLAN cluster Service 1
2)    Trunked Groups                      : 1
      21) Number of others in cluster     : 2
      22) Change cluster information
                  { NO (1), YES (2) }     : NO
      23) Encapsulation format
      { 1483 (1), Alcatel trunking (2) }  : 2
3)    Broadcast Out VC                    : 0
4)    Admin Status { disable(1),
                        enable(2) }       : Enable
6)    Connection Type { PVC(1),
                          SVC(2) }        : PVC
7)    Bandwidth Group (1-8)               : 1
```

2. Enter the number of the value you want to change followed by an equal sign and the new value. For example to change the description, type:

```
1=Cluster VLAN 1
```

   A screen similar to the following will be displayed:

```
 Slot 3 Port 1 Service 1 Configuration

1)    Description (30 chars max)          : Cluster VLAN 1
2)    Trunked Groups                      : 1
      21) Number of others in cluster     : 2
      22) Change cluster information
                  { NO (1), YES (2) }     : NO
      23) Encapsulation format
          { 1483 (1), Alcatel trunking (2) } : 2
3) Broadcast Out VC: 0
4) Admin Status { disable(1),
                    enable(2) }           : Enable
6) Connection Type { PVC(1),
                        SVC(2) }          : PVC
7)    Bandwidth Group (1-8)               : 1

Enter (option=value/save/cancel) : save
```

3. After you have made all the changes, type **save** to update your configuration.

Modifying VLAN Cluster Parameters

Before you modify VLAN Cluster parameters, make sure you have created at least one VLAN Cluster. To modify VLAN Cluster parameters:

1. Access the VLAN Cluster Service submenu by typing **22=2** from either the **cas** or **mas** menu. A screen similar to that shown below is displayed.

```
Slot 3 Port 1 Service 5 VLAN Cluster Configuration

                                          Data-Direct     Broadcast
Member          Description               VCC             IN VC
Index           (a)                       (b)             (c)
-------------------------------------------------------------------------------
1       CLUSTERNUMBER1                    201             202
2       CLUSTERNUMBER2                    299             301
```

   The following fields are fields that you can configure:

   a. **Description**: A 30 character description.

   b. **Data-Direct VCC**: Enter the circuit number to be used as a point-to-point virtual circuit for a known unicast destination.

   c. **Broadcast IN VC**: Enter the circuit number to be used as a one-way (in) broadcast virtual circuit.

2. To change one of parameters, type the index number of the VLAN Cluster, followed by a, b, or c, depending upon which value you want to change. For example, to change the description for index 1, type:

```
1a=CLUSTER1
```

   The updated configuration will be displayed, as shown below:

```
 Slot 3 Port 1 Service 5 VLAN Cluster Configuration

                                          Data-Direct     Broadcast
Member          Description               VCC             IN VC
Index           (a)                       (b)             (c)
-------------------------------------------------------------------------------
1       CLUSTER1                          201             202
2       CLUSTERNUMBER2                    299             601

save|cancel|?    : save
```

3. After you have made all the changes, type **save** to update your configuration.

Modifying a 1483 Scaling Service

To modify a 1483 scaling service, follow the steps bellow.

1. Type **mas** followed by the slot/port and service number of the service. A screen similar to the following will be displayed.

```
Slot 2 Port 1 Service 2 Configuration

1)   Description (30 chars max)        : 1483 Scaling Bridge Service 2
2)   Primary Group                     : 1
     21) Number of entries saved       : 1
     22) Change mapping information
               { NO (1), YES (2) }     : NO
3)   Primary connection                : 2
4)   Admin Status { disable(1),
                    enable(2) }        : Enable
6)   Connection Type { PVC(1),
                       SVC(2) }        : PVC
7)   Bandwidth Group (1-8)             : 1

Enter (option=value/save/cancel) :
```

2. Enter the number of the value you want to change followed by an equal sign and the new value. For example to change the bandwidth group to Group No. 2, enter

```
7=2
```

   A screen similar to the following will be displayed:

```
Slot 2 Port 1 Service 2 Configuration

1)   Description (30 chars max)        : 1483 Scaling Bridge Service 2
2)   Primary Group                     : 1
     21) Number of entries saved       : 1
     22) Change mapping information
               { NO (1), YES (2) }     : NO
3)   Primary connection                : 2
4)   Admin Status { disable(1),
                    enable(2) }        : Enable
6)   Connection Type { PVC(1),
                       SVC(2) }        : PVC
7)   Bandwidth Group (1-8)             : 2

Enter (option=value/save/cancel) :
```

3. To change the mapping characteristics, enter

```
22=2
```

   at the prompt. A screen similar to the following will be displayed:

```
Slot 2 port 1 Group ID to Virtual Circuit Mapping

Total number of mapping configured : 1

1) Add Mapping Entry.
2) Add Mapping Entry by Range.
3) Delete Mapping Entry.
4) Delete Mapping Entry by Range.
5) View All Existing Mapping Entries.
6) View Existing Entry by Group ID.
7) View Existing Entry by virtual circuit.
8) Exit.
Enter option :
```

Enter one of the eight (8) options, which are described in *Editing and Displaying 1483 Mapping Parameters* on page 38-35.

4. After you have made all the changes, enter **save** to update your configuration or **cancel** to discard your changes and exit the **mas** command.

Deleting a Service

To delete a service, type **das** followed by the slot/port and service number for the service.

```
das 3/1 4
```

A screen similar to that shown below is displayed.

```
/Services % das 3/1 4

                                ATM Services

Slot  Serv Port  Service Num  Service Description                 Type
====  ====       ====         ============================       =========
3     1          1            PTOP Bridging Service 1            PTOP Priv
3     1          2            Trunking Service 2                 Trunking
3     1          3            LANE Client Service 3              802.3 LEC
3     1          4            LANE Client Service 4              802.5 LEC

                                ATM Services

                    Serv  VC   Oper
Slot  Port          Num   Typ  Status    SEL  Groups      Conn VCI's/Addresses
====  ====          ====  ===  ========  ===  ==========  ====================
3     1             1     PVC  Disabled  N/A  1           100
3     1             2     PVC  Disabled  N/A  1           500
3     1             3     SVC  Initial   03   1
3     1             4     SVC  Initial   04   1


Remove ATM Slot 3 Port 1 Service 4 (n)? : y
```

Type **y**, then press **<Enter>** to delete the service, or type **n** or **<Enter>** to keep the service. If you choose to delete the service, the following messages will be displayed.

```
Removing ATM Slot 3 Port 1 Service 4, please wait...


ATM Slot 3 Port 1 Service 4 removed

/Services %
```

Deleting Static ATM ARP Entries for CIP

To delete static entries from the CIP ARP table using the **dat** command:

1. Enter **dat**, followed by the slot number, a slash (/), the port number and the CIP service number where you want to delete this static entry. For example, to delete an ARP entry for service number 4 on the first port in slot 3, you would enter:

   aat 3/1 4

   Make sure the service number you indicate is an ATM CIP service. You cannot use the **dat** command with any service type but CIP. See *Modifying a Classical IP Service* on page 38-41 for more information on CIP services.

2. The following prompt displays:

   Enter <IP addr> <vci> :

   Enter the IP address and the Virtual Circuit Identifier (VCI) for the CIP ARP entry you want to delete. Press **<Enter>** when complete.

3. A message displays indicating the CIP ARP entry was deleted from the table:

   Static entry successfully deleted from the CIP ARP table.

   The previous prompt re-displays for you to enter more ARP entries.

   Enter <IP addr> <vci> :

Continue entering ARP entries until you are completed. Press <Enter> at the **Enter <IP addr> <vci> :** prompt when you have finished deleting entries. You will be exited from the **dat** command.

Viewing ATM Access Port Services

Before configuring a service, you can view the current ATM service configurations to determine whether you need to add a new service or modify an existing one. To view all ATM services on a switch, type **vas**. If you include the slot/port number, it displays only the services related to that port. The display includes the service number. You will need the service number to modify or delete a service.

```
/Services % vas 3/1

                         ATM Services

                 Serv    Service                          Service
Slot  Port       Num     Description                        Type
====  ====       ====    ==============================  ========
3     1          1       PTOP Bridging Service 1         PTOP Priv
3     1          2       Trunking Service 2              Trunking
3     1          3       LAN Emulation Service 3         802.3 LEC
3     1          4       LAN Emulation Service 4         802.5 LEC

                         ATM Services

                 Serv  VC   Oper
Slot  Port       Num   Typ  Status    SEL     Groups       Conn VCI's/Addresses
====  ====       ====  ===  ==========     ===========  ====================
3     1          1     PVC  Disabled  N/A     1            100
3     1          2     PVC  Disabled  N/A     1            500
3     1          3     SVC  Initial   03      1
3     1          4     SVC  Initial   04      1
```

The fields displayed by the **vas** command are described below.

Slot. The slot number of the ATM service.

Port. The port number of the ATM service.

Serv Num. The ATM service number.

Service Description. A text description of the service. This can ben entered with the **cas** command or modified with the **mas** command.

Service Type. The Service Type column for Ethernet LECs reads **802.3 LEC**. For Token Ring LECs, this column reads **802.5 LEC**. All ports on a newly-installed switch will automatically configure as 802.3 LECs.

VC Type. The virtual circuit type, which can be PVC (Permanent Virtual Circuit) or SVC (Switched Virtual Circuit).

Oper Status. The operational status of the ATM service, which can be **Enabled**, **Disabled**, or **Initial** (in an initializing mode).

SEL. The last byte of the ATM address.

Groups. The VLAN group number(s) associated with this service.

Conn VCI's. The Virtual Circuit Identifier (VCI) number used in this service.

Addresses. The MAC address(es) mapped to this service.

Viewing General Service Statistics on a Port

To view general statistics for LANE Client services on a port, type in **vss** followed by the slot/port. For example, if you wanted to obtain statistics information for port 1 on the board in slot 3, you would enter:

```
vss 3/1
```

This command displays a screen similar to the following:

```
Statistics for slot 3 interface 1

Srvc  Pkts In  Pkts Out  UPkts In  UPkts Out  BcPkts In  BcPkts Out  McPkts In  McPkts Out
====  ======  =======  =======  =========  =========  ==========  ========  =========
1     331     40974    1007     1005       1324       39969       4000      4010
2     300     40001    990      988        1300       30000       3000      3001
3     200     30000    1000     1001       1205       40000       2654      2700
```

Pkts In. The total number of packets received at this Emulated LAN.

Pkts Out. The total number of packets sent from this Emulated LAN.

UPkts In: The number of packets received in a unicast format at this Emulated LAN. Unicast packets are transmitted to one recipient.

UPkts Out: The number of packets sent in a unicast format from this Emulated LAN.

BcPkts In. The number of packets received in a broadcast format at this Emulated LAN. Broadcast packets are transmitted to all recipients in the network.

BcPkts Out. The number of packets sent in a broadcast format from this Emulated LAN.

McPkts In: The number of packets received in a multicast format at this Emulated LAN. Multicast packets are transmitted to a select group of recipients.

McPkts Out: The number of packets sent in a multicast format from this Emulated LAN.

Viewing Service Statistics for a LANE Client

To view statistics for a specific LANE Client service, type in **vss** (found in the ATM menu), followed by the slot/port and the service number for the service. For example, if you wanted to obtain statistics information for slot 3, port 1, service 1, you would enter:

```
vss 3/1 1
```

This command displays a screen similar to the following:

```
Status/Statistics for slot 3 interface 1 Service 1

Service: LAN Emulation Service 1

LEC status      : Initial
ELAN Name       : default
ELAN Type       : 802.3
LEC ID          : 0
LES version     : ATM Forum 1.0
LES address     : 3903488001bc900001017838c00020da8436a0c1 (learned)
BUS address     : 3903488001bc900001017838c00020da8436a0c1
LECS address    : 47007900000000000000000000a03e00000100 (ILMI/well-known LECS addr)

BUS
MC Forward VPC/VCC  :    0/ 0    MC Send VPC/VCC      : 0/ 0
Echo suppress       :       0

LES
Control Direct VPC/VCC  :  0/ 47    Cntl Distribute VPC/VCC :  0: 48
Control Frames Sent     : 19367     Control Frames Rcvd     : 19415
LE arps Sent            :    13     LE arps Received        :    23

LECS
Configuration VPC/VCC  :    0/ 0
Packets Sent           :       0    Packet Received         :       0

STATISTICS
Packets  In          :     331    Unicast Packets In      :  1007
Packets  Out         :   40974    Unicast Packets Out     :  1005
Broadcast Pkts In    :    1324    Multicast Packets In    :  4000
Broadcast Pkts Out   :   39969    Multicast Packets Out   :  4010
```

Token Ring LECs display two additional fields after the **LEC ID** field. These additional fields are **Bridge Num** and **Ring Num**.

The following section describes the fields displayed by VSS for a specific LANE Client service (the fields displayed by VSS for general Lane Client services are also included under the heading labeled **STATISTICS**.

Service: The name of the service.

LEC Status: The current status of the LEC. The LEC may be either **Operational** or **Non-Operational**.

ELAN Name: The name of the Emulated LAN.

ELAN Type: The Emulated LAN type. Possible options are 802.3 (Ethernet) or 802.5 (Token Ring).

LEC ID: The LAN emulation client identifier.

Bridge Num: A unique number used to identify the source routing bridge. This field displays only for 802.5 Token Ring clients.

Ring Num: The ring number assigned to the Token Ring for participation in source routing. This field displays only for 802.5 Token Ring clients.

LES version: The version of the LAN Emulation Server.

LES address: The address of the LAN Emulation Server.

BUS address: The address of the Broadcast Unknown Server.

LECS address: The address of the LAN Emulation Configuration Server.

BUS:

MC Forward VPC/VCC: VPC contains the VPI that identifies the VPC where it connects to this LE Client. VCC contains the VCI that identifies the VCC where it connects to this LE Client.

MC Send VPC/VCC: VPC contains the VPI that identifies the VPC where it connects to this LE Client. VCC contains the VCI that identifies the VCC where it connects to this LE Client.

Echo Suppress: The number of packets received with the client's LEC-ID.

LES:

Control Direct VPC/VCC: VPC contains the VPI that identifies the VPC where it connects to this LE Client. VCC contains the VCI that identifies the VCC where it connects to this LE Client.

Cntl Distribute VPC/VCC: VPC contains the VPI that identifies the VPC where it connects to this LE Client. VCC contains the VCI that identifies the VCC where it connects to this LE Client.

Cntl Frames Sent: The number of control frames sent to the LES.

Cntl Frames Rcvd: The number of control frames received from the LES.

LE arps Sent: The number of LE ARPs sent to the LES.

LE arps Received: The number of LE ARPs received from the LES.

LECS:

Configuration VPC/VCC: VPC contains the VPI that identifies the VPC where it connects to this LE Client. VCC contains the VCI that identifies the VCC where it connects to this LE Client.

Packets Sent: The number of packets sent to the LAN Emulation Configuration Server.

Packets Received: The number of packets received from the LAN Emulation Configuration Server.

STATISTICS :

Packets In: The total number of packets received at this Emulated LAN.

Packets Out: The total number of packets sent from this Emulated LAN.

Broadcast Pkts In: The number of packets received in a broadcast format at this Emulated LAN. Broadcast packets are transmitted to all recipients in the network.

Broadcast Pkts Out: The number of packets sent in a broadcast format from this Emulated LAN.

Unicast Packets In: The number of packets received in a unicast format at this Emulated LAN. Unicast packets are transmitted to one recipient.

Unicast Packets Out: The number of packets sent in a unicast format from this Emulated LAN.

Multicast Packets In: The number of packets received in a multicast format at this Emulated LAN. Multicast packets are transmitted to a select group of recipients.

Multicast Packets Out: The number of packets sent in a multicast format from this Emulated LAN.

Viewing the LANE LE_ARP Table

This command is useful for showing MAC to ATM identifier mappings. To view the ATM LANE LE_ARP table, type in **vlat**, followed by the slot/port and service number for the service.

```
Interface/ATM % vlat 5/1 2


        ATM LANE LE_ARP Table

MAC Address        ATM Network Prefix          ESI          SEL  VPI/VCI  Age  Remote
===========  ======================== ============== ==  ======= ==== =======
0020da0210e0 39000000000000000000000 0020da0210e0 00  101/153  5    True
0020da021210 39000000000000000000000 0020da021210 00  181/106  59   True
0020da05f674 39000000000000000000000 0020da05f674 00  166/138  226  False
0020da220053 39000000000000000000000 0020da220053 00  185/146  233  True
0020da0204b0 39000000000000000000000 0020da0204b0 00  169/108  257  True

Interface/ATM %
```

MAC Address: The MAC addresses of learned stations attached to the emulated LAN.

ATM Network Prefix: The first 13 bytes of the ATM address.

ESI: End station identifier, consisting of the next 6 bytes of the ATM address.

SEL: The last byte of the ATM address.

VPI: Virtual Path Identifier.

VCI: Virtual Circuit Identifier.

Age: The time since the MAC has been seen by this service.

Remotes: This field will read **True** if the MAC was learned via the LE-ARP response from the ATM end station. This field will read **False** if the LE-ARP response came from the LES (i.e., the entry was already in the LES database).

Token Ring 802.5 LECs contain an additional display that maps source route descriptor to ATM address. The following table is an example of the **vlat** command issued for a Token Ring LEC:

```
/Services % vlat 3/1 2

   ATM LANE LE_ARP Table

MAC Address  ATM Network Prefix                    ESI          SEL VPI/VCI  Age Remote
===========  ====================================  ==  ===========  ===== 
0020af0133d3 47000580ffe1000000f215120b0020da6fc640 02    0/ 47   191   True
0020af0136af 47000580ffe1000000f215120b0020da6d2b4002      0/ 48   95    True


   ATM 802.5 LANE (SR RD to ATM_ADDRESS) LE_ARP Table

SR RD  ATM Network Prefix          ESI          SEL    VPI/VCI  Age Remote
=====  ======================  ========================================
00e1  47000580ffe1000000f21512  0b0020da6d2760  02     0/ 41   161  False
00a1  47000580ffe1000000f21512  0b0020da6d2760  02     0/ 41   267  False
```

The top table is the same as a standard **vlat** display. The second table shows how the source route descriptor maps to the ATM address. The **SR RD** field displays the source route descriptor, consisting of 4 hex nibbles. The left three (3) nibbles represent the ring number; the rightmost nibble represents the bridge number.

Viewing ATM Service Statistics for Classical IP

To view ATM service statistics, type in **vss** and press **<Enter>**. A screen similar to the following will be displayed:

```
/Interface/ATM % vss 5/1 3

   Status/Statistics for slot 5 interface 1 Service 3

Service       : Classical IP Service 3

>From IP:

   Packets Received   = 0    Broadcast Packets Received= 0    Packets Discarded = 0

>To IP:

   Packets Sent       = 0

>From net:

   Packets Received   = 0    Packets Discarded       = 0
   ARP Response       = 0    Inv ARP Request         = 0
   Inv ARP Response   = 0    Inv ARP Request         = 0    Negative ARP Reply = 0


>To net:

   Packets Received   = 0    Packets Discarded       = 0
   ARP Response       = 0    Inv ARP Request         = 0
   Inv ARP Response   = 0    Inv ARP Request         = 0    Negative ARP Reply =0

/Interface/ATM %
```

Service: The name of the service.

From IP:

Packets Received: The number of packets received via IP.

Broadcast Packets Received: The number of broadcast packets received via IP.

Packets discarded: The number of packets received via IP that were discarded.

To IP:

Packets sent: The number of packets sent via IP.

From net:

Packets received: The number of packets received via the network.

Packets discarded: The number of packets received via the network that were discarded.

ARP response: The number of ARP response packets received via the network.

ARP request: The number of ARP request packets received via the network.

Inv ARP response: The number of inverse ARP response packets received via the network.

Inv ARP request: The number of inverse ARP request packets received via the network.

Negative ARP Reply: The number of inverse ARP negative acknowledgment packets received via the network.

To net:

Packets sent: The number of packets sent via the network.

Packets discarded: The number of packets sent via the network that were discarded.

ARP response: The number of ARP response packets sent via the network.

ARP request: The number of ARP request packets sent via the network.

Inv ARP response: The number of inverse ARP response packets sent via the network.

Inv ARP request: The number of inverse ARP request packets sent via the network.

ARP Acknowledge: The number of inverse ARP negative acknowledgment packets sent via the network.

Viewing the CIP ARP Table

To view the ARP table for CIP, enter **vat** followed by **<Enter>**. This table (similar to that shown below) lists the IP addresses that are mapped to an ATM address.

```
Interface/ATM % vat

  IP Address                ATM Address                                  VCI  TTL  Type
============== ========================================== ==== ===== =======
186.207.183.15  470000580ffe10000000f215120b00204815120b 0    15    static
186.207.182.11  470000580ffe10000000f215120b0020416ad721 16   11    dynamic

/Interface/ATM %
```

IP Address: The IP Address for this entry.

ATM Address: The ATM address to which the IP address maps.

VCI: The Virtual Circuit Identifier for this ATM address.

TTL: The Time To Live counter for this address entry expressed in minutes. The entry ages out after the number of minutes indicated in this column.

Type: Indicates whether this address was entered by the user (static) or created by the system (dynamic).

Viewing Service Statistics for VLAN Clusters

To view VLAN Cluster service statistics, type in **vss** and press **<Enter>**. A screen similar to the following will be displayed:

```
/Interface/ATM % vss 3/1 5
   Status/Statistics for slot 3 interface 1 Service 5

Number of additional members in this cluster is    : 2
Broadcast Out VCI used on this cluster             : 500

Additional Member : 1
---------------------------------------
Description          : CLUSTERNUMBER1
Data-Direct VCI      : 201
Broadcast In VCI     : 202

Additional Member : 2
---------------------------------------
Description          : CLUSTERNUMBER2
Data-Direct VCI      : 299
Broadcast In VCI     : 301

/Interface/ATM %
```

Description: The description for the additional VLAN Cluster member.

Data-Direct VCI: The circuit number of the point-to-point virtual circuit for a known unicast destination.

Broadcast In VCI: The circuit number of the one-way (in) broadcast virtual circuit.

Viewing 1483 Scaling Service Parameters

You can display 1483 scaling parameters with the **vgptovc** command. The syntax for this command is as follows:

vgptovc slot/port service_ID [beginning_group_ID/ ending_group_ID]

The **beginning_group_ID/ ending_group_ID** option will display a range of groups on a 1483 scaling service. If you do not use this option, then all groups will be displayed.

♦ Note ♦

If you have logged into the UI with the write privilege and you just want to display a simple list of the mapping entries for a 1483 scaling service, you can use the 1483 mapping submenu. This submenu is accessed through either the **cas** or **mas** commands and is described in *Editing and Displaying 1483 Mapping Parameters* on page 38-35.

For example, to display all groups on 1483 scaling service No. 2 on Slot 2, Port 1, enter

vgptovc 2/1 2

at the system prompt. A screen similar to the following will be displayed.

Slot 2 Port 1 Service 2 Group ID to Virtual Circuit Mapping

Group Id to VC Mapping and Connection Statistics

Slot /Port	Group	VCI	Rx SDUs	Tx SDUs	Rx Cells	Tx Cells	Rx Octets	Tx Octets
2/1	1	100	0	0	0	0	0	0
2/1	2	101	0	0	0	0	0	0
2/1	3	104	0	0	0	0	0	0

END OF MAPPING TABLE

The fields displayed by the **vgptovc** command are described below.

Slot. The slot number for this group.

Port. The port number for this group.

VCI. The Virtual Circuit Identifier (VCI) for this group.

Rx SDUs. The number of Service Data Units (SDUs), or frames, received on this group.

Tx SDUs. The number of SDUs (frames) transmitted on this group.

Rx Cells. The number of cells received on this group. The value is derived from the **Rx SDUs** statistic. Once an SDU (frame) is received on the port, the cells in the SDU are counted and added to this statistic.

Tx Cells. The number of cells transmitted on this group. The value is derived from the **Tx SDUs** statistic. Once an SDU (frame) is transmitted on the port, the cells in the SDU are counted and added to this statistic.

Rx Octets. The number of octets (bytes) received in the form of SDUs (frames) on this group.

Tx Octets. The number of octets (bytes) transmitted in the form of SDUs (frames) on this group.