



Configuring ILMI

This chapter describes the Integrated Local Management Interface (ILMI) protocol implementation within the ATM switch router.



Note

This chapter provides advanced configuration instructions for the Catalyst 8540 MSR, Catalyst 8510 MSR, and LightStream 1010 ATM switch routers. For a description of the role of ILMI, refer to the *Guide to ATM Technology*. For complete descriptions of the commands mentioned in this chapter, refer to the *ATM Switch Router Command Reference* publication.

This chapter includes the following sections:

- Configuring the Global ILMI System on page 9-1
- Configuring an ILMI Interface on page 9-5

Configuring the Global ILMI System

This section describes configuring the ATM address and the LAN emulation configuration server (LECS) address, and displaying the ILMI configuration for the entire switch.

Configuring the ATM Address

The ATM switch router ships with an autoconfigured ATM address. Private Network-Network Interface (PNNI) uses the autoconfigured address to construct a flat PNNI topology. ILMI uses the first 13 bytes of this address as the switch prefix that it registers with end systems. For a description of the autoconfigured ATM address and considerations when assigning a new address, refer to the *Guide to ATM Technology*.



Note

The most important rule in the addressing scheme is to maintain the uniqueness of the address across very large networks.

Multiple addresses can be configured for a single switch, and this configuration can be used during ATM address migration. ILMI registers end systems with multiple prefixes during this period until an old address is removed. PNNI automatically summarizes all of the switch's prefixes in its reachable address advertisement.

To configure a new ATM address that replaces the previous ATM address, see the “Configuring the ATM Address” section on page 10-5.

Configuring Global ILMI Access Filters

The ILMI access filter feature allows you to permit or deny certain ILMI registered addresses.



Note

If you want to allow certain addresses to be registered via ILMI, but restrict those addressees from being advertised through PNNI, use the PNNI suppressed summary address feature instead. For additional information, see the “Configuring Redistribution” section on page 10-45, or the **summary-address** command in the *ATM Switch Router Command Reference* publication.

If end systems are allowed to register arbitrary addresses via ILMI, including addresses that do not match the ILMI prefixes used on the interface, a security hole may be opened. The ILMI access filter feature closes the security hole by permitting or denying ILMI registration of different classes of addresses.

The ILMI access filter allows you to configure two levels of access filters:

- Globally, to configure the switch default access filter
- At the interface level, to set the per-interface specific override

In either level, you can choose among the following options:

- Permit all—Any ATM end system address (AESAs) registered by an attached end system is permitted.
- Permit prefix match—Only AESAs that match an ILMI prefix used on the interface are permitted.
- Permit prefix match and well-known group addresses—AESAs that match an ILMI prefix used on the interface as well as the well-known group addresses, including the old LECS address (47.0079.0000.0000.0000.0000.00A0.3E00.0001.00) and any address matching the ATM Forum address prefix for well-known address (C5.0079.0000.0000.0000.0000.00A0.3E) are permitted.
- Permit prefix match and all group addresses—All group addresses, including the well-known group addresses, as well as AESAs that match the ILMI prefix(es) used on the interface are permitted.

To configure global ILMI access filters, use the following global configuration command:

Command	Purpose
atm ilmi default-access permit { all matching-prefix [all-groups wellknown-groups] }	Configures an ILMI default access filter.



Note

If you use Cisco's Simple Server Redundancy Protocol (SSRP) for LAN emulation in this network, ILMI registration of well-known group addresses should be permitted. This allows the active LECS to register the well-known LECS address with the switch. Either the **permit all**, **permit matching-prefix wellknown-groups**, or **permit matching-prefix all-groups** option should be configured.

Example

The following example configures the global default access filter for ILMI address registration to allow well-known group addresses and addresses with matching prefixes:

```
Switch(config)# atm ilmi default-access permit matching-prefix wellknown-groups
```

See the command **atm address-registration** in the *ATM Switch Router Command Reference* publication for information on configuration of the individual interface access filter override.

Display the ILMI Access Filter Configuration

To display the global ILMI default access configuration, use the following privileged EXEC command:

Command	Purpose
more system:running-config	Displays the global ILMI default access configuration.

Example

The following example displays the ILMI filter configuration for all ATM interfaces:

```
Switch# more system:running-config
Building configuration...
Current configuration:

<information deleted>

!
atm abr-mode efci
atm lecs-address-default 47.0091.8100.0000.0040.0b0a.1281.0040.0b4e.d023.00 1
atm lecs-address-default 47.0091.8100.0000.0040.0b0a.1281.0040.0b07.4023.00 2
→ atm ilmi default-access permit matching-prefix
atm address 47.0091.8100.0000.0040.0b0a.2b81.0040.0b0a.2b81.00
atm address 47.0091.8100.0000.0060.3e5a.7901.0060.3e5a.7901.00
atm router pnni
    statistics call
    node 1 level 56 lowest
```

Configuring the LANE Configuration Server Address

To configure the LECS address advertised to the directly connected end nodes, use the following global configuration command:

Command	Purpose
atm lecs-address <i>lecs-address</i> [<i>sequence-number</i>]	Configures the switch LECS address.

The *sequence-number* provides the position of this address in the ordered LECS address table.

Example

The following example shows how to configure the LECS ATM address:

```
Switch(config)# atm lecs-address 47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.9030.01
```

Displaying the ILMI Global Configuration

To display the switch ILMI configuration, use the following EXEC commands:

Command	Purpose
show atm addresses	Displays the ATM addresses.
show atm ilmi-configuration	Displays the ILMI configuration.
show atm ilmi-status	Displays the ILMI status.

Examples

The following example shows the ATM address and the LECS address:

```
Switch# show atm addresses

Switch Address(es):
 47.009181000000000000CA79E01.00000CA79E01.00 active
 88.888888880000000000000000.000000005151.00

Soft VC Address(es):
 47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.0000.00 ATM0
 47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.8000.00 ATM3/0/0
 47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.8010.00 ATM3/0/1
 47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.8020.00 ATM3/0/2
 47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.8030.00 ATM3/0/3
 47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.9000.00 ATM3/1/0
 47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.9010.00 ATM3/1/1
 47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.9020.00 ATM3/1/2
 47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.9030.00 ATM3/1/3

ILMI Switch Prefix(es):
 47.0091.8100.0000.0000.0ca7.9e01
 88.8888.8888.0000.0000.0000.0000

ILMI Configured Interface Prefix(es):

LECS Address(es):
 47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.9030.01
 47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.9030.02
```



Note

Since the 12.0(1a)W5(5b) release of the system software, addressing the interface on the route processor (CPU) has changed. The ATM interface is now called atm0, and the Ethernet interface is now called ethernet0. Old formats (atm 2/0/0 and ethernet 2/0/0) are still supported.

The following example shows the ILMI configuration:

```
Switch# show atm ilmi-configuration

Switch ATM Address (s) :
1122334455667788990112233445566778899000
LECS Address (s):
1122334455667788990011223344556677889900
ARP Server Address (s):
1122334455667788990011223344556677889900
```

The following example shows the ILMI status:

```
Switch# show atm ilmi-status

Interface : ATM0 Interface Type : Local
Configured Prefix(s) :
47.0091.8100.0000.0003.c386.b301

Interface : ATM3/0/0 Interface Type : Private NNI
ILMI VCC : (0, 16) ILMI Keepalive : Disabled
Configured Prefix(s) :
47.0091.8100.0000.0003.c386.b301

Interface : ATM3/0/3 Interface Type : Private NNI
ILMI VCC : (0, 16) ILMI Keepalive : Disabled
Configured Prefix(s) :
47.0091.8100.0000.0003.c386.b301
```

Configuring an ILMI Interface

To configure an ILMI interface, perform the following tasks, beginning in global configuration mode:

	Command	Purpose
Step 1	Switch(config)# interface atm <i>card/subcard/port[.vpt#]</i> Switch(config-if)#	Specifies an ATM interface and enters interface configuration mode.
Step 2	Switch(config-if)# atm auto-configuration	Enables ILMI autoconfiguration, including determination of interface protocol, version, and side.
Step 3	Switch(config-if)# atm address-registration	Configures ILMI address registration for a specified interface.
Step 4	Switch(config-if)# atm ilmi-keepalive [<i>seconds</i>] [<i>retry number</i>]	Configures ILMI keepalive.



Note

If the ILMI VC (by default VCI = 16) is disabled, then the ILMI is disabled.

Examples

The following example shows how to enable ILMI autoconfiguration on ATM interface 3/0/3:

```
Switch(config)# interface atm 3/0/3
Switch(config-if)# atm auto-configuration
```

The following example shows how to enable ATM address registration on ATM interface 3/0/3:

```
Switch(config)# interface atm 3/0/3
Switch(config-if)# atm address-registration
```



Note

If you use the **no atm address-registration** command to disable ILMI on this interface, the keepalives and responses to incoming ILMI queries continue to function. If you want ILMI to be completely disabled at this interface, use the **no atm ilmi-enable** command.

The following example shows how to configure the ILMI ATM interface 3/0/3 with a keepalive time of 20 seconds and retry count of 3:

```
Switch(config)# interface atm 3/0/3
Switch(config-if)# atm ilmi-keepalive 20 retry 3
```

In this example, the peer network element is polled every 20 seconds.

Proceed to the following section to confirm the ILMI interface configuration.

Configuring Per-Interface ILMI Address Prefixes

The ATM switch router allows configuration of per-interface ILMI address prefixes, so different address prefixes can be registered with end systems attached to different interfaces. When any per-interface ILMI address prefixes are configured, they override the prefix(es) derived from the first 13 bytes of the switch ATM address(es) for that specific interface.

Multiple ILMI address prefixes can be configured on each interface; for example, during ATM address migration.

To configure a per-interface ILMI address prefix, perform the following tasks, beginning in global configuration mode:

	Command	Purpose
Step 1	Switch(config)# interface atm <i>card/subcard/port[,vpt#]</i> Switch(config-if)#	Specifies an ATM interface and enters interface configuration mode.
Step 2	Switch(config-if)# atm prefix <i>13-byte-prefix</i>	Configures the ILMI address prefix.

Examples

The following example shows how to change the ATM address of the switch from the autoconfigured address 47.0091.8100.0000.0041.0b0a.1081.0041.0b0a.1081.00 to the new address 47.0091.8100.5670.0000.0000.1122.0041.0b0a.1081.00:

```
Switch(config)# atm address 47.0091.8100.5670.0000.0000.1122...
Switch(config)# no atm address 47.0091.8100.0000.0041.0b0a.1081...
```

The following example shows how to configure an additional ATM address manually, or address prefix 47.0091.8100.0000.0003.c386.b301 on ATM interface 0/0/1:

```
Switch(config)# interface atm 0/0/1
Switch(config-if)# atm prefix 47.0091.8100.0000.0003.c386.b301
```

Displaying ILMI Address Prefix

Use the **show atm addresses** command to display the ILMI address prefix configuration for all interfaces or a specific interface.

To display the ILMI address prefix configuration for all interfaces, use the following EXEC command:

Command	Purpose
show atm addresses	Displays the interface ILMI address prefix configuration.

Example

The following example shows the ILMI address prefix configuration for all ATM interfaces:

```
Switch# show atm addresses

Switch Address(es):
 47.00918100000000410B0A1081.00410B0A1081.00 active
 47.00918100000000603E5ADB01.00603E5ADB01.00
 47.009181005670000000001122.00400B0A1081.00

Soft VC Address(es):
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.0000.00 ATM0/0/0
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.0000.63 ATM0/0/0.99
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.0010.00 ATM0/0/1
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.0020.00 ATM0/0/2
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.0030.00 ATM0/0/3
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.1000.00 ATM0/1/0
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.1010.00 ATM0/1/1
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.1020.00 ATM0/1/2
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.1030.00 ATM0/1/3
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.8000.00 ATM1/0/0
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.8010.00 ATM1/0/1
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.8020.00 ATM1/0/2
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.8030.00 ATM1/0/3
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.9000.00 ATM1/1/0
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.9010.00 ATM1/1/1
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.9020.00 ATM1/1/2
 47.0091.8100.0000.0041.0b0a.1081.4000.0c80.9030.00 ATM1/1/3

ILMI Switch Prefix(es):
 47.0091.8100.0000.0041.0b0a.1081
 47.0091.8100.0000.0060.3e5a.db01
 47.0091.8100.5670.0000.0000.1122

ILMI Configured Interface Prefix(es):

LECS Address(es):
```

Displaying the ILMI Interface Configuration

To show the ILMI interface configuration, use the following EXEC command:

Command	Purpose
show atm ilmi-status atm <i>card/subcard/port</i>	Shows the ILMI configuration on a per-port basis.

Example

The following example displays the ILMI status for ATM interface 3/0/0:

```
Switch# show atm ilmi-status atm 3/0/0

Interface : ATM3/0/0 Interface Type : Private NNI
ILMI VCC : (0, 16) ILMI Keepalive : Disabled
Configured Prefix(s) :
47.0091.8100.0000.0003.c386.b301
```

Configuring ATM Address Groups

ATM address groups allow more than one interface to have the same ATM address. These multiple connections provide load balancing for traffic from an end station.

Configure the interfaces in a group by performing the following tasks, beginning in global configuration mode:

	Command	Purpose
Step 1	Switch(config)# interface atm <i>card/subcard/port[,vpt#]</i> Switch(config-if)#	Specifies an ATM interface and enters interface configuration mode.
Step 2	Switch(config-if)# atm interface-group <i>number</i>	Configures the ATM address group.

Example

The following example shows how to configure ATM interface 1/1/0 and ATM interface 3/0/1 in ATM address group 5:

```
Switch(config)# interface atm 1/1/0
Switch(config-if)# atm interface-group 5
Switch(config-if)# exit
Switch(config)# interface atm 3/0/1
Switch(config-if)# atm interface-group 5
```


Displaying ATM Address Group Configuration

To determine if an interface is a member of an ATM address group, use the following privileged EXEC command:

Command	Purpose
show running-config interface atm <i>card/subcard/port</i>	Shows the ILMI configuration on a per-port basis.

Example

The following example shows the ATM address group configuration for ATM interface 1/1/0 and ATM interface 3/0/1:

```
Switch# show running-config interface atm 1/1/0
Building configuration...

Current configuration:
!
→ interface ATM1/1/0
   no ip address
   no ip directed-broadcast
   no atm ilmi-keepalive
   atm prefix 47.0091.8100.5670.0000.0000.1122...
→ atm interface-group 5
   clock source free-running
end
Switch# show running-config interface atm 3/0/1
Building configuration...

Current configuration:
!
→ interface ATM3/0/1
   no ip address
   no ip directed-broadcast
   no atm ilmi-keepalive
   atm prefix 47.0091.8100.5670.0000.0000.1122...
→ atm interface-group 5
   clock source free-running
end
```

