This chapter provides procedures for using CiscoView to perform Asynchronous Transfer Mode LAN Emulation (ATM LANE) configuration on Catalyst 5000 series switches. For LightStream 1010 ATM features, refer to Chapter 6, “ATM Features for the LightStream Switch.”

**Note** The LANE Manager feature allows you to display and configure LANE information on Catalyst 5000 series switches. On Catalyst 3000 series switches, you can only display LANE information with LANE Manager; configuration tools are not available. For this reason, where figures show Create, Configure, Modify, and/or Delete buttons, these buttons may not appear on Catalyst 3000 series switch and LightStream 1010 switch LANE Manager screens.

**Note** Where windows display optional fields, you can either enter a value or leave the field blank so the device automatically generates the value.

### Creating a LANE Configuration Task List

Before you begin LANE configuration, you must decide whether you want to set up one or multiple ELANs. If you set up multiple ELANs, you must decide where the LESs and LECs will be located, and whether to restrict the LECs that can belong to each ELAN. Proceed to configure LANE.

Only the tasks pertaining to configuring Catalyst 5000 series switch are provided in the following sections.
Creating a LANE Configuration Task List

**Note** Follow the tasks in the order listed to make maximal use of a Catalyst 5000 series switch to display ATM addresses. Displaying the ATM addresses of LESs and LECs as you configure them can save you the time and effort of computing the addresses. These savings can be considerable when you set up the LECS Database—especially for ELANs with restricted membership. Restricted membership means the LEC which asked to join this ELAN, must pass other restrictions on this ELAN. The other restrictions are defined in the LECS Database.

To configure LANE, complete these steps:

**Step 1** Review the following sections before proceeding:

- LANE Interface and Subinterface Rules
- LANE Configuration Notes for the ATM Module
- Before You Begin

**Step 2** Create a LANE plan. Draw up a plan and a worksheet for your own LANE scenario. Determine the LANE components to use, their locations, their associated VLANs, and the necessary redundancy features. Leave space for noting the ATM address of each LANE component on each subinterface of each participating device.

Your plan should include the following information:

- Catalyst 5000 series switch interface where the LECS will be located
- Catalyst 5000 series switch interface and subinterface where the LES and BUS for each ELAN will be located
- Catalyst 5000 series switch ATM modules, subinterfaces, and VLANs where the LECs for each ELAN will be located
- The name of the default ELAN in the LECS Database (optional)

**Step 3** Decide whether to set up one or multiple ELANs. If you set up multiple ELANs, decide where the LES/BUSs and LECs will be located and whether you will restrict membership of the LECs that can belong to each ELAN.
Note You can configure some ELANs with unrestricted membership and some with restricted membership. You can also configure a default ELAN, which must have unrestricted membership.

Restricted membership means the LEC that asked to join this ELAN, must pass other restrictions on this ELAN. The other restrictions are defined in the LECS Database. Unrestricted membership means any LEC can ask to join this ELAN.

Refer to “Setting Up the Database for Restricted-Membership LANs,” in this chapter for additional information.

Step 4 Perform the steps listed in the section, “Configuring a LANE” to configure the LANE.

Step 5 Perform the steps listed in the section, “Checking ATM Configuration” to check the configuration.

LANE Interface and Subinterface Rules

The following rules apply to assigning LANE components to the major ATM interface and its subinterfaces:

- The LECS is always assigned to the major interface.
- The assignment of any other component to the major interface is identical to assigning that component to the .0 subinterface.
- The LES and the LEC of the same ELAN can be configured on the same subinterface.
- The LECs of two different ELANs cannot be configured on the same subinterface.
- The LESs of two different ELANs cannot be configured on the same subinterface.
- Multiple LES, BUS, and LECS can exist for the same ELAN, providing redundancy.
LANE Configuration Notes for the ATM Module

The following configuration notes describe the configuration of a LANE on Catalyst 5000 series switches:

- For LANE configuration with an ATM module installed in a Catalyst 5000 series switch, LECs are automatically activated for configured VLANs.

- Catalyst 5000 series and Catalyst 3000 series switches use Interim Local Management Interface (ILMI) to activate and configure the ATM module. If ILMI is enabled on the ATM module and on the connected equipment, a link is created automatically. If ILMI is not active, the LEC address and the ATM address prefix for the module will have to be configured in the appropriate configuration menus.

- LECs are activated on an as-needed basis. For every VLAN in Catalyst 5000 series and Catalyst 3000 series switches stack with ports assigned to it, an LEC is activated on Catalyst 5000 series and Catalyst 3000 series switch ATM module for that VLAN. The LEC joins that ELAN on the ATM cloud with the same name as the VLAN name.

- BUSs are created automatically when the LES is created.

- By default, when a VLAN is assigned ports in Catalyst 5000 series switch, the LEC for a VLAN is activated and then joined to the corresponding ELAN on the cloud. With a Catalyst 5000 series switch ATM module, there is an option to allow or disallow the module from joining a particular ELAN simply by omitting the VLAN from the list of VLANs specified in the Trunk Allowed VLANs field.

- Catalyst 5000 series and Catalyst 3000 series switch ATM module establishes ATM channels on VPI=0 (zero) only. The ATM User-Network Interface (UNI) port on Catalyst 5000 series switch must be configured to use 0 (zero) bits for VPI usage and 11 bits for VCI usage.

- The VLAN name on Catalyst 5000 series switch must match exactly with the corresponding ELAN name setup on an LES or Catalyst 5000 series switch fails to connect to the network.

- The ATM LANE module has the following default configurations:
  - The ILMI and signaling permanent virtual circuits (PVCs) are set up.
  - A default LECS Database is provided with the ATM module. This can be used as is or modified to better suit network needs.
— No LANE is configured.
— Nonvolatile random-access memory (NVRAM) contains no configuration information.

• The ATM LANE module does the following:
  — Provides a default LECS Database
  — Configures the LECS ATM address
  — Sets up and starts LECs
  — Associates the LECS with ELAN

Configuring a LANE

Note  This section applies only to Catalyst 5000 series switches equipped with ATM module(s).

This section contains instructions for configuring a LANE, and includes the following sections:
• “Before You Begin”—some helpful information to be noted prior to configuring LANE
• “Procedures”—step-by-step instructions for configuring a LANE, and includes the following:
  — Setting Up the LECS
  — Setting Up the LES/BUS
• “Checking ATM Configuration”—instructions for checking the configuration
Before You Begin

Before you begin implementing LANE, be aware of the following:

- All ATM switches should have identical lists of the global LECS addresses in the identical priority.
- The operating LECSs must use an identical configuration database.
- In an underlying ATM network failure, there can be multiple master LECs and multiple active LESs for the same ELAN, yielding a partitioned network. The LECs will continue to operate normally, but transmission between different partitions of the network is not possible. The system recovers when the network break is repaired.
- The LANE subsystem can handle up to 16 LECS addresses.
- The number of LESs that can be defined per ELAN is unlimited.
- When an LECS switchover occurs, no previously joined LECs are affected.
- In an LES/BUS switchover, there is a momentary loss of LECs until all LECs are transferred to the new LES/BUS.
- LECSs automatically come up as masters until a higher level LECS tells them otherwise.
- A higher priority LES coming online bumps the current LES off the same ELAN. For a short time after a power on, there might be some changing of LECs from one LES to another, depending upon the order of the LESs coming up.
- If no specified LESs are up or connected to the master LECS, and more than one LES is defined for an ELAN, the LECS rejects any configuration request for that specific ELAN.
- Changes made to the list of LECS addresses on ATM switches can take up to 1 minute to propagate through the network. Changes made to the database regarding LES addresses take effect almost immediately.
- If no designated LECSs are operational or reachable, the ATM Forum-defined “well-known” LECS address is used.
ATM Addresses

You can display the default ATM addresses for the LECS, LES, BUS, and LEC. Perform these steps:

**Step 1** Display the default LANE address and write down the address on the worksheet. Following is a list of locations for address information:

(a) LECS—go to the LECS Configuration window and write down the address listed in the Actual LECS Address: field.

(b) LES/BUS—go to the LES/BUS Configuration window and write down the address listed in the Actual LES, BUS ATM Addresses: field.

(c) LEC—go to the LEC Details window and write down the address listed in the LEC ATM Address: field. To display the MAC address, click **Address Mapping**, and write down the MAC address.

**Step 2** Repeat Step 1 for each switch that participates in LANE and write down the displayed addresses on the worksheet.

**Step 3** Click **Cancel** to exit the window.

Procedures

This section contains instructions for performing the following:

- Setting Up the LECS
- Setting Up the LES/BUS
- Checking ATM Configuration

Setting Up the LECS

On any Catalyst 5000 series switch, you can set up one or multiple LECS for multiple ELANs. You can set up an LECS for a given ELAN on any Catalyst 5000 series switch you choose to participate in that ELAN. After you set up the interface for the VLAN, you must link the VLAN number with the ELAN name.
One LECS for One ELAN
To set up only an LECS for an ELAN, perform the following steps:

**Step 1**  From the LECS Management window, select the default database and click **Create**. The LECS Creation window opens.

**Step 2**  Specify the configuration for the LECS, including the following:
- Interface
- LECS Database (you may use the default database or choose a name from the database table)
- LECS administrative status
- LECS master state
- (Optional) LECS address and LECS address mask

**Step 3**  Click **Create** to commit the input(s).

**Step 4**  Click **Cancel** to exit the window.

One LECS for Multiple ELANs
To configure a switch as the LECS for multiple ELANs with unrestricted membership, complete the following steps:

**Step 1**  From the LECS Management window, select the default LECS Database and click **Configuration**. The LECS Configuration window opens.

**Step 2**  Click **LECS Database**. The LECS Database window opens.

**Step 3**  Click **Configuration**. The Database Configuration window opens.

**Step 4**  Create a named database for the LECS and click **Modify** to commit the name.

**Step 5**  Click **Cancel** to exit the window and return to the Database Configuration window.

**Step 6**  Select the LES category and click **Configuration**. The Database Configuration—LES Category window opens.
Note In Steps 7 and 8, enter the ATM address of the LES for the specified ELAN, as noted in the worksheet and obtained in the section, “ATM Addresses.”

Step 7 Bind the name of the first ELAN to the ATM address of the LES for that ELAN.
Step 8 Bind the name of the second ELAN to the ATM address of the LES.
Step 9 Repeat Steps 7 and 8, providing a different ELAN name and an ATM address for each additional ELAN in this switch cloud.
Step 10 (Optional) Specify a default ELAN for LECs not explicitly bound to an ELAN.
Step 11 Click Modify to commit the input in the window and exit the window.

Setting Up the Database for Restricted-Membership LANs
When the database is set up for restricted-membership ELANs, create database entries that link the name of each ELAN to the ATM address of its LES.

However, you may choose not to specify where the LECs are located. That is, when setting up the LECS Database, you do not have to provide any database entries that link the ATM or MAC addresses of any LECs with the ELAN name.

Those LEC database entries specify the LECs allowed to join the ELAN. When an LEC requests the LECS to indicate which ELAN it is to join, the LECS consults its database and then responds as configured.

When LECs for the same restricted-membership ELAN are located in multiple switches, each LEC ATM or MAC address must be linked explicitly with the name of the ELAN. As a result, configure as many LEC entries (at Step 4, in the following procedure) as there are LECs for ELANs. Each LEC has a different ATM address in the database entries.

To set up the LECS for ELANs with restricted membership, perform the following steps:

Step 1 From the LECS Management window, click Database. The LECS Database window opens.
Step 2 Click Create. The LECS Database Creation window opens.
Step 3 Create a named database for the LECS, click Create to commit the name, exit the window and return to the LECS Database window.
Configuring a LANE

Step 4  Click **Configuration** and select the LES category. The Database LES Configuration window opens.

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**Note**  In Steps 5 and 6, enter the ATM address of the LES for the specified ELAN, as noted in the worksheet and obtained in the section, “ATM Addresses.”

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Step 5  Use **Create** to bind the name of the first ELAN to the ATM address of the LES for that ELAN.

Step 6  Bind the name of the second ELAN to the ATM address of the LES.

Step 7  Repeat Steps 6 and 7, providing a different ELAN name and an ATM address, for each additional ELAN in this switch cloud.

Step 8  (Optional) Specify a default ELAN for LECs not explicitly bound to an ELAN.

Step 9  Add a database entry associating a specific LEC ATM address with a specific restricted-membership ELAN.

Step 10 Click **Modify** to commit the input in the window and exit the window.

Step 11 Repeat Steps 4 through 11 for each LEC with restricted-membership ELANs on this switch cloud. Specify the LEC ATM address and the name of the ELAN with which it is linked.

Setting Up the LES/BUS

For each switch that participates in LANE, you must set up the necessary LES for each ELAN. BUSs are created automatically when the LES is created.

Once the LES and BUS have been set up, display and record the LES and BUS ATM addresses. Be sure to keep track of the interface where the LECS will eventually be located.

If there is only one default ELAN, you need to set up only one LES. If multiple ELANs are required, set up the LES for another ELAN on a different subinterface on the same interface—or place it on a different switch.
To set up the LES/BUS for an ELAN, complete the following steps:

**Note** If the ELAN in Step 2 has restricted membership, you might not want to specify the name here. You need to specify the name in the LECS Database when it is set up. However, if you link the LEC to an ELAN in Step 2 and, through some mistake, it does not match the database entry linking the LEC to an ELAN, this LEC will not be allowed to join this ELAN or any other.

If you decide to include the name of the ELAN linked to the LEC and later want to associate that LEC with a different ELAN, make the change in the LECS Database before you make the change for the LEC on this subinterface.

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**Step 1** From the LES/BUS Configuration window, click **Create**. The LES/BUS Creation window opens.

**Step 2** Specify the parameters for the first ELAN.

**Step 3** Click **Create** to commit the change(s).

**Step 4** Repeat Steps 2 and 3 for all other ELANs on this module.

**Step 5** Click **Cancel** to exit the window.

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**Checking ATM Configuration**

Follow these steps to confirm configuration has been completed correctly.

**Step 1** Select a module, and then select **Configure>card**. The Physical category information for the module is displayed. Verify the model displayed and the status fields associated with the model are correct.

**Step 2** Select a port, and then select **Configure>port**. The Physical category information for the port is displayed. Verify the status fields associated with the port are correct.
Step 3  Select an ATM port, and then select **Configure>port**. The Physical category information for the port is displayed. Verify the ATM address information is displayed. Then, from the ATM Configuration menu, select the ELAN Table submenu and verify information on configured ELANs.

Step 4  Return to the CiscoView Main menu. Choose the Statistics menu. Display the message log information for the switch. Pay special attention to ATM type messages recorded in the log. If possible, screen capture the message log or make note of ATM related messages for future references.

Step 5  Clear the message log buffer using the Clear Logs command at the bottom of the message display log screen.

Step 6  If necessary, reconnect Catalyst 5000 series switch back into your network topology and channel the normal data flow back to them. If reconnecting the switches into your network, be sure the link LEDs are lit for each of the connected 10BaseT ports.

Step 7  Check your network health monitoring equipment (if available) to ensure the network is running cleanly. Check attached network devices for any obvious signs that the flow of data is being impeded.

Step 8  From each Catalyst 5000 series switch containing ATM modules, log back into the console, go to the Statistics menu, and display the message log. Pay special attention to ATM specific messages. Compare the ATM specific messages present in the log to the messages previously recorded. If needed, consult with Cisco support for an explanation of the different messages and their importance. Click **Return** to exit the display and return to the Statistics menu. Repeat this for each switch.

Step 9  From the CiscoView Main menu, select the whole device, select **Configure>device**, and access each of the Table categories to verify the address tables on each Catalyst 5000 series switch.

Step 10 Check the health of the network and the message log on each Catalyst 5000 series switches involved. If you see any irregularities are seen, investigate them immediately and, if needed, contact Cisco support.
Monitoring and Maintaining the LANE Components

After configuring LANE components on an interface or any of its subinterfaces, on a specified subinterface, or on an ELAN, display the LANE component status.

To show LANE status, perform the following steps:

**Step 1** From the LECS Management window, click **VC Connection** to display the LES/BUS Creation window for the LECS configured on any interface. Due to space limitations, the ATM addresses for both parties of a selected VC Connection entry are displayed when you click **Details** in the LES/BUS Creation window. This displays the LES/BUS Creation window.

**Step 2** From the LECS Management window, click **Creation** to display the LES/BUS Creation window, and then click **LECS Database** to display the LECS Database window. From the LECS Database window, select each of the categories to display the configuration window for each category.

**Step 3** From the CiscoView Main menu, select the device, and then select **Configure>device>ARP Table category** to display the LANE ARP table of the LEC configured on the specified subinterface or ELAN.