

Configuring ILMI

This chapter describes the Interim Local Management Interface (ILMI) protocol implementation within the Lightstream 1010 ATM switch. The Lightstream 1010 uses ILMI to automatically identify which of its interfaces are User-Network Interface (UNI), attached to ATM end-systems, and which are Network-to-Network Interface (NNI), attached to other systems. It can also differentiate between private and public network links. This information is used by the ATM routing protocols, Private Network-to-Network Interface (PNNI) and Interim Interswitch Protocol (IISP), to automatically discover and bring up a network of interconnected LightStream 1010 switches.

The ILMI protocol is also used for the following:

- ATM address registration across an ATM UNI
- Configuring ATM end-systems with ATM address prefixes
- Allowing the switch to discover the 48-bit MAC addresses of the attached systems

ILMI reduces the need for manual configuration of attached end-systems, and is important in the plug-and-play operation of Lightstream 1010 based networks. ILMI is also used to inform LANE clients of the location of the LANE Configuration Server (LECS). ILMI on the LightStream 1010 also allows the switch to provide Cisco ATM adapters with the address of an Internet protocol (IP) over ATM (RFC 1577) Address Resolution Protocol (ARP) server. This allows plug-and-play operation of ATM desktops.

Two tasks will be described in the following sections:

- Configure the Global ILMI System
- Configure an ILMI Interface

Configure 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.

Configure the ATM Address

The LightStream 1010 ATM Switch is autoconfigured with an ATM address using a hierarchical addressing model similar to the Open System Interconnect (OSI) network service access point (NSAP) addresses. PNNI uses this hierarchy to construct ATM peer groups. ILMI uses the first 13 bytes of this address as the switch prefix that it registers with end systems.

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

During the initial startup, the LightStream 1010 generates an ATM address using the defaults described in the section “ATM Address Configuration” in the chapter “Initially Configuring the LightStream 1010 ATM Switch.” The switch’s ATM address uses a hierarchical addressing model similar to the Open System Interconnect (OSI) network service access point (NSAP) addresses. PNNI uses this hierarchy to construct ATM peer groups. ILMI uses the first 13-bytes of this address as the switch prefix that it registers with end systems.

For configuration of a new ATM address that replaces the previous ATM address and is used to generate a new PNNI node ID and peer group ID, see the section “Configure PNNI Node” in the chapter “Configuring PNNI.”

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 the ATM address manually, use the following command using the **no** form of this command to disable.

Task	Command
At the privileged EXEC prompt, enter configuration mode from the terminal.	configure ¹ [terminal]
Configure the ATM address for the switch.	atm address atm_address

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference* publication.

Example

The following example adds the ATM address prefix 47.0091.8100.5670.000.0ca7.ce01 and the ellipses (...) add the default MAC address as the last six bytes.

```
Switch(config)#atm address 47.0091.8100.5670.0000.0ca7.ce01...
Switch(config)#
```

Configure per Interface ILMI Address Prefix

The Lightstream 1010 ATM switch allows configuration of per interface ILMI address prefixes. This allows for different address prefixes to 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, use the following command using the **no** form of this command to remove the prefix:

Task	Command
At the privileged EXEC prompt, enter configuration mode from the terminal.	configure ¹ [terminal]
Specify an ATM interface and enter interface configuration mode.	interface atm <i>card/sub_card/port</i>
Configure the ILMI address prefix.	atm prefix <i>13-byte prefix</i>

1. These commands are documented in the *LightStream 1010 ATM Switch Command Reference* publication.

Example

The following example configures the ILMI 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
Switch(config-if)#
```

Display ILMI Address Prefix

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

To display the ILMI address prefix configuration, perform the following task in user EXEC mode:

Task	Command
Display the interface ILMI address prefix configuration.	show atm address

Example

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

```
Switch#show atm address

Switch Address(es):
 47.00918100000000410B0A1081.00410B0A1081.00 active
 47.009181000000000603E5ADB01.00603E5ADB01.00
 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):
Switch#
```

Configure the LAN Emulation Configuration Server Address

Use the following command to configure the LAN Emulation Configuration Server (LECS) address advertised to the directly connected end nodes. Use the **no** form of this command to return to the default configuration.

Task	Command
At the privileged EXEC prompt, enter configuration mode from the terminal.	configure¹ [terminal]
Configure the switch LECS address.	atm lecs-address <i>lecs-address</i> [<i>sequence_number</i>]

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference* publication.

The *sequence_number* provides the position of this address in the ordered LECS address table.

Example

The following example configures the LECS ATM address:

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

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

Displaying the ILMI Global Configuration

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

Task	Command
Display the ATM addresses.	show atm address
Display the ILMI configuration.	show atm ilmi-configuration
Display the ILMI status.	show atm ilmi-status

Examples

The following example displays the LightStream 1010 ATM address and the LECS address:

```
Switch#show atm address

Switch Address(es):
  47.00918100.0000.0000.0ca7.9e01.00000ca79e01.00 active
  88.88888888000000000000000000.000000005151.00

Soft VC Address(es):
  47.0091.8100.0000.0000.0ca7.9e01.4000.0c81.0000.00 ATM2/0/0
  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
Switch#
```

The following example displays the ILMI configuration:

```
Switch#show atm ilmi-configuration

Switch ATM Address (s) :
11223344556677889900112233445566778899000
LECS Address (s):
1122334455667788990011223344556677889900
ARP Server Address (s):
1122334455667788990011223344556677889900
Switch#
```

The following example displays the ILMI status:

```
Switch#show atm ilmi-status

Interface : ATM2/0/0 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
Switch#
```

Configure an ILMI Interface

This section describes configuration of an ILMI interface on a per interface basis. Use the **no** form of the following commands to disable ILMI parameters:

Task	Command
At the privileged EXEC prompt, enter configuration mode from the terminal.	configure ¹ [terminal]
Select interface port.	interface atm <i>card/subcard/port</i> [.vpt#]
Configure the well-known ILMI VPI = 0, VCI = 16.	atm pvc <i>vpi vci</i>
Enable ILMI for a specific interface.	atm ilmi-enable
Configure ILMI address registration for a specified interface.	atm address-registration
Enable ILMI link determination feature.	auto-link-determination
Configure ILMI keepalive.	atm ilmi-keepalive [seconds]

1. This command is documented in the *LightStream 1010 ATM Switch Command Reference* publication.

Note If VPI = 0, VCI = 16 is disabled, then the ILMI is disabled.

The following example enables ILMI on ATM interface 3/0/3:

```
Switch(config)#interface atm 3/0/3
Switch(config-if)#atm ilmi-enable
Switch(config-if)#
```

The following example enables ATM address registration on ATM interface 3/0/3:

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

Note If you use the **no atm address-registration** command to disable ILMI on this interface the keep-alives and responses to incoming ILMI queries will continue to function. If you want ILMI to be completely disabled at this interface, the ILMI permanent virtual channel (PVC) should be disabled.

The following example configures the ILMI ATM interface 3/0/3 with a keepalive time of 20 seconds:

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

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

Note The ILMI keep-alives are only sent if the interface is a UNI (N) or PNNI interface.

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

Displaying the ILMI Interface Configuration

To show the ILMI configuration use the following EXEC mode command:

Task	Command
Show the ILMI configuration on a per port basis.	show atm ilmi-status atm <i>card/sub_card/port</i>

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
Switch#

Switch#
```

